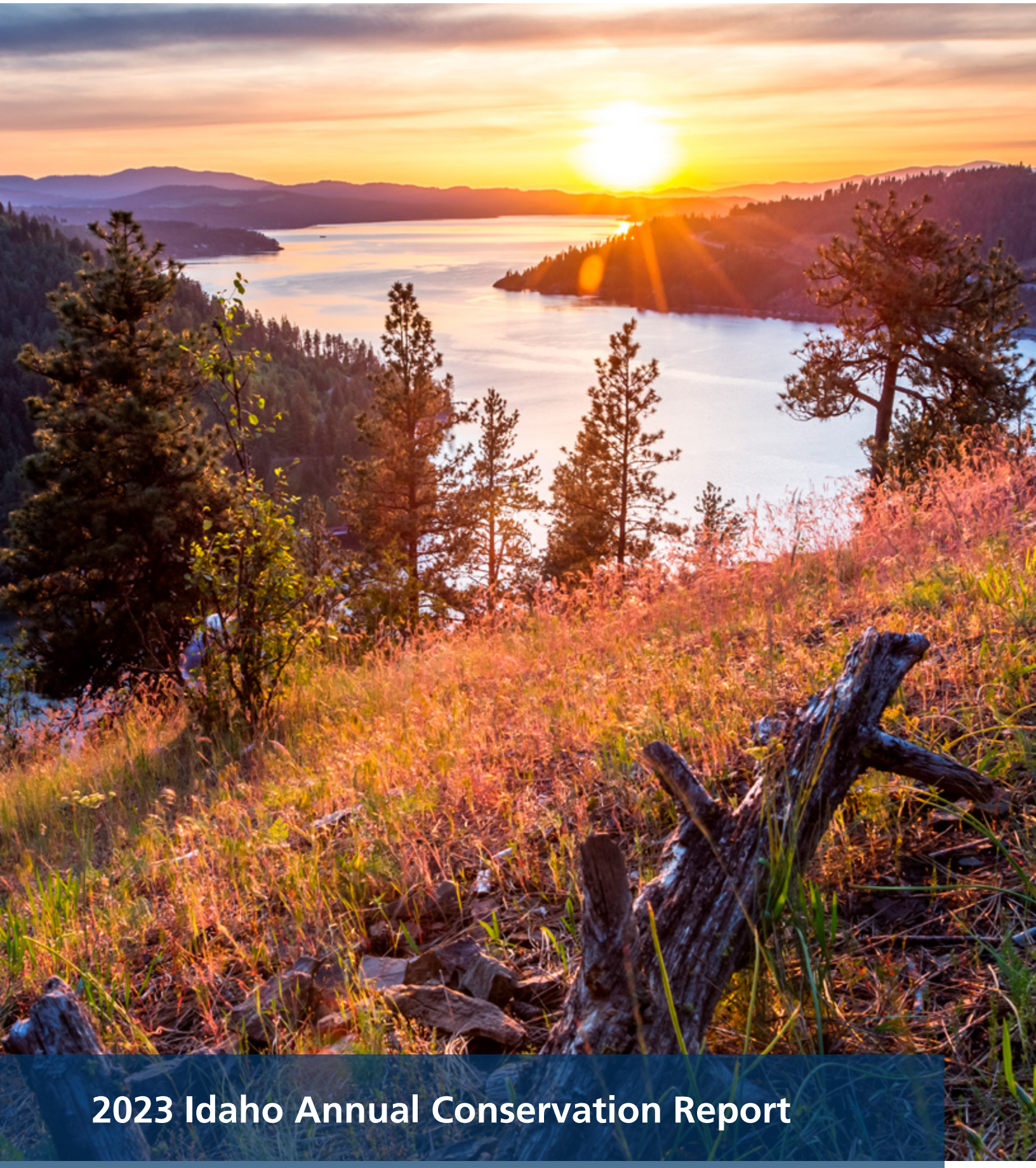


2023 Idaho Annual Conservation Report

July 31, 2024

All forward-looking statements contained in this document are based on underlying assumptions (many of which are based, in turn, upon further assumptions). These statements are subject to a variety of risks, uncertainties, and other factors. Most of these factors are beyond our control and may have a significant effect on our operations, results of operations, financial condition, or cash flows, which could cause actual results to differ materially from those anticipated in our statements.

Such risks, uncertainties, and other factors include, among others, those in our most recent annual report on Form 10-K, or quarterly report on Form 10-Q, filed with the Securities and Exchange Commission. Those reports are available on our website at avistacorp.com.

Front cover: Mineral Ridge, Lake Coeur d'Alene, Idaho

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES AND SUPPLEMENTS

Route of the Hiawatha Trail, Idaho

INTRODUCTION

For more than four decades, Avista has served its communities by developing and implementing reliable and cost-effective energy-efficiency programs. This *2023 Annual Conservation Report* provides a summary of Avista's efforts to support customer energy needs for residential and commercial customers across the company's service territory. Avista's efficiency programs help customers discover innovative ways to conserve energy, live more comfortably, operate businesses with more efficiency, and save money – all while continuing to be a least-cost resource for the company.

In 2023, customers in Avista's service territory took advantage of efficiency programs and services at participation rates similar to pre-pandemic rates. While customers and contractors continued to report some supply chain constraints and labor shortages, program participation had a strong recovery, particularly in the fourth quarter of the year. One factor driving this increase in engagement was customer participation in Avista's innovative new program offerings in 2023 – specifically the Midstream and Small-Business Direct-Install Lighting Programs. Avista programs continue to focus on affordability and flexibility, with a large emphasis on customer-centered energy solutions.

In addition to a portfolio of programs implemented by Avista and third-party contractors, the company continues to support regional market transformation efforts through the Northwest Energy Efficiency Alliance (NEEA). Reported conservation energy savings, cost-effectiveness, and other related data, however, are specific to local programs unless otherwise noted.

FIGURE 1 – ELECTRIC AND NATURAL GAS SERVICE AREAS

TARIFF RIDER BALANCES

At the start of 2023, the Idaho electric and natural gas (aggregate) tariff rider balances were overfunded by nearly $5 million. During the year, approximately $10.8 million in tariff rider revenue was collected to fund energy efficiency, while over $11.3 million was expended to operate energy-efficiency programs. The $570,000 excess of expenditures over collections contributed to the decrease in the overfunded balance of the tariff riders, resulting in an overfunded balance close to $4.4 million by year-end.

Table 1 illustrates the 2023 tariff rider activity by fuel type.

TABLE 1 – TARIFF RIDER ACTIVITY

	Electric	Natural Gas	Total
Beginning Balance (Underfunded)/Overfunded	**$ 6,812,862**	**$ (1,823,835)**	**$ 4,989,027**
Energy-Efficiency Funding	$ 6,688,244	$ 4,062,642	$ 10,750,886
Net Funding of Operations	$ 13,501,106	$ 2,238,807	$ 15,739,913
Energy-Efficiency Expenditures	$ 9,137,460	$ 2,186,149	$ 11,323,609
Ending Balances (Underfunded)/Overfunded	**$ 4,363,646**	**$ 52,658**	**$ 4,416,304**

IDAHO ACHIEVEMENTS

- ***Electric Conservation:*** For 2023, Avista's electric Energy-Efficiency Program achieved 15,530,289 kWh of conservation from local programs.
- ***Natural Gas Conservation:*** For 2023, Avista's natural gas Energy-Efficiency Program achieved 231,497 therms of conservation from local programs.
- ***NEEA Conservation:*** An additional 5,992 MWh were conserved through the Northwest Energy Efficiency Alliance (NEEA) program, resulting in overall electric savings of 21,523 MWh; an additional 217,045 therms led to an overall natural gas savings of 448,542 therms.

Note: This *Annual Conservation Report* is intended to provide information on Avista's local programs and therefore will consistently refer to the local achievement of 15,530,289 kWh for electric and 231,497 therms for natural gas. Values shown in total will not always equal the sum of the column in presentation charts due to rounding.

Portfolio Trends

Avista's electric energy savings achieved in 2023 were higher than in 2022 (15,530,289 kWh vs 14,927,336 kWh). This gain was due mainly to increases in savings through the Prescriptive Lighting Program, which rose 24 percent between 2022 and 2023 and accounted for 51 percent of overall program savings.

TABLE 2 – ELECTRIC ENERGY SAVINGS (KWH)

Customer Segment	2022	2023
Residential (Inclusive of Low-Income Programs)	1,219,172	1,898,530
Commercial/Industrial	13,708,164	13,631,759
Total	**14,927,336**	**15,530,289**

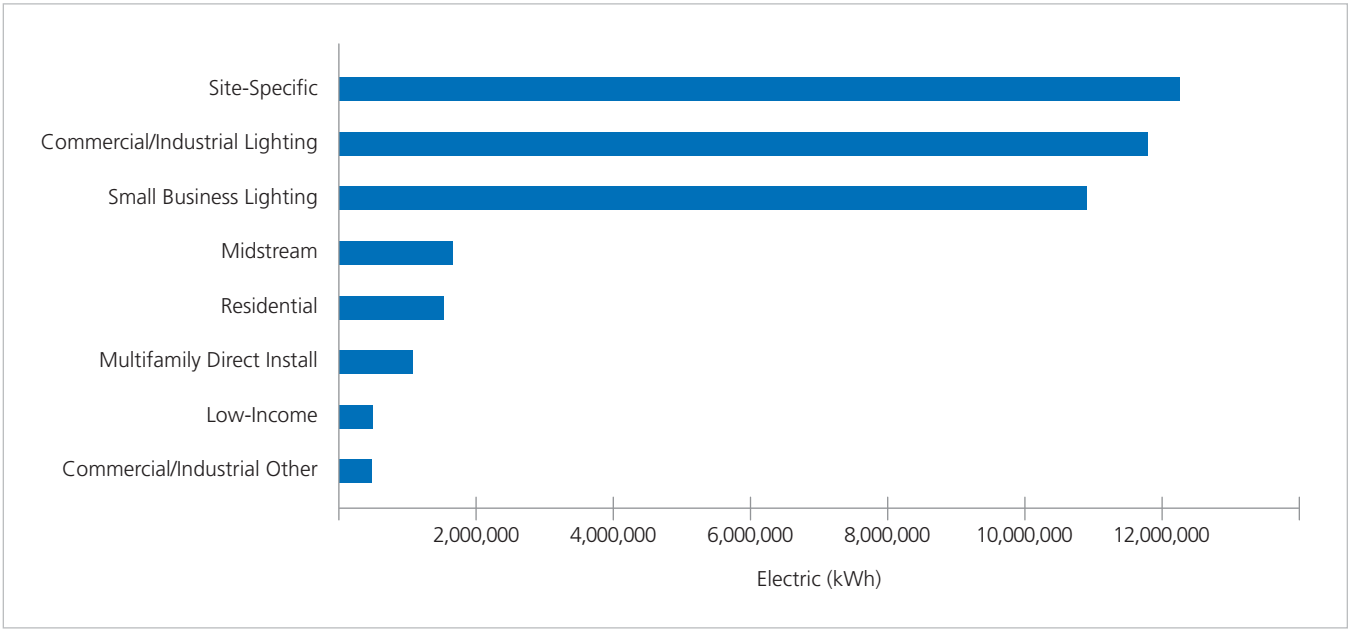
As shown in Table 3, Avista's natural gas portfolio decreased in savings in 2023 compared to the prior year. While the commercial/industrial savings increased by 60 percent, the residential portfolio decreased significantly. This was largely due to a 60 percent reduction in savings from the HVAC Program.

TABLE 3 – NATURAL GAS ENERGY SAVINGS (THERM)

Customer Segment	2022	2023
Residential	268,369	169,490
Commercial/Industrial	37,961	62,007
Total	**306,330**	**231,497**

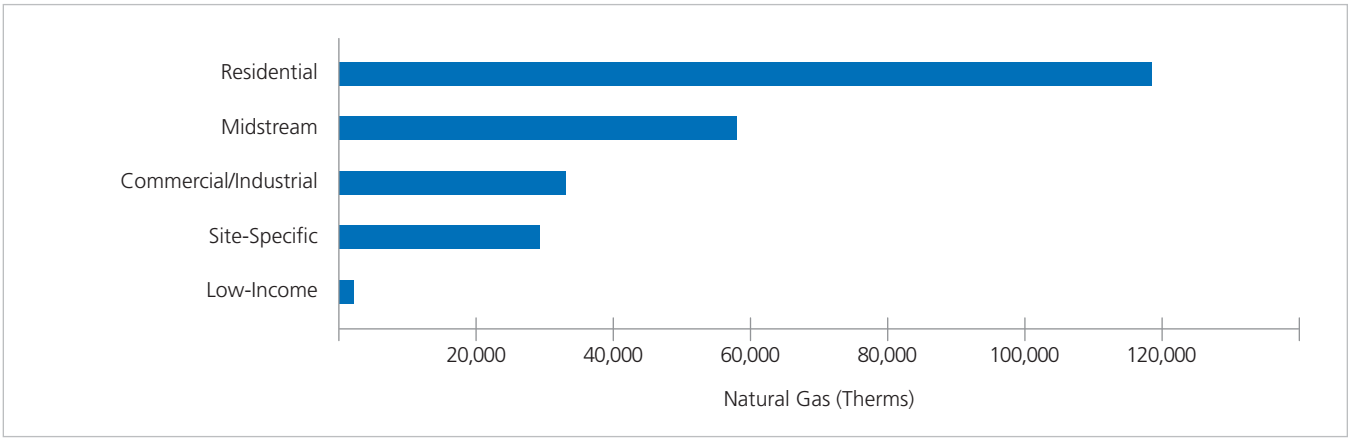
Of Avista's overall electric portfolio, the commercial/industrial Prescriptive Lighting Program and Small Business Lighting Program obtained 70 percent of the savings in 2023. All other programs combined achieved the remaining 30 percent (see Figure 2).

FIGURE 2 – ELECTRIC SAVINGS PORTFOLIO



Of Avista's overall natural gas savings portfolio, residential HVAC and Midstream Program obtained 58 percent of the savings in 2023 (see Figure 3).

FIGURE 3 – NATURAL GAS SAVINGS PORTFOLIO



Verified Savings

Avista's targets are set through the *Integrated Resource Plan* (*IRP*) process. Targets for 2023 were 14,970 MWh and 465,478 therms.

For the 2023 electric target, Avista chose to use the conservation potential assessment (CPA) obtained from its 2021 electric *IRP* as the basis for its *Annual Conservation Plan* (*ACP*) savings goals and targets. The company's 2023 conservation acquisition target identified in its *IRP* was 14,970 MWh of qualifying energy efficiency in Idaho.

The 2023 natural gas target of 465,478 therms was identified in the 2021 natural gas *IRP* and was used to establish the targets for each program in the natural gas portfolio.

In 2023, the electric energy-efficiency portfolio achieved first-year annual energy savings of 15,530 MWh (21,523 MWh inclusive of NEEA) and natural gas savings of 230,111 therms (447,156 therms inclusive of NEEA). Based on the target established in the electric and natural gas *IRP*s, Avista achieved 104 percent (144 percent inclusive of NEEA) of the electric savings target and 49 percent (96 percent inclusive of NEEA) of natural gas.

Table 4 shows 2023 savings by fuel and sector. The Idaho electric portfolio achieved an overall 91 percent realization rate.

TABLE 4 – ENERGY EFFICIENCY SAVINGS BY SECTOR – ELECTRIC

Sector	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Commercial/Industrial	14,276,472	13,631,759	95%
Residential	2,614,744	1,727,219	66%
Low-Income	223,111	171,311	77%
Total	**17,114,327**	**15,530,289**	**91%**

The Idaho natural gas portfolio achieved an overall realization rate of 70 percent, as shown in Table 5.

TABLE 5 – ENERGY EFFICIENCY SAVINGS BY SECTOR – NATURAL GAS

Sector	Reported Savings (Therms)	Evaluated Savings (Therms)	Realization Rate
Commercial/Industrial	67,047	62,007	92%
Residential	262,607	167,465	64%
Low-Income	2,136	2,025	95%
Total	**331,790**	**231,497**	**70%**

Expenditures

As part of Avista's annual business planning process, the company sets an expectation for operational planning, pursuing all cost-effective measures under Tariff Schedules 90 and 190. Since customer incentives are the largest component of expenditures, customer demand can easily affect the funding level of the tariff riders. Table 6 provides a detailed comparison of budgeted to actual energy-efficiency expenditures by fuel type.

TABLE 6 – ANNUAL CONSERVATION PLAN BUDGET TO ACTUAL EXPENDITURES COMPARISON

	Electric	Natural Gas
Projected 2023 Expenditures		
Incentives Budget	$ 4,354,990	$ 2,819,450
Non-Incentives and Labor	$ 1,092,851	$ 98,357
NEEA, CPA, EM&V	$ 500,040	$ 45,004
Total Budgeted Expenditures	**$ 5,947,881**	**$ 2,962,810**
Actual 2023 Expenditures		
Incentives	$ 5,830,551	$ 1,429,549
Non-Incentives and Labor	$ 2,513,379	$ 474,343
Market Transformation, CPA, EM&V, R&D, Pilot Programs	$ 793,530	$ 282,256
Total Actual Expenditures	**$ 9,137,460**	**$ 2,186,149**
Variance	**$ 3,189,579**	**$ (776,661)**

Table 7 illustrates the top five programs with the highest impact on the expenditure variance.

TABLE 7 – PROGRAMS WITH HIGHEST IMPACT ON EXPENDITURE VARIANCE

Program	Planned	Actual	Variance	Variance Percentage
Small Business Lighting	$ –	$ 1,823,804	$ 1,823,804	–
Commercial/Industrial Prescriptive Lighting	$ 1,392,400	$ 1,969,025	$ 576,625	41%
Residential Midstream – Electric	$ 96,381	$ 115,290	$ 18,909	20%
Commercial HVAC – Electric	$ 1,950	$ 8,500	$ 6,450	331%
Commercial Prescriptive Shell – Electric	$ 5,680	$ 2,423	$ (3,258)	(57)%

EVALUATION APPROACH

Evaluation is a critical component of any successful energy conservation program; Avista employs evaluation, measurement, and verification (EM&V) protocols to validate and report verified energy savings related to its energy-efficiency measures and programs. Those protocols include the comprehensive analyses and assessments necessary to supply useful information to both management and stakeholders. (EM&V includes impact and process, and taken as a whole, is analogous with industry standard terms such as portfolio evaluation or program evaluation.)

Program evaluations are generally conducted by third-party EM&V firms, selected on a biennial basis through a competitive bidding process managed by Avista's supply chain management group. The scope of work for selected evaluators is defined and managed by the company's planning and analytics team. Third-party evaluators provide recommendations pertaining to specific programs and related processes in impact and process evaluation report outputs. Avista incorporates recommendations to improve program performance, enact changes to programs, and make decisions to phase out programs and measures.

Recommendations from third-party evaluations, as well as the application of lessons learned through each program year, are incorporated into Avista's annual business planning process to further refine program design and improve their chances of success.

For 2023, Avista retained ADM to conduct impact and process evaluations of electric and natural gas programs in the utility's Idaho program portfolio. Evaluations took a portfolio-wide approach to provide a benchmark against which future years can be compared. Impact and process evaluations for most programs were also completed at the program level, so that customer experience could be better delineated and realization rates understood.

Several guiding EM&V documents are maintained and published to support planning and reporting requirements. These include the Avista EM&V framework, an annual EM&V plan, and EM&V contributions within other demand-side management (DSM) and Avista corporate publications. Program-specific EM&V plans are created to inform and benefit the DSM activities. These documents are reviewed and updated as necessary to improve the processes and protocols for energy-efficiency measurement, evaluation, and verification.

EM&V efforts are also used to evaluate emerging technologies and applications in consideration of their inclusion in Avista's energy-efficiency portfolio. In its electric portfolio, Avista may spend up to 10 percent of its conservation budget on programs whose savings impacts have not yet been measured if the overall conservation portfolio passes the applicable cost-effectiveness test. These programs may include educational, behavioral change, and other investigatory projects. Specific activities can include product and application document reviews, development of formal evaluation plans, field studies, data collection, statistical analysis, and solicitation of user feedback.

Both Avista and its customers benefit from activities and resources related to energy efficiency and conservation. To contribute to regional efforts, Avista's Energy Efficiency Engineering Manager has a voting role on the Regional Technical Forum (RTF) – the advisory committee to the Northwest Power and Conservation Council (NPCC) and a primary source of information regarding the standardization of energy savings and measurement processes for electric applications in the Pacific Northwest. This knowledge base provides Avista with energy-efficiency data, metrics, non-energy benefits, and references for inclusion in the company's Technical Reference Manual (TRM) relating to acquisition planning and reporting. Avista also works with other Northwest utilities and NEEA in several pilot projects and subcommittee evaluations; portions of the energy-efficiency savings acquired through the latter's regional programs are attributable to Avista's portfolio.

Evaluation Methodology and Activities

An impact evaluation was performed on each program in the Idaho program portfolio that achieved savings in 2023. Evaluators used the following approaches to calculate energy impact, as defined by the International Performance Measurement and Verification Protocols (IPMVP)[1] and the Uniform Methods Project (UMP)[2]:

- Simple verification (web-based surveys supplemented with phone surveys)
- Document verification (review project documentation)
- Deemed savings (RTF unit energy savings (UES) and Avista TRM values)
- Whole facility billing analysis (IPMVP Option C)

Evaluators completed these tasks for each electric and natural gas impact from projects completed in Avista's Idaho service territory.

The EM&V methodologies are program-specific and determined by previous Avista evaluation methodologies, as well as the relative contribution of a given program to the overall energy-efficiency impacts. In addition to drawing on IPMVP, evaluators also reviewed relevant information on infrastructure, framework, and guidelines set out for EM&V work as defined by several guidebook documents that were published in recent years. These include the following:

- Northwest Regional Technical Forum (RTF)[3]
- National Renewable Energy Laboratory (NREL), United States Department of Energy (DOE) The Uniform Methods Project (UMP): Methods for Determining Energy Efficiency Savings for Specific Measures, April 2013[4]
- International Performance Measurement and Verification Protocol (IPMVP) maintained by the Efficiency Valuation Organization (EVO) with sponsorship by the U.S. Department of Energy (DOE)[5]

Evaluators kept data collection instruments, calculation spreadsheets, and monitored/survey data available for Avista records.

The primary objective of the impact evaluation is to determine ex-post verified net energy savings. This evaluation considers the cyclical feedback loop among program design, implementation, and impact evaluation. Evaluation activities during the evaluation estimate and verify annual energy savings and identify whether a program is meeting its goals. These activities are aimed at providing guidance for continuous program improvement and increased cost effectiveness for future program years.

Evaluators defined three major approaches to determining net savings for Avista's programs:

- A ***Deemed Savings*** approach uses stipulated savings for energy conservation measures where savings values are well-known and documented. These prescriptive savings may also include an adjustment for certain measures, such as lighting measures in which site operating hours may differ from RTF values.

1) https://www.nrel.gov/docs/fy02osti/31505.pdf
2) https://www.nrel.gov/docs/fy18osti/70472.pdf
3) https://rtf.nwcouncil.org/measures
4) Notably, The Uniform Methods Project (UMP) includes the following chapters authored by ADM. Chapter 9 (Metering Cross-Cutting Protocols) was authored by Dan Mort and Chapter 15 (Commercial New Construction Protocol) was Authored by Steven Keates.
5) Core Concepts: International Measurement and Verification Protocol. EVO 100000 – 1:2016, October 2016.

- A ***Billing Analysis*** approach estimates energy savings by applying a linear regression to utility meter billing data for measured participant energy consumption. Billing analyses included billing data from nonparticipant customers. This approach does not require on-site data collection for model calibration, and it aligns with the IPMVP Option C.
- A ***Custom*** approach, used for the Site-Specific Program, selects the appropriate IPMVP option to apply to the specific measure or project. As most projects in the program are lighting retrofits, this is typically Option A. However, Options B, C, and D are also employed, depending upon the project. Specific methods are discussed in each site report.

Evaluators accomplished the following quantitative goals as part of the impact evaluation:

- Verified savings with 10 percent precision at the 90 percent confidence level.
- Applied the RTF to verify measure impacts, where appropriate.
- Conducted billing analysis with a suitable comparison group to estimate measure savings, where available data exists.
- Used IPMVP analysis methods for custom projects.

For each program, evaluators calculated adjusted savings for each measure based on the Avista TRM and results from the database review. They calculated verified savings for each measure based on the RTF UES, Avista TRM, or billing analysis in combination with the results from document review. For the HVAC, Water Heat, Fuel Efficiency, Small Home & Multifamily Weatherization, and Appliances Programs, evaluators also applied in-service rates (ISRs) from verification surveys.

FIGURE 4 – IMPACT EVALUATION METHOD

The evaluators assigned a level of methodological rigor for each measure and program, based on its contribution to the portfolio savings and availability of data.

They analyzed billing data for all electric measure participants in the HVAC and Low-Income Programs. Billing analysis results determined evaluated savings only for measures where savings could be isolated – that is, where enough participants who installed only that measure could be identified. Program-level realization rates for the HVAC, Water Heat, and Fuel Efficiency Programs incorporate billing analysis results for some measures.

Impact Evaluation Results, Portfolio

As a result of the impact evaluation performed, the following realization rates were achieved in the Idaho program portfolio:

- ***Electric***: 91 percent realization rate and 15,530,289 kWh in annual verified savings.
- ***Natural Gas***: 70 percent realization rate and 231,497 therms in annual gross savings.

COST-EFFECTIVENESS

Before implementing any new program, Avista conducts analyses to determine whether that program is cost-effective from both the company's and customers' perspectives. Avista uses four metrics to evaluate cost-effectiveness: the utility cost test (UCT), the total resource cost (TRC), the participant cost test (PCT), and the ratepayer impact test (RIM). For Idaho programs, the UCT is the most important. Avista's cost-effectiveness goal for both the electric and natural gas program portfolios is to have a UCT above 1.00, which indicates that the benefits to the utility exceed the costs of implementing the program. In 2023, the UCT benefit/cost ratios were 1.45 for electric and 1.01 for natural gas.

TABLE 8 – ELECTRIC PORTFOLIO COST-EFFECTIVENESS RESULTS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 18,834,190	$ 15,458,671	1.22
Utility Cost Test (UCT)	$ 11,725,343	$ 8,069,657	1.45
Participant Cost Test (PCT)	$ 22,657,795	$ 7,389,014	N/A*
Ratepayer Impact (RIM)	$ 11,725,343	$ 23,618,605	0.50

* Participant Cost Test is not appropriate to apply to Low Income benefits and costs. These totals include Low Income totals aggregated with Residential and Commercial totals.

TABLE 9 – NATURAL GAS PORTFOLIO COST-EFFECTIVENESS RESULTS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 2,386,009	$ 6,665,220	0.36
Utility Cost Test (UCT)	$ 2,071,628	$ 2,059,959	1.01
Participant Cost Test (PCT)	$ 28,574,595	$ 4,605,261	N/A*
Ratepayer Impact (RIM)	$ 2,071,628	$ 30,320,172	0.07

* Participant Cost Test is not appropriate to apply to Low Income benefits and costs. These totals include Low Income totals aggregated with Residential and Commercial totals.

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COMMERCIAL/INDUSTRIAL SECTOR

Lewiston, Idaho

COMMERCIAL/INDUSTRIAL SECTOR

Overview

The commercial/industrial energy-efficiency market has traditionally been served through a combination of prescriptive and site-specific programs. Any savings measure not offered through the Prescriptive Program path – or that does not meet its parameters – is automatically eligible for treatment through the Site-Specific Program path. In 2023, Avista launched its Midstream Program, which partners with distributors and trade allies to offer incentives to a broader range of customers than the company's programs previously reached. HVAC systems and food service equipment measures now go through the Midstream Program rather than through prescriptive channels.

The Prescriptive Program path remains in Avista's program portfolio for straightforward equipment installations that generally have similar operating characteristics. For example, some lighting equipment and variable frequency drives. Projects can range from small to very large.

In 2023, Avista also launched an innovative direct-install lighting program for small businesses. This program, which offers low- to no-cost lighting upgrades to Schedule 11 and Schedule 12 customers, has been extremely popular with customers and trade allies alike.

The Site-Specific Program path is reserved for unique or complex projects that require custom savings calculations and technical assistance from Avista's energy engineers (such as compressed air, process equipment and controls, and comprehensive lighting retrofits). In certain instances, a performance-based approach is used.

- ***71,391 commercial/industrial electric projects in 2023***: Total savings of 13,632 MWh
- ***110 commercial/industrial natural gas projects in 2023***: Total savings of 62,007 therms

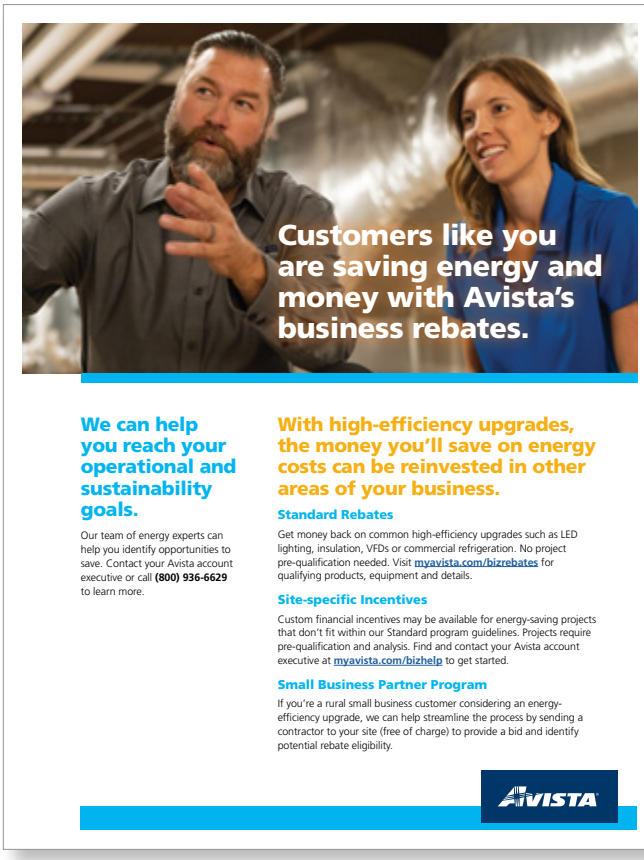
TABLE 10 – COMMERCIAL/INDUSTRIAL VERIFIED SAVINGS BY PROGRAM

Commercial/Industrial Program	Electric Savings (kWh)	Natural Gas Savings (Therms)
Prescriptive Lighting	7,978,849	–
Small Business Lighting	2,956,164	–
Midstream	58,355	8,922
HVAC	42,924	12,969
Grocer	1,928	–
Shell	37,320	7,117
Green Motors	–	–
Site-Specific	2,556,219	29,069
Food Service Equipment	–	3,930
Total Commercial/Industrial	**13,631,759**	**62,007**

Marketing

Avista expanded its approach to commercial and industrial energy-efficiency marketing in 2023. The company developed education and awareness campaigns to share ways to save energy, available rebate programs, and customer energy-efficiency success stories. Avista refreshed all web pages offering energy-saving advice and program information to business customers. Ads for energy-efficiency rebate programs were redeveloped, offering multiple creative options to engage customers. The regional account executives who manage business customer projects continued to play a large role in spreading program awareness and increasing engagement. Because this customer segment holds significant energy-saving potential, new case studies were developed to highlight successful customer energy-saving experiences. Customer projects were also highlighted on LinkedIn. The purpose of these efforts was to engage the business audience in the energy-efficiency conversation and show companies how they can benefit from saving energy with the help of Avista's programs.

FIGURE 5 – COMMERCIAL/INDUSTRIAL BUSINESS PROGRAMS OVERVIEW FLYER



Energy efficiency rebates and incentives for Avista business customers.

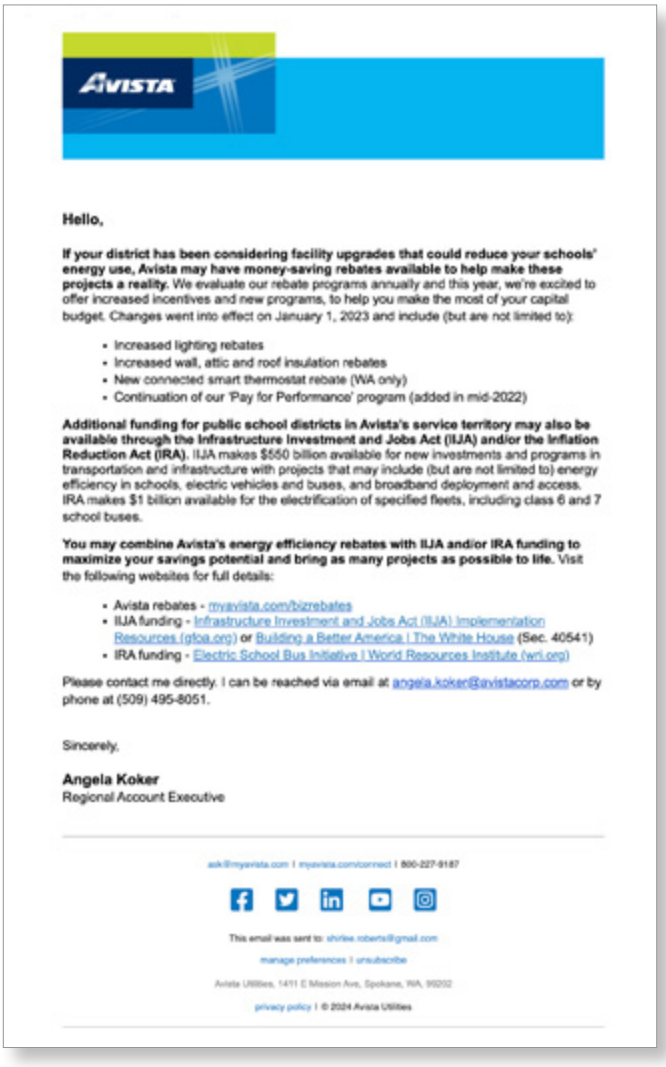
Standard Rebates	
Commercial Lighting Save energy immediately with lighting upgrades. LED technology continues to improve, further reducing costs and minimizing maintenance needs.	Rebates available for lighting retrofits and lighting controls.
Commercial Insulation Prevent air from escaping or entering your building by adding insulation You'll save on heating and cooling and keep your space more comfortable.	Rebates available for energy-efficient wall, attic and roof insulation.
Commercial Connected Thermostat Replace your standard thermostat with a connected thermostat to save energy.	Rebates available to Washington customers only with primary heating equipment fueled by Avista electricity or natural gas.
Commercial Clothes Washer Save energy by replacing your commercial clothes washer with a new ENERGY STAR product.	Rebates available to Washington customers only with water heating fueled by Avista electricity or natural gas.
Commercial Grocer For customers with commercial refrigeration (grocery stores, supermarkets, convenience stores, etc.). Upgrade equipment to improve efficiencies and minimize energy losses.	Rebates available for various display case LEDs, doors, motors, control, strip curtains and gaskets.
Commercial Compressed Air Leak Detection Reduce energy use by repairing leaks in your compressed air system.	Rebates available and dependent upon verified leak repair and energy savings.
HVAC Variable Frequency Drive (VFD) VFDs use far less pressure and power than single-speed motors, yet create the same energy flow necessary to drive fans and pumps. Minimize wasted energy and save on operational costs.	Rebates available for retrofits of VFDs on commercial HVAC equipment.
Green Motors Rewind Over time, all motors lose efficiency. A bad repair/rewind can adversely affect overall functionality. Quality rewinding ("green rewind") ensures a motor maintains its original efficiency.	Rebates available for Green Rewinds on 15hp to 500hp NEMA-rated motors at participating service centers.
Pay for Performance Retrofit Annual incentives that capture all electric and/or natural gas savings at the meter, rather than separate rebates for individual measures.	Rebates available for buildings with 20,000 sf or more of conditioned space and dependent upon annual energy savings.
Site-Specific Incentives	
For energy-saving projects that do not meet our Standard program guidelines, a custom (site-specific) financial incentive may be available. Eligibility is dependent upon project analysis and pre-qualification, prior to the project's start. To learn more, find and contact your account executive at myavista.com/bizhelp.	Incentives vary by project and state, potentially covering a significant portion of costs.
Small Business Partner Program	
For Avista's rural small business customers, we'll pay one of our licensed partner contractors to travel to your site, talk with you about your project, draw up a bid and determine eligibility for any of our rebate programs, so you can decide if and how you'd like to move forward.	Contact Lorri Kirstein at lorri.kirstein@avistacorp.com or (509) 495-2873 for more information.

For full program details and rebate forms, visit myavista.com/bizrebates or call (800) 936-6629.

2023

Throughout the year, Avista reached out to business customers directly via email, offering energy-saving advice and helpful program information related to the healthcare and manufacturing/industrial industries. As a follow-up to a message sent in late 2022, a direct email and postal letter were also sent to school districts that may benefit from federal funding through the Infrastructure Investment and Jobs Act or Inflation Reduction Act in combination with Avista's energy-efficiency incentives. A direct email and postal letter were sent to Avista's large commercial and industrial customers on Rate Schedules 21 and 25, furthering awareness about programs and services the company offers to help reduce energy usage.

FIGURE 6 – COMMERCIAL/INDUSTRIAL INCREASE ENERGY EFFICIENCY IN YOUR SCHOOLS EMAIL



Hello,

If your district has been considering facility upgrades that could reduce your schools' energy use, Avista may have money-saving rebates available to help make these projects a reality. We evaluate our rebate programs annually and this year, we're excited to offer increased incentives and new programs, to help you make the most of your capital budget. Changes went into effect on January 1, 2023 and include (but are not limited to):

- Increased lighting rebates
- Increased wall, attic and roof insulation rebates
- New connected smart thermostat rebate (WA only)
- Continuation of our 'Pay for Performance' program (added in mid-2022)

Additional funding for public school districts in Avista's service territory may also be available through the Infrastructure Investment and Jobs Act (IIJA) and/or the Inflation Reduction Act (IRA). IIJA makes $550 billion available for new investments and programs in transportation and infrastructure with projects that may include (but are not limited to) energy efficiency in schools, electric vehicles and buses, and broadband deployment and access. IRA makes $1 billion available for the electrification of specified fleets, including class 6 and 7 school buses.

You may combine Avista's energy efficiency rebates with IIJA and/or IRA funding to maximize your savings potential and bring as many projects as possible to life. Visit the following websites for full details:

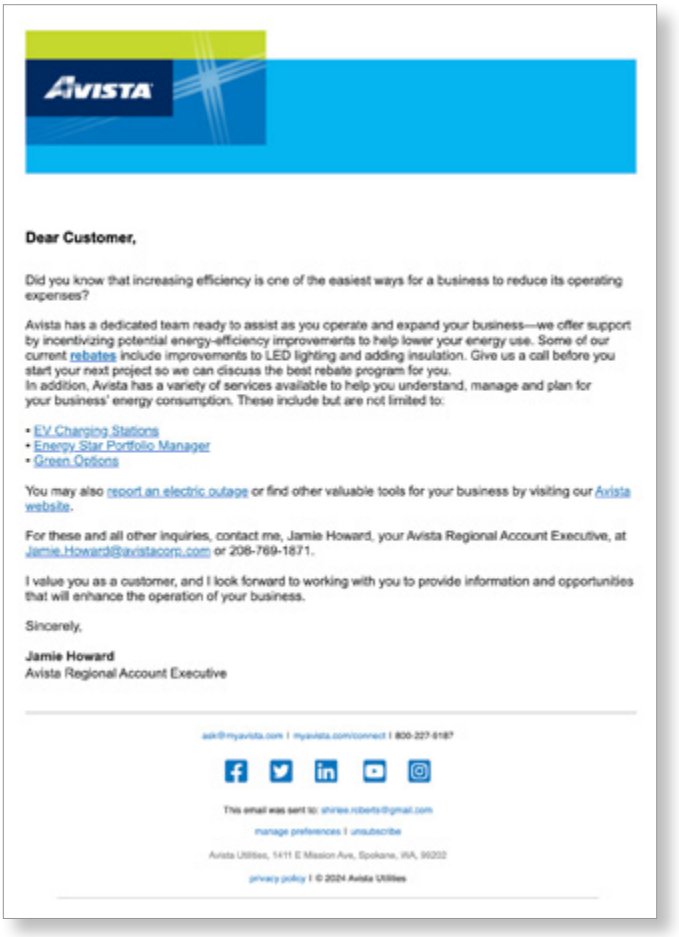
- Avista rebates - myavista.com/bizrebates
- IIJA funding - Infrastructure Investment and Jobs Act (IIJA) Implementation Resources (gfoa.org) or Building a Better America | The White House (Sec. 40541)
- IRA funding - Electric School Bus Initiative | World Resources Institute (wri.org)

Please contact me directly. I can be reached via email at angela.koker@avistacorp.com or by phone at (509) 495-8051.

Sincerely,

Angela Koker
Regional Account Executive

FIGURE 7 – COMMERCIAL/INDUSTRIAL PROGRAMS AND SERVICES FOR SCHEDULE 21 AND 25 CUSTOMERS EMAIL



Dear Customer,

Did you know that increasing efficiency is one of the easiest ways for a business to reduce its operating expenses?

Avista has a dedicated team ready to assist as you operate and expand your business—we offer support by incentivizing potential energy-efficiency improvements to help lower your energy use. Some of our current rebates include improvements to LED lighting and adding insulation. Give us a call before you start your next project so we can discuss the best rebate program for you.
In addition, Avista has a variety of services available to help you understand, manage and plan for your business' energy consumption. These include but are not limited to:

- EV Charging Stations
- Energy Star Portfolio Manager
- Green Options

You may also report an electric outage or find other valuable tools for your business by visiting our Avista website.

For these and all other inquiries, contact me, Jamie Howard, your Avista Regional Account Executive, at Jamie.Howard@avistacorp.com or 208-769-1871.

I value you as a customer, and I look forward to working with you to provide information and opportunities that will enhance the operation of your business.

Sincerely,

Jamie Howard
Avista Regional Account Executive

ask@myavista.com | myavista.com/connect | 800-227-9187

This email was sent to: shirlee.roberts@gmail.com

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Avista Utilities, 1411 E Mission Ave, Spokane, WA, 99202

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Avista continued its long-standing business customer newsletter, Energy Solutions, using program promotion boxes that direct viewers to myavista.com and its energy-efficiency programs. A lead article was included each month, providing a consistent opportunity for energy-efficiency storytelling. The newsletter goes out monthly to a customer list managed by each regional account executive.

FIGURE 8 – COMMERCIAL/INDUSTRIAL ENERGY SOLUTIONS EMAIL

Building on the success of a similar in-person event held in mid-2022, Avista offered an energy-efficiency program open house in the spring of 2023. An in-person option was hosted in March, while an online version was offered in April. Commercial and industrial trade ally vendors and contractors were invited and greeted by Avista's program managers, energy engineers, and account executives. Energy-efficiency rebate programs and services were discussed and shared, with the intention that trade allies would further their participation on their customers' behalf.

Avista partnered with business customers to continue to build out its library of energy-efficiency case studies. While former case studies continued to be used in external marketing, a new rural project was added. Luxury Living, LLC shared its success with lighting, heating, and insulation rebate programs, as well as other services provided by Avista. Generic case studies were also developed on the benefits of LED lighting, fixing compressed-air system leaks, and upgrading commercial grocer equipment. The case study campaigns ran from March to December via broadcast, OTT, digital, and print advertisements.

In total, Avista's 2023 paid advertising campaigns for commercial/industrial energy efficiency resulted in over 12.1 million impressions. Avista's web pages for business energy efficiency received more than 161,000 views. The landing page for energy-saving programs and services averaged over 4,200 views each month, an increase over the previous year's average of 2,000 views per month.

FIGURE 9 – COMMERCIAL/INDUSTRIAL LUXURY LIVING, LLC PRINT ADVERTORIAL

Rural business owners save money and energy with Avista.

MIKE STORMO *(left)*
GARRY ROSMAN *(right)*
CO-OWNERS, LUXURY LIVING LLC

Rural businesses often lack easy access to expert guidance on energy-saving measures. Avista's Small Business Partner Program eliminates the costs and hassle of obtaining help by bringing energy-efficiency knowledge and project funding incentives straight to businesses in small communities, including Davenport, Washington, population 1,740.

Garry Rosman and Mike Stormo are two Davenport business partners who've benefited from this program. Born and raised locally, the men have been friends for nearly 50 years. And they've invested in commercial businesses and property together many times, including in their latest project: Luxury Living LLC, Davenport's newest senior independent living apartments.

"Our Small Business Partner Program showed Garry and Mike how to make their apartment building energy efficient," says program manager, Lorri Kirstein. "It also significantly reduced their renovation expenses with Avista rebates and incentives as well as outside grants."

Through the program, Avista covers expenses for a specialized, licensed contractor to visit the facility and submit a competitive bid for an energy-efficiency project. The bid includes applicable Avista rebates as well as state grants that may be available. With a complete price in hand and the contractor ready to go, the customer can easily decide whether to move forward.

In Garry and Mike's case, they had come across a building for sale near Davenport's hospital. Built in the 70s, it was a medical clinic that housed four doctors, a dentist and a chiropractor. The doctors, however, planned to move.

"If something didn't happen, the building was just going to deteriorate," says Garry. "We scratched our heads on how to make something useful for the community that would last."

Given the building's proximity to the hospital, they decided to convert it into apartments for independent senior living. Until then, the few alternatives for seniors in Davenport either required purchase, included nursing care, or had income restrictions.

They bought the building and after receiving their first energy bill, they were shocked by how much electricity was being used.

"We immediately called Avista," says Mike. "They sent out a tech, who found that the existing sidewalk snow-melt system was running 24/7, costing almost $600 extra a month.

Garry adds, "The tech mentioned that Avista may help pay for an automatic thermostat for seasonal heating systems—one that senses temperature and moisture. He put us in touch with Lorri. We not only received a rebate and grant for the new heat-control system, but after she caught wind of our apartment project, she volunteered to have Avista assist with everything."

With Mike as construction manager and Garry handling logistics, their plan was to convert 11 office units into one, one-plus-, and two-bedroom apartments, including ADA certified units. Unfortunately, they quickly learned the outer walls and original support structure were an issue.

"The 2 x 4 walls had to be furred into 2 x 6's to meet code," Mike explains. "In some places there was only two inches of insulation. We had to fix the ceiling, too, to fit maximum insulation."

Avista provided rebates to replace the deteriorated insulation. Rebates were also given to refurbish areas where single-pane windows were removed and were replaced with insulated walls.

Garry and Mike wanted the units to have private entries, so visiting guests didn't have to go through the main building. So, they installed French doors on all the back decks.

Says Mike, "The wide doors are also a safety measure for elderly tenants. If ever there's an emergency, first responders can bring in mobile medical equipment a lot easier."

"Safety is also why we installed a gas fireplace in each unit," adds Garry. "Should a winter storm knock out power to our new heat pumps, the fireplace can heat the entire apartment."

For added energy savings, Garry and Mike took advantage of rebates on high efficiency LED lighting for the entire complex, including the dentist and chiropractor offices which had obsolete fluorescents. They also saved on sensors for the common area to automatically shut off lights when unoccupied.

LORRI KIRSTEIN OF AVISTA EXAMINES THE BRIGHTER LED LIGHTING INSTALLED FOR SENIORS.

"Altogether, they received $25,946 in rebates and $12,846 in grants," says Lorri.

"Their upgrades also saved 65,600 kWh of electricity and 850 therms of natural gas, which lowered their bill."

According to Garry and Mike, the benefits of working with Avista went beyond rebates and lower energy costs. By emphasizing energy efficiency and equipment, they were able to improve tenant comfort and keep rents affordable.

Both men agreed that Avista and its Small Business Partner Program were pivotal in helping them to complete their new independent senior living apartments. They are currently undertaking several other projects with Avista's help.

See how Avista can help your business save energy at myavista.com/bizrebates.

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FIGURE 10 – COMMERCIAL/INDUSTRIAL LUXURY LIVING, LLC BROADCAST

FIGURE 11 – COMMERCIAL/INDUSTRIAL LUXURY LIVING, LLC DIGITAL ADS

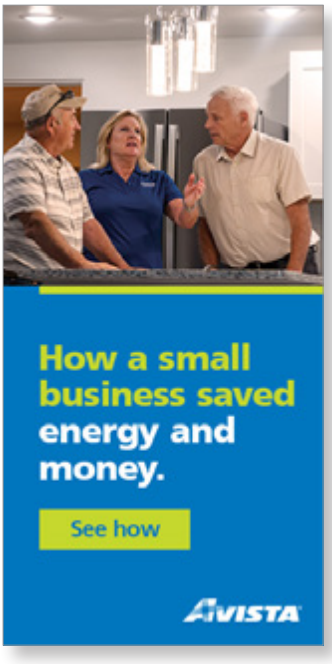
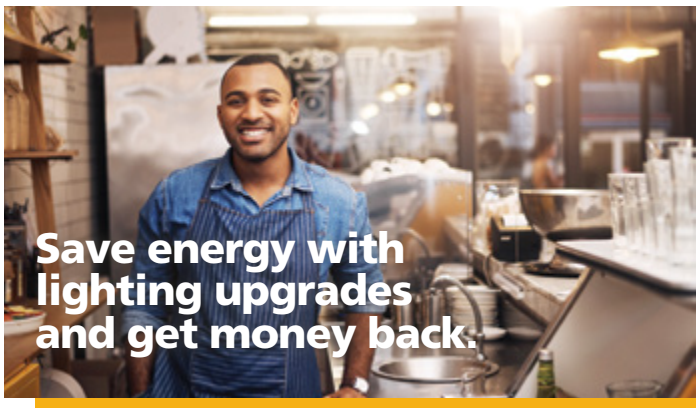


FIGURE 12 – COMMERCIAL/INDUSTRIAL LIGHTING PRINT ADVERTORIAL



Save energy with lighting upgrades and get money back.

New lighting technologies are constantly improving and can help every type of business reduce energy consumption, furthering progress toward sustainability goals. That's why Avista offers lighting incentive programs to help its commercial electric customers make the switch.

According to ENERGY STAR®, "lighting is responsible for up to 17% of all the electricity consumed in U.S. commercial buildings, meaning there are plenty of opportunities to make your lighting more energy efficient." ENERGY STAR® predicts that "by 2027, widespread use of LEDs could reduce our nation's electricity use equal to the annual electrical output of 44 large electric power plants."[1]

Brit Stottlemyre, Regional Account Executive at Avista, says, "Lighting is the first place commercial customers should look when trying to identify ways to save."

According to Brit, some customers use rebates to reduce costs on just a few lamps, while others retrofit entire facilities. "We've awarded million-dollar rebate checks and seen savings that exceed three million kilowatt hours per year (worth over $250,000 annually). The savings potential can be immense."

LEDs emit far less heat than fluorescent lights, saving even more on energy costs because of their reduced impact on ventilation and cooling loads, adds Brit. LEDs can also last up to 15 times longer, which significantly decreases maintenance and replacement costs, especially for those with long operating hours.

There is also lighting's positive effect on employee productivity. The right lighting in an office, warehouse or industrial setting has been shown to lower worker fatigue and stress and improve overall mood and health. Increased visibility can also reduce the chance of accidents, especially where forklifts and machinery are being used. Illuminating a business at night can help deter theft, as well.

LED technology continues to advance, offering a variety of customization options. For instance, customers can now tailor lights by intensity and adjust color temperature to create a desirable ambiance and mood.

Interior and exterior lighting, including sign lighting can all qualify for incentives. Avista also provides incentives for lighting, controls, including occupancy sensors, which detect movement and automatically turn off lights after occupants leave a room. (Some controls sense daylight to shut off, say, parking lot lights at sundown.) Lighting controls greatly reduce energy consumption and will extend the lifespan of any lighting.

"Avista rebates have helped many of our business customers pay for new LED lighting systems to conserve energy and support a more flexible energy grid," explained Brit.

"We offer lighting incentives on projects that qualify to businesses of all sizes and any industry. No project is too big or too small to consider."

Outside of project qualification, the only eligibility requirement is that the business must be an Avista commercial or industrial customer with a rate schedule of 11 or higher.

Avista offers standard off-the-shelf and custom program options.

The standard option is typically for replacing existing equipment. Pre-approved rebates are offered on items identified by Avista as proven energy savers. A couple examples are upgrades from fluorescent and HID fixtures to LED.

The custom option is for projects that don't fit Avista's standard guidelines. Avista's account executives can coordinate a project analysis for projected energy savings.

While Avista does not make vendor recommendations, many local electricians and lighting contractors can assist in selecting and installing the correct equipment.

Businesses that participate in the standard program do not need pre-approval before purchasing and installing equipment, but they must meet all the program requirements listed on Avista's incentive agreement.

Customers may hire a licensed electrician to install their equipment or do it themselves. Afterward, with the standard program, they simply complete and submit a rebate application within 120 days of the installation.

"LEDs use approximately 90% less energy to emit the same amount of light as traditional bulbs. Businesses see energy savings right away after completing a lighting retrofit," says Brit. "I've even had some customers tell me that their reduced lighting expenses paid for their project costs in under a year. I highly recommend it to all our commercial customers."

For more information and a list of products that qualify, go to myavista.com/bizrebates

(If you don't find a rebate that fits your needs, ask your Avista account executive for possible custom options. Find your account executive at myavista.com/bizhelp.)

[1] *www.energystar.gov/buildings/save_energy_commercial_buildings/ways_savelupgrade_lighting*

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FIGURE 13 – COMMERCIAL/INDUSTRIAL LIGHTING DIGITAL AD

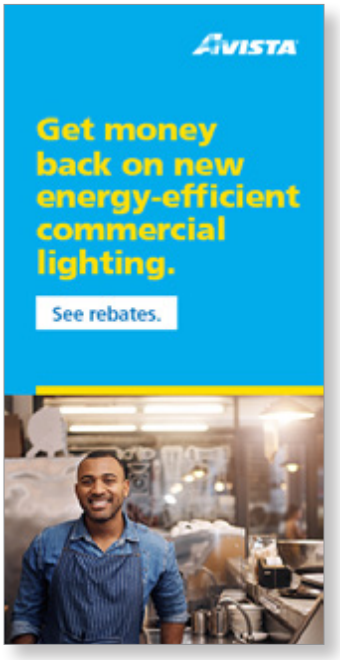

FIGURE 14 – COMMERCIAL/INDUSTRIAL GROCER PRINT ADVERTORIAL

Grocery stores put great efforts into maintaining a constant supply of food for people to consume. Their efforts, however, consume a lot of energy.

Whether it's a small neighborhood convenience store or a large superstore with thousands of square feet, energy consumption is primarily due to refrigeration. Many rows of freezers and coolers must operate around the clock, seven days a week, to preserve product quality and ensure safety.

According to an EPA study, commercial refrigeration is "the biggest energy user within supermarkets, accounting for about 40 to 60 percent of electricity consumption."[1] It can take quite a bite from the grocery industry's thin profit margins.

"Refrigeration is our number one target for saving energy when helping our grocery business customers," says Christian Wright, Avista Regional Account Executive. "Unlike product and labor, store energy costs are a variable operating expense that can be mitigated without a huge investment. It's why Avista developed its Commercial Grocer Program."

Avista's Commercial Grocer Program makes it easy and more affordable for participating businesses to achieve savings on their utility bills, explained Wright. Under the program, Avista provides grocers with cash incentives to help reduce the upfront costs of making energy-efficiency modifications to their refrigeration units.

Not only does that save on your energy bills, but ENERGY STAR estimates that every dollar saved in energy is equivalent to increasing sales by $59.[2]

Avista's Commercial Grocer Program lets you retrofit all types of refrigeration equipment, including reach-in, walk-in, and many storage units and display cases. For energy-efficient refrigeration, Avista says preventing cold air from escaping and warm air from entering is key.

Avista provides incentives for anti-sweat controls in refrigerated display cases. Anti-sweat controls regulate the output of anti-sweat heaters. They sense humidity levels around reach-in glass doors, so the heater only operates when needed, improving the case's efficiency.

For additional refrigeration savings in your cases, electronically commutated motors (ECMs) are good for refrigerator evaporators in walk-in coolers or freezers. They offer quieter operation, reduced maintenance and increased longevity when compared to other motors.

Adding ECM controls can help maintain consistent refrigeration temperature by decreasing evaporator fan-motor speed or temporarily turning the fan off once the desired temperature is met.

The Commercial Grocer Program also has incentives available on qualifying new strip curtains for walk-in freezers and coolers, as well as certain door gaskets.

One of Avista's top energy-saving suggestions is for grocers to upgrade their lighting in open and reach-in refrigerated cases to LEDs. LEDs use up to 50 percent less energy than fluorescent tubes and can last over 10 times longer. You'll save energy and replacement costs, plus you'll reduce maintenance time because they don't have to be changed as often.

Not only that, LEDs emit far less heat for improved temperature control, which supports the ability to maintain food quality. LED lighting is better at reflecting the color and textures of fresh foods to create added product appeal, too.

There are a few restrictions within the Commercial Grocer Program, however, Avista may offer incentives for non-standard projects, as well. Grocer business customers just need to contact their Avista account executive to have their projects evaluated and prequalified beforehand.

"Saving energy creates a stronger bottom line for program participants and reduces a store's carbon footprint, too," says Wright. "It's no wonder why so many of my grocer business customers take advantage of our program."

Find your Avista account executive and see qualifying Commercial Grocer Program equipment at myavista.com/bizrebates.

[1] *Heather Klemick, Elizabeth Kopits, and Ann Wolverton. (2015). The Energy Efficiency Paradox: A Case Study of Supermarket Refrigeration System Investment Decisions (NCEE Working Paper Series Working Paper # 15-03). EPA. Retrieved from https://www.epa.gov/sites/default/files/2016-03/documents/2015-03.pdf*

[2] *Supermarkets: An Overview of Energy Use and Energy Efficiency Operations, ENERGY STAR. Retrieved from https://www.energystar.gov/sites/default/files/buildings/tools/SPP%20Sales%20Flyer%20for%20Supermarket%20and%20Grocery%20Stores.pdf*

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FIGURE 15 – COMMERCIAL/INDUSTRIAL GROCER DIGITAL AD

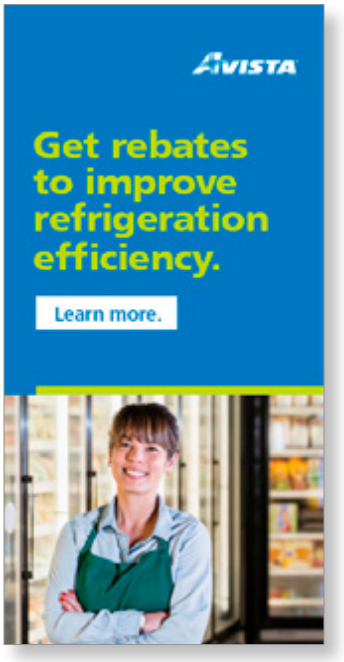

FIGURE 16 – COMMERCIAL/INDUSTRIAL COMPRESSED-AIR PRINT ADVERTORIAL

Get cash back when you eliminate leaks in your compressed air system.

Many commercial and industrial businesses are unknowingly letting money disappear into thin air. If your operation uses a compressed air system that leaks, your company is one of them.

The U.S. Department of Energy reports that unchecked leaks in a compressed air system can account for a significant portion of energy use, often wasting as much as 20% to 30% of the compressor's output.

"When your compressed air systems leak, you end up paying for a lot of energy that isn't doing anything productive for your business," says Avista Account Executive Kim Casey.

Seventy percent of all manufacturing facilities in the United States have some form of compressed air system. Most of these systems provide compressed air to drive a variety of equipment throughout a plant, including machine tools, painting booths, materials separation, and materials handling.

Auto service centers and collision repair shops also rely on compressed air for pneumatic tools, air-powered lifts, tire inflation, spray painting and numerous other tasks.

The trouble is fluctuating pressure from a leaking compressed air system can cause air-operated tools and equipment to function less efficiently, slowing or interfering with work duties. If a job requires consistent air pressure, it can even compromise product quality.

Leaks in a system will also put added strain on the compressor because it is forced to run longer and cycle unnecessarily. This leads to more frequent repairs and downtime, not to mention a shorter compressor lifespan. All these costs add up.

Energy Tips, Compressed Air, U.S. Dept. of Energy.
https://www.energy.gov/eere/amo/articles/minimize-compressed-air-leaks

"The possibility of leaks should be addressed by every business that utilizes a compressed air system," states Kim. "That's why Avista helps its commercial electric customers by offering an incentive for leak detection and repair."

Avista's Leak Detection program helps commercial and industrial customers save energy and money by reimbursing them for costs associated with eliminating leaks in their compressed air systems.

Under the program, customers hire a contractor to perform a preliminary acoustic-imaging leak-detection audit on their system. Audits inspect the entire compressed-air system for leaks, with special attention paid to the most common problem areas: couplings, fittings, pipe joints, quick disconnects, hoses, valves, FRL (filter, regulator and lubricator) and other components.

Using the resulting report, the customer then fixes the leaks in-house or hires someone to do it. Once the leaks are fixed, the customer must undergo a second acoustic imaging audit to obtain a report that shows the repairs worked and how much energy is being saved.

To initiate reimbursement, the customer fills out Avista's Compressed Air Leak Detection rebate form, attaches their two audit reports, and submits the paperwork to Avista. Upon approval, Avista pays the customer $0.23 for every kilowatt hour of electricity the repair(s) saves.

The U.S. Industrial Electric Motor Systems Market Opportunities Assessment (Motor Market Assessment) estimates that the energy consumed by a compressed-air system in a typical manufacturing facility could be reduced by 17% through maintenance or repairs with simple paybacks of three years or less.

"Avista's Leak Detection program improves your energy efficiency and your bottom line," says Kim. "Commercial and industrial companies interested in the program should contact their Avista account executive for details."

To find your Avista account executive, go to myavista.com/bizhelp.

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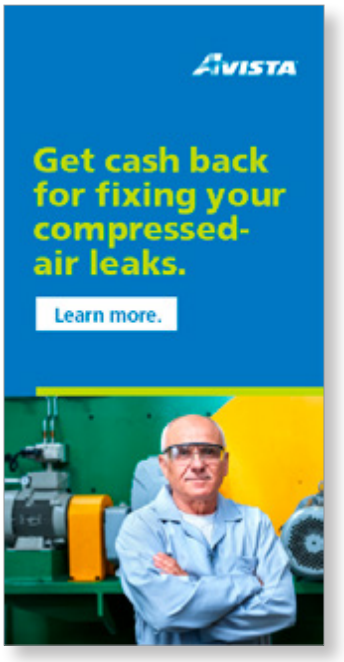
FIGURE 17 – COMMERCIAL/INDUSTRIAL COMPRESSED-AIR DIGITAL AD



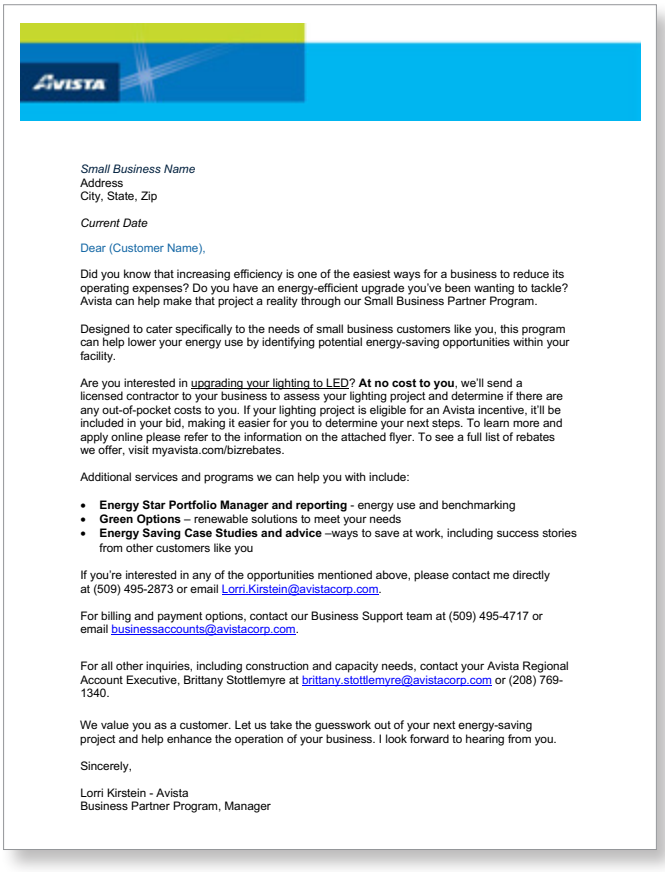
Business Partner Program

The Business Partner Program (BPP) began in fall 2019 as an outreach effort designed to target small business customers in Avista's rural service territories. The BPP brings awareness of Avista's services to rural small business customers in Idaho and Washington, and includes information on energy audits, budget billing plans, and energy-efficiency rebates. Due to this program's success, beginning in fall 2023, it has been expanded to include both rural and urban small business customers.

Avista continues to offer the Trade Ally Bid Program, in which the company arranges for various vendors (e.g., lighting, HVAC, window, and insulation) to provide cost estimates to customers for energy-efficiency upgrades to their facilities.

Avista has collaborated with trade ally partners to help customers identify energy conservation projects by performing audits, walking through the efficiency incentive process, and helping customers obtain bids for projects. The Trade Ally Bid Program has enabled Avista to educate and empower small business customers who may not have the time, budget, or access to contractors to make efficiency improvements.

FIGURE 18 – COMMERCIAL/INDUSTRIAL SMALL BUSINESS PARTNER PROGRAM LETTER



Small Business Name
Address
City, State, Zip

Current Date

Dear (Customer Name),

Did you know that increasing efficiency is one of the easiest ways for a business to reduce its operating expenses? Do you have an energy-efficient upgrade you've been wanting to tackle? Avista can help make that project a reality through our Small Business Partner Program.

Designed to cater specifically to the needs of small business customers like you, this program can help lower your energy use by identifying potential energy-saving opportunities within your facility.

Are you interested in upgrading your lighting to LED? **At no cost to you**, we'll send a licensed contractor to your business to assess your lighting project and determine if there are any out-of-pocket costs to you. If your lighting project is eligible for an Avista incentive, it'll be included in your bid, making it easier for you to determine your next steps. To learn more and apply online please refer to the information on the attached flyer. To see a full list of rebates we offer, visit myavista.com/bizrebates.

Additional services and programs we can help you with include:

- **Energy Star Portfolio Manager and reporting** - energy use and benchmarking
- **Green Options** – renewable solutions to meet your needs
- **Energy Saving Case Studies and advice** –ways to save at work, including success stories from other customers like you

If you're interested in any of the opportunities mentioned above, please contact me directly at (509) 495-2873 or email Lorri.Kirstein@avistacorp.com.

For billing and payment options, contact our Business Support team at (509) 495-4717 or email businessaccounts@avistacorp.com.

For all other inquiries, including construction and capacity needs, contact your Avista Regional Account Executive, Brittany Stottlemyre at brittany.stottlemyre@avistacorp.com or (208) 769-1340.

We value you as a customer. Let us take the guesswork out of your next energy-saving project and help enhance the operation of your business. I look forward to hearing from you.

Sincerely,

Lorri Kirstein - Avista
Business Partner Program, Manager

Impact Evaluation: Commercial/Industrial Sector

Although some individual project results varied, particularly within the Midstream Program, the overall commercial/industrial sector performed strongly in 2023 relative to reported savings. Most projects that ADM sampled for the evaluation were well-documented and matched findings from the remote project verifications. Savings realization rates were as follows:

- ***Electric***: Total verified savings of 13,632 MWh, with a combined realization rate of 91 percent.
- ***Natural Gas***: Total verified savings of 62,007 therms, with a combined realization rate of 70 percent.

Performance and Savings Goals

The commercial/industrial sector exceeded the combined prescriptive and site-specific program paths' electric goal of 11,327 MWh, with the programs achieving 120 percent of the overall goal. For natural gas programs, the commercial/industrial sector exceeded the annual therm savings goal for combined prescriptive and site-specific programs, achieving 60,621 therms (145 percent of the combined prescriptive and site-specific program paths' natural gas savings goal of 41,878 therms).

Cost-Effectiveness

Tables 11 and 12 show the commercial/industrial sector cost-effectiveness results by fuel type.

TABLE 11 – COMMERCIAL/INDUSTRIAL ELECTRIC COST-EFFECTIVENESS RESULTS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 8,602,598	$ 12,254,090	0.70
Utility Cost Test (UCT)	$ 8,602,563	$ 6,022,296	1.43
Participant Cost Test (PCT)	$ 9,290,803	$ 6,231,794	1.49
Ratepayer Impact (RIM)	$ 8,602,563	$ 15,313,064	0.56

TABLE 12 – COMMERCIAL/INDUSTRIAL NATURAL GAS COST-EFFECTIVENESS RESULTS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 539,514	$ 451,026	1.20
Utility Cost Test (UCT)	$ 525,923	$ 442,399	1.22
Participant Cost Test (PCT)	$ 6,724,369	$ 8,627	779.45
Ratepayer Impact (RIM)	$ 525,923	$ 7,153,177	0.07

Program-by-Program Summaries

Commercial/Industrial Site-Specific Program

TABLE 13 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM METRICS

Site-Specific Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		23
Overall kWh Savings		2,556,219
Incentive Spend	$	402,074
Non-Incentive Utility Costs	$	334,898
Idaho Energy Efficiency Rider Spend	$	736,972
Site-Specific Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		3
Overall Therm Savings		29,069
Incentive Spend	$	87,120
Non-Incentive Utility Costs	$	95,586.48
Idaho Energy Efficiency Rider Spend	$	182,706

Description

The commercial/industrial energy-efficiency market is delivered through a combination of prescriptive and site-specific offerings. Any measure not offered through a prescriptive program is automatically eligible for treatment through the Site-Specific Program, subject to the criteria for participation in that program. Avista's account executives work with commercial/industrial customers to help identify energy-efficiency opportunities. Customers receive technical assistance in determining potential energy and cost savings and identifying and estimating incentives for participation. Site-specific projects include appliances, compressed air, HVAC, industrial process, motors (non-prescriptive), shell, and lighting; the majority are lighting and shell measures.

Program Activities

- ***Electric***: Savings of 2,556,219 kWh, or 16 percent of the overall electric savings. The largest percentage of incentives went to non-lighting projects (96 percent).
- ***Natural Gas***: Savings of 29,069 therms in 2023.

Measure type and savings are shown in Figure 19.

FIGURE 19 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM INCENTIVE DOLLARS BY MEASURE

Program Changes

In 2023, Avista increased the incentive levels to $0.26 per kWh and $3.50 per therm savings for the Site-Specific Program path. The company continues to offer an incentive for any qualifying electric or natural gas energy-saving improvements that are cost-effective with a 15-year simple payback or less and up to 70% of the project's incremental costs.

Impact Evaluation

Table 14 shows reported and evaluated electric energy savings for Avista's Commercial/Industrial Site-Specific Program path for the year. The overall Site-Specific Program path had a 99 percent realization rate for electric measures.

TABLE 14 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM ELECTRIC IMPACT FINDINGS

Program Path	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Site-Specific	2,576,031	2,556,219	99%

Unlike other commercial/industrial programs, completing a census review of all site-specific projects is not feasible. To ensure accurate verified savings estimates, evaluators developed a sample of representative sites to inspect using a stratified random sampling procedure, which is detailed on page 92 of Appendix A. Of twelve projects in the final design sample, evaluators identified minor discrepancies in five, based on information gathered from in-person site visits as well as project documentation review. Table 15 summarizes the reasons for discrepancies between reported and evaluated savings.

TABLE 15 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM EVALUATION SUMMARY OF DISCREPANCIES

Project Type	Number of Occurrences	Savings Impact	Reason(s) for Discrepancy
Site-Specific Lighting	1	↑	Evaluators were unable to fully reconstruct all claimed savings calculations, but it appears that HVAC interactive effects were omitted. These effects were included in verified savings calculations, leading to a slightly high realization rate (RR).
	1	↓	Evaluators were unable to recreated expected savings for (14) 2L F96T12HO-E to (21) 76W LED strips. Verified savings was calculated using actual fixture wattages, verified lighting hours of operation and deemed HVAC interactive factors specific to the building type and HVAC configuration (Medium Office, ID, >2006 vintage). This resulted in slightly reduced kWh savings.
Replacement of two fixed speed pumps and two VFD controlled pumps	1	↑	The ex-ante assumed only one pump was running and just used north pump data as it was the primary pump during the monitoring period. This assumption is reasonable because the customer reported that only one runs at a time. There were, however, a few instances when the north pump stopped, and the south pump took over and their operation overlapped briefly (which is expected occasionally). Evaluators used the summed percentage amps instead of the north pump percentage amps which reduced savings slightly (one percent). The ex-ante also subtracted the standard deviation of the post average power from the overall kW demand reduction, which lowered the realization rate. Evaluators used the average kW values when calculating the kW demand reduction.
			The kWh RR was also affected by the annual operation hours. The ex-ante assumed annual hours of 8,500, but according to the customer on a site visit, the facility has at least one pump running 24 hours a day, seven days a week. Evaluators therefore used 8,760 annual hours, which increased the realization rate by three percent.
Replacement of two pulp agitator motors with new VFD controlled motors	1	↑	The ex-ante calculations treated the new agitator as part of the project. The evaluator didn't include the new agitator in the savings calculations since it isn't part of a VFD system upgrade. These changes reduced the overall savings and realization rate.
			The power factors for the baseline and as-built systems were different in the ex-ante and ex post analyses. The ex-ante used a 0.772 baseline power factor, based on the assumption that the baseline motor is a DC motor controlled by a DC VFD. The evaluator assumed a constant speed motor baseline with a power factor of 0.85. The ex-ante assumed a 0.98 power factor for the post-install motors while the evaluator used the motor nameplate power factor. These changes reduced the overall savings and realization rate.
			The final difference in calculation parameters was the annual hours of operation. The ex-ante assumed 8,500 hours while the evaluator used 8,652 hours based on the customers' testimony during an on-site visit. This change increased the overall savings and realization rate. The net effect of these discrepancies was essentially balanced, only raising the realization rate by one percent.
Older style of log mill line with a new highly efficient log line	1	↑	The ex-ante analysis assumed the 2022 levels of production, while evaluators used an average of the 2018 and 2022 production. Since the 2022 production was higher than 2018 production, the realization rate was high.

In addition to the discrepancies noted in Table 15, ex-ante calculations for all lighting projects assumed an 80 percent chance that lighting would operate during times of peak demand. Evaluators found that multiple projects have lighting fixtures that run continuously, so there is a 100 percent chance of operating during the peak period. The coincidence factor, therefore, was adjusted from 80 to 100 percent for these measures.

For natural gas measures in the Site-Specific Program, evaluators arrived at a realization rate of 117 percent. Because there were only two site-specific gas projects in Idaho in 2023, both were included in the impact evaluation review. Evaluators reviewed all project-related documentation, including specification sheets, building characteristics, calculators, invoices, project photos, and trending data.

TABLE 16 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM NATURAL GAS IMPACT FINDINGS

Program Path	Reported Savings (Therms)	Evaluated Savings (Therms)	Realization Rate
Site-Specific	24,891	29,069	117%

Plans for 2024

Avista plans to continue to offer the Site-Specific Program path in Idaho for both electric and natural gas customers in 2024 and will assess the current measurement and verification process to determine whether improvements need to be made. The company continues to offer the Business Partner Program (BPP), which is designed to reach a larger percentage of small- and medium-sized business customers in its rural and urban service territory, reminding them about the availability of basic scoping energy audits, budget billing plans, and energy-efficiency rebate programs. As part of the BPP, the Trade Ally Bid Program will also continue in 2024. The Trade Ally Bid Program is a collaboration between Avista, and its trade ally partners to offer bid assistance for energy-efficiency upgrades.

Commercial/Industrial Prescriptive Lighting Programs

TABLE 17 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM METRICS

Prescriptive Lighting Program Summary		2023
Participation, Savings, and Costs		
Conservation Projects		60,149
Overall kWh Savings		7,978,849
Incentive Spend	$	1,969,025
Non-Incentive Utility Costs	$	1,045,335
Idaho Energy Efficiency Rider Spend	$	3,014,360

Description

The Commercial/Industrial Prescriptive Lighting Program is intended to prompt commercial electric customers to increase the energy efficiency of their lighting equipment through direct financial incentives. The program indirectly supports the infrastructure and inventory necessary to ensure that the installation of high-efficiency equipment is a viable option for the customer.

In 2004, Avista developed a prescriptive approach to streamline the process and make it easier for customers and vendors to participate. This program provides for many common retrofits to receive a predetermined incentive amount, which is calculated using a baseline average for existing wattages and the average replacement wattages from the previous year's project data. Energy savings are calculated based on actual customer run times and qualified product lighting data.

This simplified approach makes program participation more accessible, especially for smaller customers and vendors. The measures included in the Prescriptive Lighting Program include fluorescent, incandescent, and HID lamps and fixture retrofits to more energy-efficient LED light sources and controls.

Program Activities

Savings for prescriptive lighting were 7,978,849 kWh, or 59 percent of commercial/industrial electric savings, a slight increase in savings compared to 6,416,259 kWh in 2022.

The increase in exterior lighting projects seen during COVID-19 receded as interior projects, specifically the 4-foot T12/T8 LED lamp replacement measure, achieved a high level of kWh savings in 2023. While Sign Lighting, an exterior lighting measure that has generally performed well, saw much lower throughput than in the past, traditionally strong measures continued to achieve a majority of savings again in 2023. Apart from July and September, monthly goals were met, and annual savings targets were reached.

FIGURE 20 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM SAVINGS BY MONTH

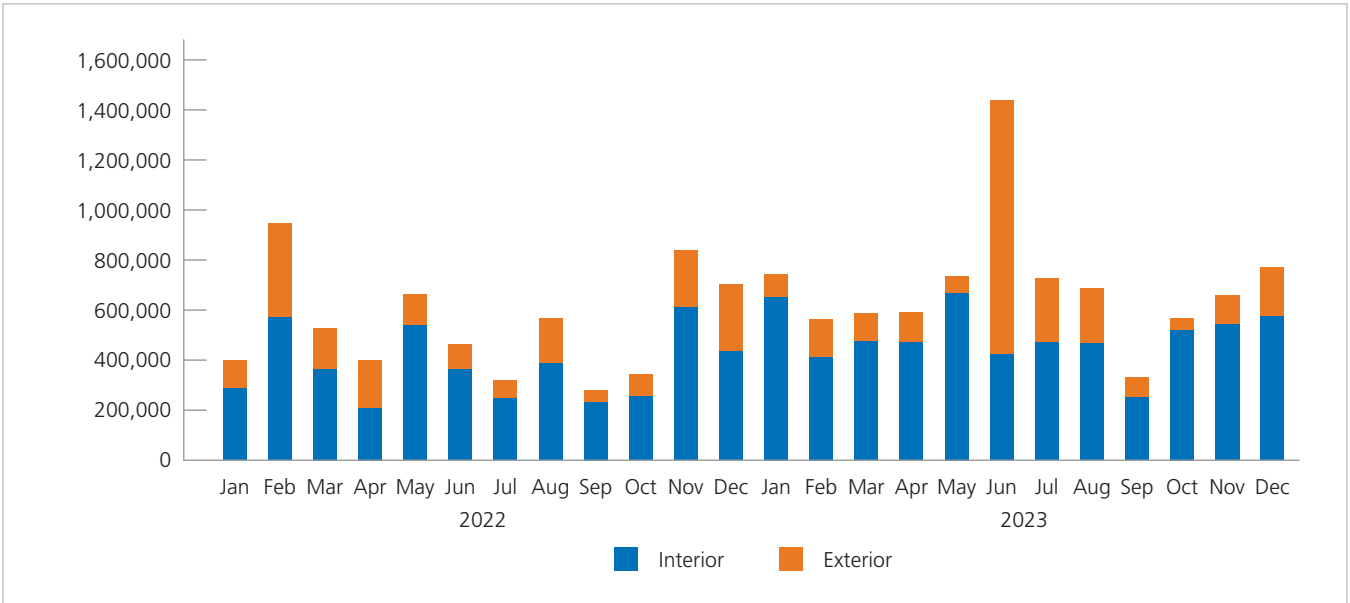


FIGURE 21 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE EXTERIOR LIGHTING PROGRAM KWH SAVINGS BY MEASURE

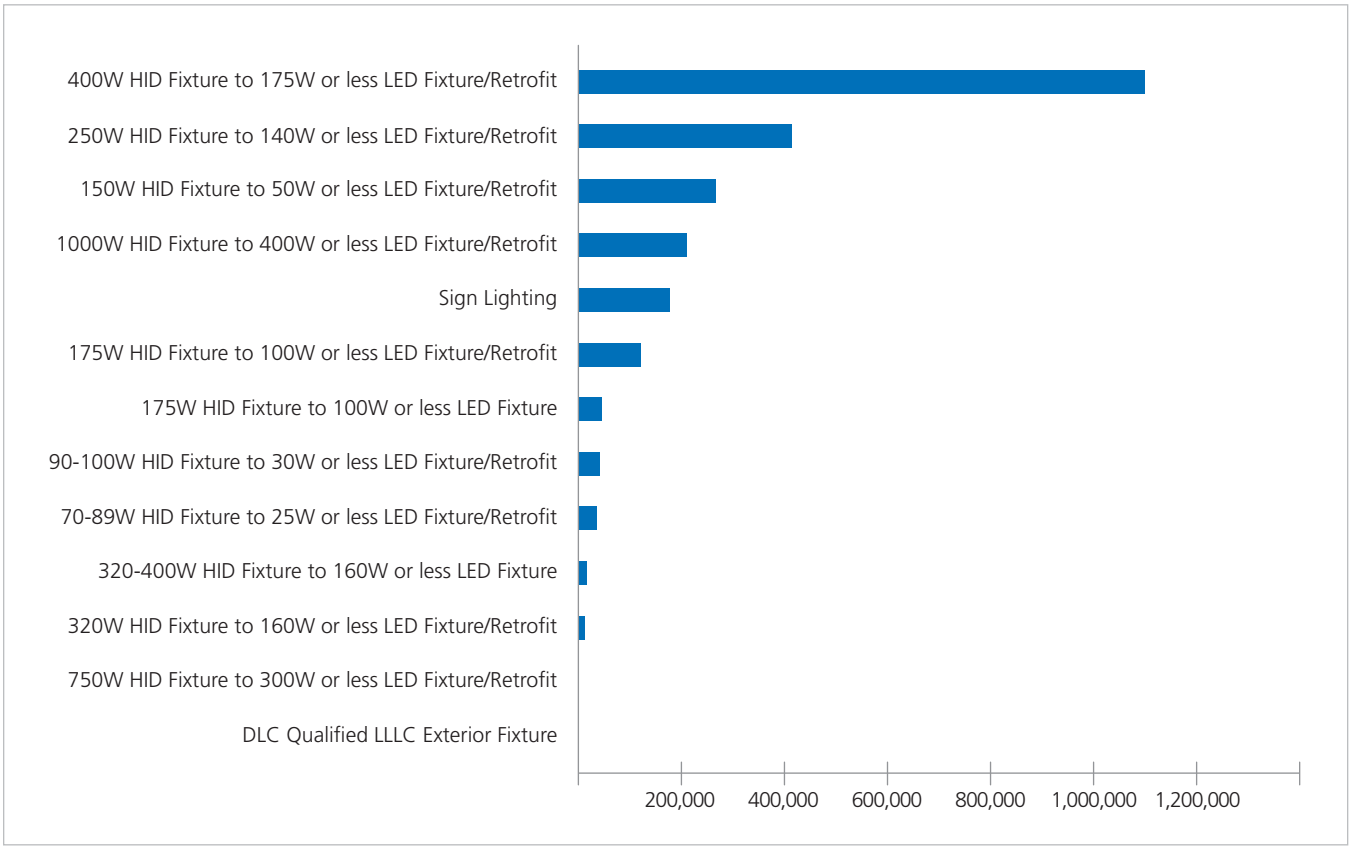
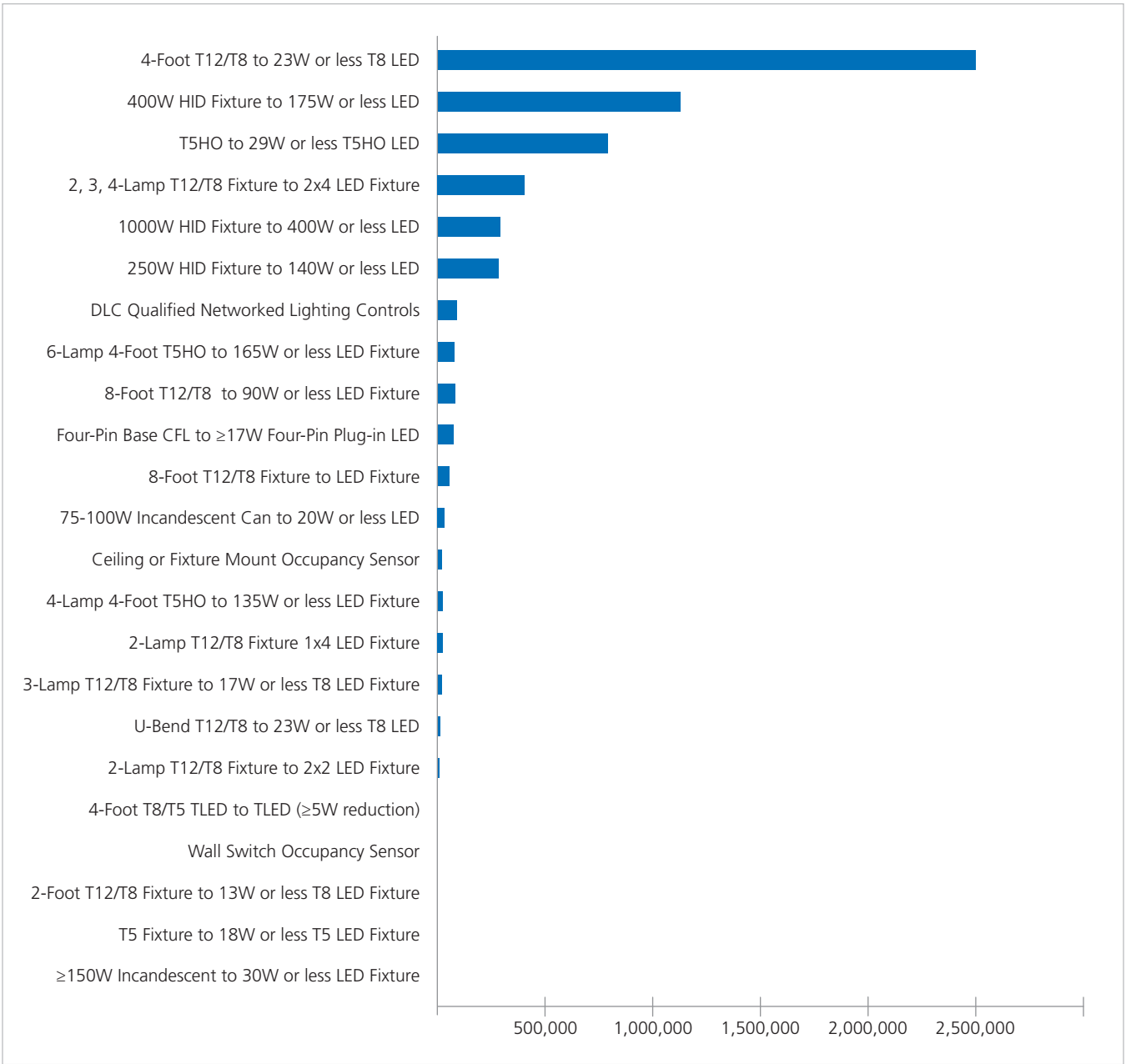


FIGURE 22 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE INTERIOR LIGHTING PROGRAM KWH SAVINGS BY MEASURE



Program Changes

Table 18 shows the changes Avista made to the program in 2023.

TABLE 18 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM CHANGES

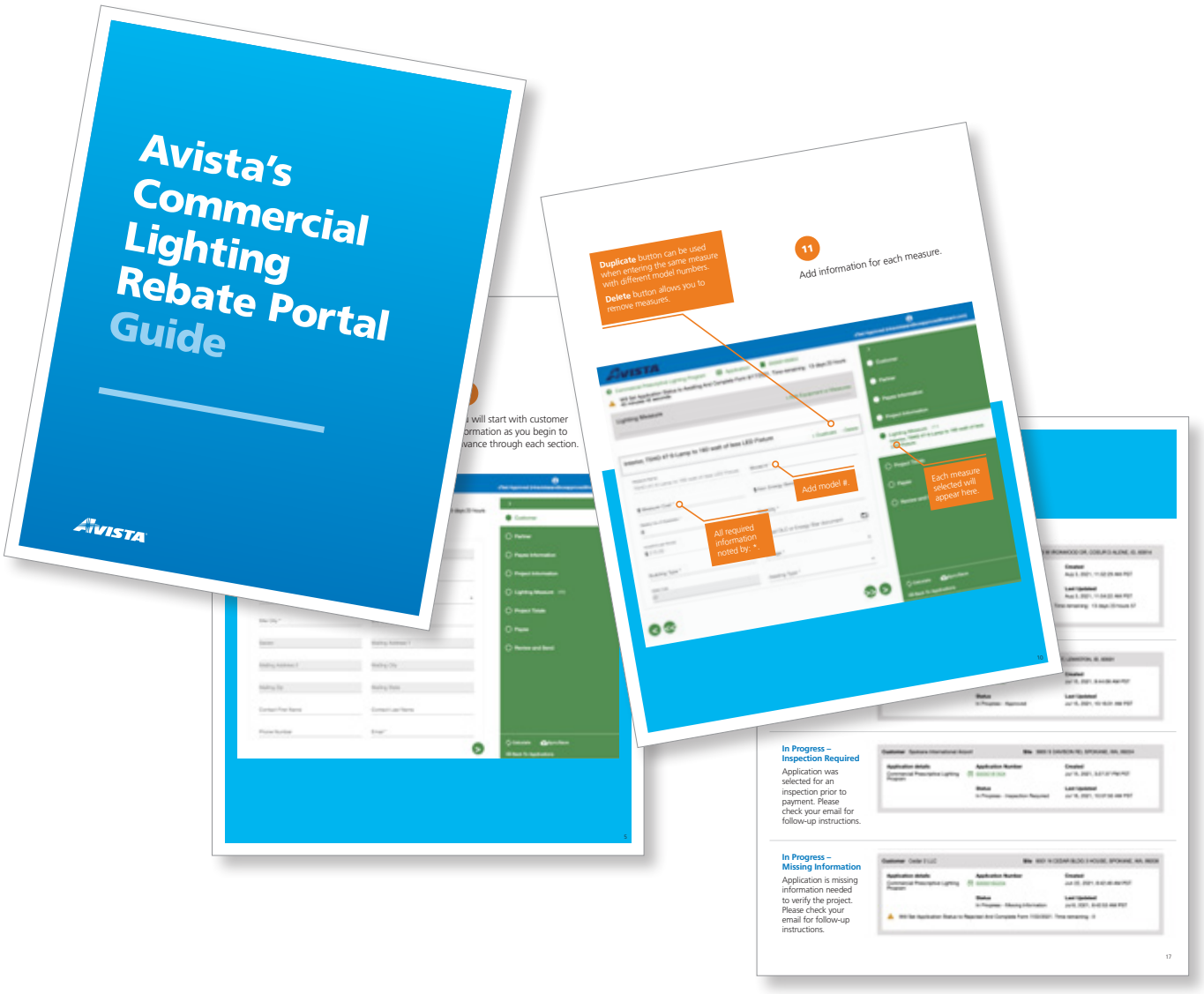
2023 Changes to Commercial/Industrial Prescriptive Lighting Rebates	2022	2023
Exterior Lighting		
Replacement HID Lighting (Pole, Wallpack, or Canopy) Requires at Least 4,288 Hours of Use per Year – Must Be DLC or ENERGY STAR-Rated		
70-89W HID Fixture to ≤ 25W LED Fixture or Lamp	$ 75.00	$ 85.00
90-100W HID Fixture to ≤ 30W LED Fixture or Lamp	$ 100.00	$ 120.00
150W HID Fixture to ≤ 50W LED Fixture or Lamp	$ 160.00	$ 180.00
175W HID Fixture to ≤ 100W LED Fixture or Lamp	$ 160.00	$ 180.00
250W HID Fixture to ≤ 140W LED Fixture or Lamp	$ 200.00	$ 230.00
320W HID Fixture to ≤ 160W LED Fixture or Lamp	$ 250.00	$ 280.00
400W HID Fixture to ≤ 175W LED Fixture or Lamp	$ 330.00	$ 375.00
575W HID Fixture to ≤ 300W LED Fixture or Lamp	$ 350.00	$ 400.00
750W HID Fixture to ≤ 300W LED Fixture or Lamp	$ 660.00	$ 750.00
1000W HID Fixture to ≤ 400W LED Fixture or Lamp	$ 825.00	$ 930.00
1500W HID Fixture to ≤ 600W LED Fixture or Lamp	Site-Specific	$ 1,300.00
New Construction Fixtures HID Lighting Requires at Least 4,288 Hours of Use per Year – Must Be DLC or ENERGY STAR-Rated		
175W Code HID Fixture to ≤ 100W LED Fixture	$ 150.00	$ 170.00
250W Code HID Fixture to ≤ 140W LED Fixture	$ 195.00	$ 225.00
320W Code HID Fixture to ≤ 160W LED Fixture	$ 220.00	$ 250.00
Sign Lighting Retrofit – Requires at Least 4,288 Hours of Use per Year		
T12 to LED Sign Lighting – per Square Foot	$ 11.00	$ 13.00
Interior Lighting		
Replacement Lamps – Must Be DLC or ENERGY STAR-Rated		
T12/T8 Fluorescent to ≤ 13W T8 Two Foot TLED	$ 7.50	$ 9.00
T12/T8 Fluorescent to ≤ 17W T8 Three-Foot TLED	$ 10.00	$ 11.00
T12/T8 Fluorescent to ≤ 23W T8 Four-Foot TLED	$ 12.50	$ 14.00
T12/T8 Fluorescent to ≤ 45W T8 Eight-Foot TLED	$ 23.00	$ 27.00
T12/T8 Fluorescent to ≤ 23W T8 U-Bend TLED	$ 13.50	$ 15.00
T5 Fluorescent to ≤ 18W T5 Four-Foot TLED	$ 14.00	$ 17.00
T5HO Fluorescent to ≤ 29W T5HO Four-Foot TLED	$ 25.00	$ 30.00
T8/T5 TLED to TLED (≥ 5W reduction)	$ 4.00	$ 5.00
Four-Pin Base CFL to Four-Pin Plug-in LED	$ 15.00	$ 18.00

2023 Changes to Commercial/Industrial Prescriptive Lighting Rebates	2022	2023
Interior Lighting		
Replacement Fixtures – Must Be DLC or ENERGY STAR-Rated		
T12/T8 to ≤ 40W 1x4 LED Fixture	$ 35.00	$ 40.00
T12/T8 to ≤ 40W 2x2 LED Fixture	$ 30.00	$ 35.00
T12/T8 to ≤ 60W 2X4 LED Fixture	$ 55.00	$ 60.00
T12/T8 to ≤ 90W Eight-Foot LED	$ 55.00	$ 85.00
4-Lamp T5HO Fluorescent to ≤ 135W LED	$ 85.00	$ 100.00
6-Lamp T5HO Fluorescent to ≤ 160W LED	$ 185.00	$ 200.00
175W HID to ≤ 75W LED Fixture or Lamp	Site-Specific	$ 145.00
250W HID to ≤ 140W LED Fixture or Lamp	$ 235.00	$ 265.00
400W HID to ≤ 175W LED Fixture or Lamp	$ 285.00	$ 325.00
1000 Watt HID to ≤ 400W LED Fixture or Lamp	$ 450.00	$ 560.00
>42W Incandescent Can to ≤ 20W LED Fixture	Site-Specific	$ 20.00
65W Incandescent to ≤ 10W LED Fixture	Site-Specific	$ 45.00
75-100W Incandescent Can to ≤ 20W LED Fixture	$ 50.00	$ 60.00
≥ 150W Incandescent to ≤ 30W LED Fixture	Site-Specific	$ 75.00
Controls		
Wall Switch Occupancy Sensor	Site-Specific	$ 17.00
Ceiling or Fixture Mount Occupancy Sensor	$ 40.00	$ 75.00
Networked Lighting Controls	$ 75.00	$ 150.00

Program Marketing

Key to the success of the Prescriptive Lighting Program is clear communication to lighting supply houses, distributors, electricians, and customers regarding incentive requirements and forms. The Avista website communicates program requirements and highlights opportunities for customers. In addition, the company's regionally based account executives play an integral role in delivering the Prescriptive Lighting Program to commercial/industrial customers. Any changes to the program typically include 120 days' advance notice to allow customers to submit applications for incentives under the old requirements or incentive levels if desired. This usually includes – at a minimum – direct email communication to trade allies as well as website updates.

FIGURE 23 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM REBATE WEB PORTAL



Impact Evaluation

TABLE 19 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM ELECTRIC IMPACT FINDINGS

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Prescriptive Lighting	8,374,096	7,978,849	95%

Recommendations

Within the Prescriptive Lighting Program, evaluators recommend collecting space HVAC configuration information and using interactive HVAC effects factors when calculating prescriptive lighting savings for interior spaces.

Avista has acknowledged this recommendation and will consider it in the future, as negative values, such as the increased need for heating, often become more significant than positive values, like the decreased need for air conditioning. Including therms also puts an additional burden on the customer to report heating and cooling information correctly.

Plans for 2024

With the more sophisticated measure-level detail in iEnergy, Avista has been able to update lighting measures annually to reflect market conditions, adding new measures that were typically paid for through the Site-Specific Program. Some refinement to the program is anticipated in 2023 as the company plans to use increased incentive calculations ($0.26/kWh) for deemed amounts.

Avista will continue to be flexible in making midyear changes as needed to further encourage program participation and will review the impacts of the Small Business Lighting Program. Additionally, Avista plans to increase customer self-service by launching a web interface that allows customers to submit their incentive applications. Finally, Avista will consider collecting space HVAC configuration information to inform HVAC interactive effects, while considering how to balance the accuracy of savings with the ease of customer and contractor participation in the program.

Commercial/Industrial Direct-Install Lighting Program

Description

In partnership with Resource Innovations, Avista is providing a Direct-Install Lighting Program to supplement and enhance the ongoing customer engagement and energy efficiency efforts already in place. Avista contracts with local electrical trade allies to ensure that customers receive installation of appropriate energy-saving lighting measures such as lamps, fixtures, and controls, as well as a brief onsite audit identifying additional efficiency opportunities. Marketing and collateral handouts are provided to encourage future program participation. This program allows customers who have traditionally been unable to participate in programs requiring upfront capital the opportunity to receive new lighting and lower their energy costs. The direct-install methodology also boosts regional markets by endorsing local businesses and trade allies and providing training and upskilling opportunities.

TABLE 20 – COMMERCIAL/INDUSTRIAL DIRECT-INSTALL LIGHTING PROGRAM METRICS

Direct-Install Lighting Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		41
Overall kWh Savings		140,527
Incentive Spend	$	41,453
Non-Incentive Utility Costs	$	18,411
Idaho Energy Efficiency Rider Spend	$	59,864

Program Implementation

To market and implement the Direct-Install Lighting Program, Avista and Resource Innovations have developed engagement procedures for the direct installation and audit approach. The iEnergy software platform is utilized to streamline customer eligibility, maintain data integrity, and lower administrative costs. Specifically, the development of the iEnergy OnSite tool has allowed trade allies to conduct customer eligibility checks, complete surveys and enrollment, perform facility walkthrough assessments, and project scope creation and costs. It also captures all applicable lighting program data, tracks equipment that is removed or installed, calculates site-specific savings based on wattage reduction and hours of operation, generates customer-facing reports, and allows for quality control reviews and inspections as required.

Program Eligibility

This program provides a valuable service to small- and medium-sized commercial electric customers in Avista's Idaho service territory under rate schedules 11 or 12. Resource Innovations uses ZIP codes and city identifiers to "cluster" eligible customers geographically and establish an efficient routing for door-to-door marketing, audits, and installations. Customers may also complete a request form on myavista.com to express interest in participating. Table 21 shows the estimated annual savings and the value of the direct installation (direct benefit to customer, or DBtC) for the lighting program. DBtC amounts represent the total cost of the program outside of allocated program administrative costs.

TABLE 21 – COMMERCIAL/INDUSTRIAL DIRECT-INSTALL LIGHTING PROGRAM MEASURES AND DIRECT BENEFIT

Projected Program Metrics		
Overall kWh Savings		2,956,164
Direct Benefit to Customer	$	1,823,804
Non-Incentive Utility Costs	$	387,297
Total Costs	**$**	**2,211,101**

Commercial/Industrial Prescriptive Non-Lighting Programs

TABLE 22 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING PROGRAM METRICS

Prescriptive Non-Lighting Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		11,236
Overall kWh Savings		3,096,691
Incentive Spend	$	1,865,257
Non-Incentive Utility Costs	$	405,707
Idaho Energy Efficiency Rider Spend	$	2,270,964
Prescriptive Non-Lighting Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		107
Overall Therm Savings		32,938
Incentive Spend	$	154,751
Non-Incentive Utility Costs	$	103,751
Idaho Energy Efficiency Rider Spend	$	258,502

Description

Commercial Food Service Equipment – The Commercial Food Service Equipment Program, which was rolled into the Midstream Program in mid-2023, was designed to encourage customers to purchase energy-efficient equipment either as a replacement for existing equipment or as a new product to support food service activities. Metrics reported in this section reflect the program's accomplishments leading up to the shift to the Midstream Program.

Compressed Air Line Isolation – Targeting commercial compressed-air customers, this program is for compressed-air leak detection. Incentives are paid for the repair of leaks identified by an audit from a preliminary acoustic imaging detector, followed by a second audit that verifies the repair of those leaks. Avista commercial electric customers are eligible for this program.

Commercial Natural Gas HVAC – The Commercial Natural Gas HVAC Program, which was also absorbed by the Midstream Program in mid-2023, was designed to encourage Avista commercial natural gas customers to save energy by choosing to install energy-efficient natural gas furnaces, boilers, and unit heaters. Metrics reported in this section reflect the program's achievements prior to being rolled into the Midstream Program.

Green Motors Rewind – The goal of the Green Motors Program is to organize, identify, educate, and promote member motor service centers to commit to energy-saving shop rewind practices, continuous energy improvement, and motor-driven system efficiency. Green Motors Practices Group (GMPG) launched the green motors initiative in 2008 to work with Northwestern regional utilities and other sponsoring organizations to provide incentives, through GMPG's member motor centers, for qualifying motors meeting the organization's standards. Avista joined this effort in offering the program to electric customers who participate in the green rewind program for 15-5,000 horsepower (HP) motors. This program provides an opportunity for Avista customers to participate in a regional effort. Without it, this market is difficult for the company to reach as a local utility. Avista commercial electric customers are eligible for this program, and incentives are paid as a credit off the invoice at the time of the rewind. An incentive of $1 per horsepower goes to the customer and $1 per horsepower to the service center.

Commercial Grocer – The Commercial Grocer Program offers incentives to customers who increase the energy efficiency of their refrigerated cases and related grocery equipment, including improvements with case lighting, anti-sweat heater controls, gaskets and strip curtains, and various motor components. Refrigeration often represents the primary electricity expense in a grocery store or supermarket. The prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista fuel for the measure applied are eligible.

Commercial HVAC VFD Retrofit – The Prescriptive HVAC Variable Frequency Drive (VFD) Program is intended to prompt customers to increase the energy efficiency of their HVAC fan or pump applications with a VFD retrofit. Adding a VFD to HVAC systems is an effective tool for cutting operating costs, improving overall system performance, and reducing wear and tear on motors.

Commercial Prescriptive Shell – The Commercial Prescriptive Shell Program offers incentives to commercial customers who improve the envelopes of their existing buildings by adding insulation, which may make a business more energy-efficient and comfortable.

Commercial Appliance and HVAC Controls – This program offers incentives to Avista commercial customers who install ENERGY STAR commercial clothes washers or connected thermostats.

Commercial Pay for Performance – The Pay for Performance Program is an incentive program that pays customers for actual energy savings at the meter. Energy savings can come from building retrofits and equipment upgrades, as well as from behavioral, operations and maintenance, and retro-commissioning activities.

Program Activities

- ***Electric***: Savings of 3,096,691 kWh, an increase of 3,995 percent compared to 75,625 kWh in 2022.
- ***Natural Gas***: Savings of 65,938 therms, an increase of 73 percent compared to 18,252 therms in 2022.

FIGURE 24 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING INCENTIVE DOLLARS BY MEASURE – ELECTRIC

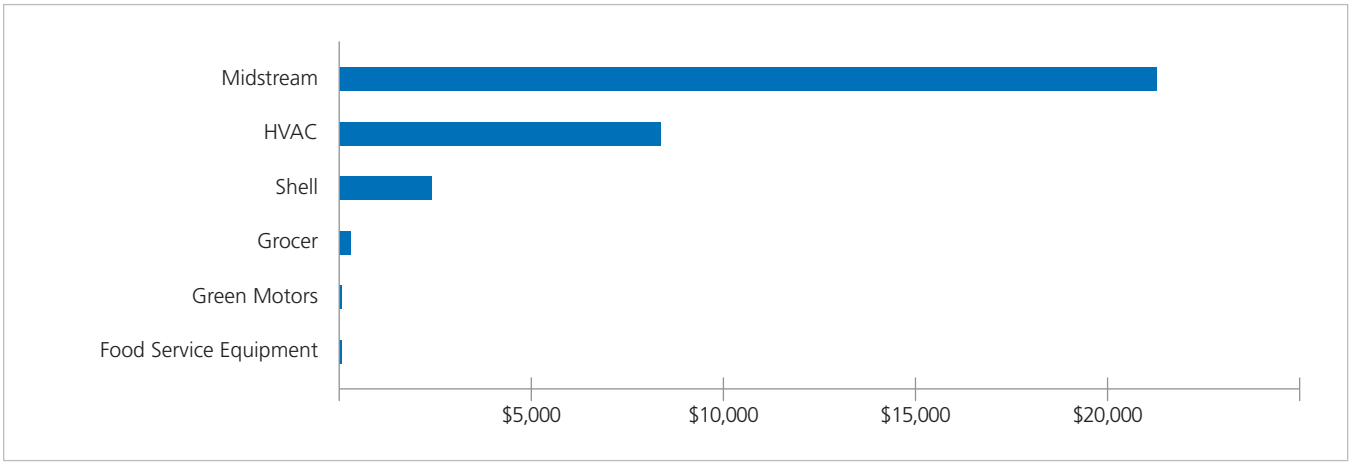
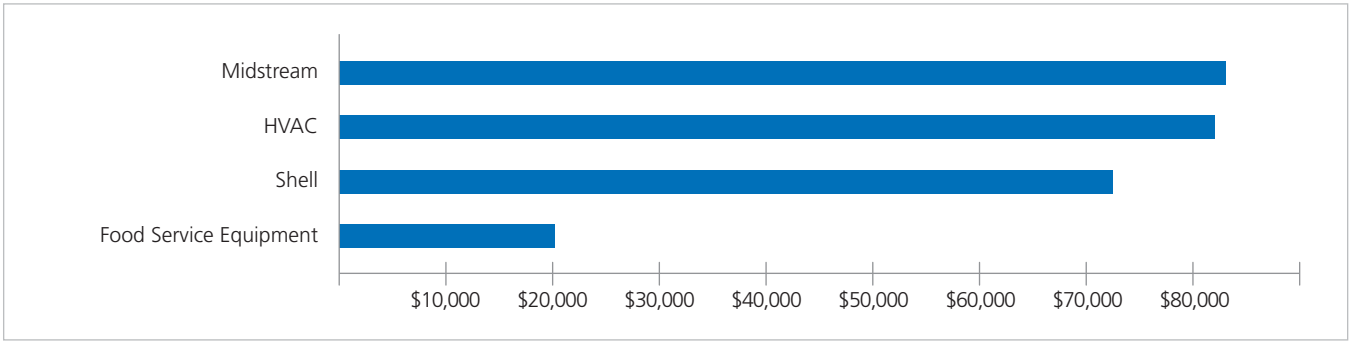


FIGURE 25 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING INCENTIVE DOLLARS BY MEASURE – NATURAL GAS



Program Changes

For 2023, the following changes were made to the Prescriptive Non-Lighting Program:

- The Commercial Food Service Equipment and Commercial Natural Gas HVAC Programs were rolled into the new Midstream Program in mid-2023.
- The line isolation measure was removed from the Compressed Air Program.
- The Fleet Heat Program was discontinued.
- A Commercial ENERGY STAR Clothes Washer and Connected Thermostat Program was offered.

In 2023, insulation measures were increased from 2022.

TABLE 23 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING PROGRAM CHANGES

Insulation Measure	Change Implemented
Wall R4 to R11-R18	From 0.60 per sq. ft. to 1.00 per sq. ft.
Wall R4 to R19 or greater	From 0.65 per sq. ft. to 1.25 per sq. ft.
Attic R11 to R30-R44	From 0.75 per sq. ft. 1.00 per sq. ft.
Attic R11 to R45 or greater	From 0.85 per sq. ft. to 1.25 per sq. ft.
Roof R11 to R30 or greater	From 0.60 per sq. ft. to 1.00 per sq. ft.

The Commercial Grocer Program added three new measures:

- Add door to medium-temperature vertical remote-condensing refrigerated case.
- Add door to low-temperature horizontal remote-condensing refrigerated case.
- Add door to medium-temperature horizontal remote-condensing refrigerated case.

Program Marketing

Avista account executives market these programs, as do external trade allies. All commercial programs are also featured on Avista's website, where business energy-savings webpages are experiencing increasing traffic. In addition, program-specific flyers, a commercial offerings one-sheet, paid digital advertising, and customer case study campaigns were all used to help build awareness about these opportunities.

Impact Evaluation

Electric: Table 24 shows the reported and evaluated electric energy savings for Avista's Commercial/Industrial Prescriptive Program path (non-lighting), as well as the realization rates between the evaluated and reported savings for 2023. The overall Commercial/Industrial Prescriptive Program path achieved a 93 percent realization rate for electric programs.

TABLE 24 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING PROGRAM IMPACT FINDINGS – ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
HVAC	42,924	42,924	100%
Food Service Equipment	–	–	–
Grocer	1,928	1,928	100%
Shell	3,458	37,320	1,079%
Green Motors	–	–	–
Midstream	142,927	58,355	41%
Commercial/Industrial Prescriptive	**3,326,344**	**3,096,691**	**93%**

Natural Gas: Natural gas prescriptive programs achieved a realization rate of 78 percent.

TABLE 25 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING PROGRAM IMPACT FINDINGS – NATURAL GAS

Program Type	Reported Savings (Therms)	Evaluated Savings (Therms)	Realization Rate
HVAC	12,969	12,969	100%
Food Service Equipment	3,930	3,930	100%
Shell	7,117	7,117	100%
Midstream	18,140	8,922	49%
Commercial/Industrial Prescriptive	**42,156**	**32,938**	**78%**

Recommendations

Within the Grocer Program, when collecting information for energy conservation measures, evaluators recommend including information about the motor power of the baseline motor. Evaluators suggest reexamining how expected unit energy savings (UES) are developed, particularly for food service equipment. Current expected UES are significantly higher than the same configurations specified in the RTF. Avista has reviewed the recommendation and will explore incorporating it into the next form version.

Plans for 2024

Avista will reassess all program measures and incentive levels in 2024.

RESIDENTIAL SECTOR

Coeur d'Alene, Idaho

RESIDENTIAL SECTOR

Overview

Avista's residential sector portfolio consists of a comprehensive suite of programs designed to encourage customers to save energy while living more comfortably in their homes. Historically, prescriptive rebate programs were the main component of the portfolio. The launch of the Midstream Program in mid-2023 has added a broader approach to capturing savings, replacing prescriptive rebate measures for HVAC and water heating upgrades. Avista's Multifamily Direct-Install Program also resumed full implementation activities as the COVID pandemic abated. While Avista concluded this long-standing program at the end of 2023, it plans to re-launch a similar offering for multifamily residents and building owners in mid-2024.

Over $1.5 million in rebates and direct benefits were provided in 2023 to Idaho residential customers, offsetting costs and enabling customers to make desired upgrades. The combined energy savings achieved for all programs within the residential sector portfolio were 1,727,220 kWh and 167,464 therms.

TABLE 26 – RESIDENTIAL SAVINGS BY PROGRAM

Residential	Electric Savings (kWh)	Natural Gas Savings (Therms)
Water Heat	4,066	9,051
HVAC	307,573	82,264
Shell	155,539	18,117
Fuel Efficiency	193,123	–
ENERGY STAR Homes	47,508	134
Multifamily Weatherization	81,535	5,445
Appliances	81,599	396
Midstream	683,356	48,830
Multifamily Direct-Install	172,921	227
Total Residential	**1,727,220**	**167,464**

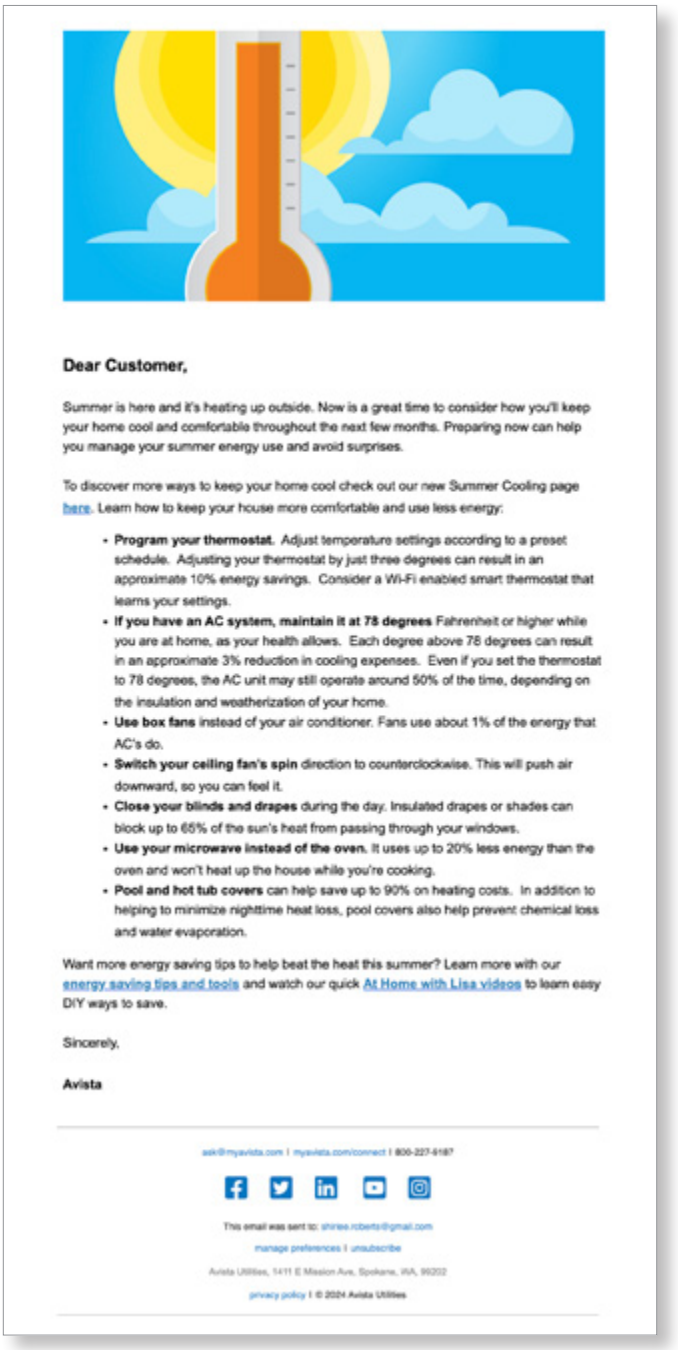
Marketing

Meeting customers where they are, with information that's valuable to them, drives Avista's energy-efficiency marketing strategies to increase awareness of and engagement with its energy-efficiency programs and resources. In 2023, the company's energy-efficiency campaigns underwent a creative refresh. Existing channels – including web pages, bill inserts, print and electronic newsletters, email, and social media – continued to expand education and program awareness. Digital tactics were also expanded to reach additional audiences.

Over the course of the year, energy-efficiency education and program posts were shared on Avista's Facebook page. Content focused on energy-saving tips and tools to help customers manage their use. Energy-saving tips and information were also shared in the company's print and electronic newsletter eight out of twelve months.

Seasonal energy-saving material was shared throughout the year, with a new summer cooling campaign to share tips promoted on social media, in Avista's newsletter, with digital advertising, and via direct email outreach. The new paid digital components garnered over 28.5 million impressions. Avista continued its winter heating campaign, providing cold weather energy-saving tips to customers via bill insert, newsletter, print advertising, social media, direct email, and digital advertising. Digital ads and website content were translated into Spanish. This campaign exceeded 31.1 million total impressions.

FIGURE 26 – RESIDENTIAL REBATES SUMMER COOLING DIRECT EMAIL



Dear Customer,

Summer is here and it's heating up outside. Now is a great time to consider how you'll keep your home cool and comfortable throughout the next few months. Preparing now can help you manage your summer energy use and avoid surprises.

To discover more ways to keep your home cool check out our new Summer Cooling page here. Learn how to keep your house more comfortable and use less energy:

- **Program your thermostat.** Adjust temperature settings according to a preset schedule. Adjusting your thermostat by just three degrees can result in an approximate 10% energy savings. Consider a Wi-Fi enabled smart thermostat that learns your settings.
- **If you have an AC system, maintain it at 78 degrees** Fahrenheit or higher while you are at home, as your health allows. Each degree above 78 degrees can result in an approximate 3% reduction in cooling expenses. Even if you set the thermostat to 78 degrees, the AC unit may still operate around 50% of the time, depending on the insulation and weatherization of your home.
- **Use box fans** instead of your air conditioner. Fans use about 1% of the energy that AC's do.
- **Switch your ceiling fan's spin** direction to counterclockwise. This will push air downward, so you can feel it.
- **Close your blinds and drapes** during the day. Insulated drapes or shades can block up to 65% of the sun's heat from passing through your windows.
- **Use your microwave instead of the oven.** It uses up to 20% less energy than the oven and won't heat up the house while you're cooking.
- **Pool and hot tub covers** can help save up to 90% on heating costs. In addition to helping to minimize nighttime heat loss, pool covers also help prevent chemical loss and water evaporation.

Want more energy saving tips to help beat the heat this summer? Learn more with our energy saving tips and tools and watch our quick At Home with Lisa videos to learn easy DIY ways to save.

Sincerely,

Avista

FIGURE 27 – RESIDENTIAL ENERGY-EFFICIENCY PRINT ADS

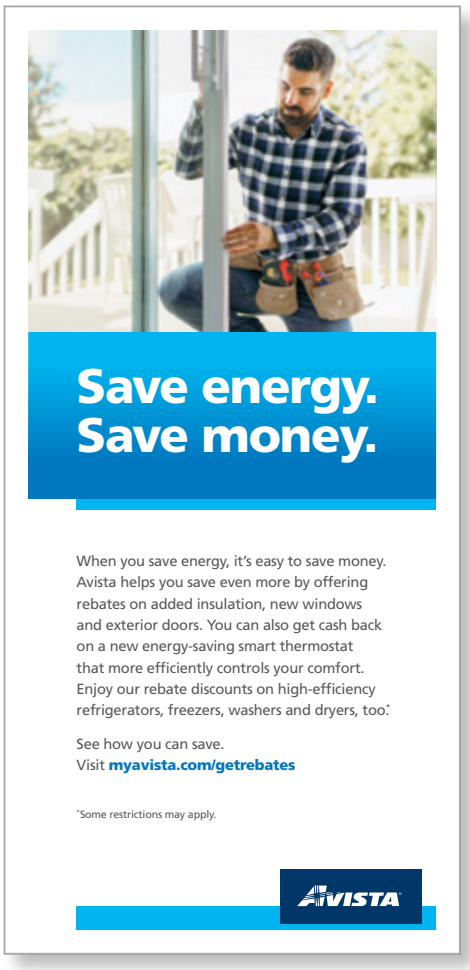


FIGURE 28 – RESIDENTIAL REBATES BILL INSERT

FIGURE 29 – RESIDENTIAL SUMMER BILL FACEBOOK POST

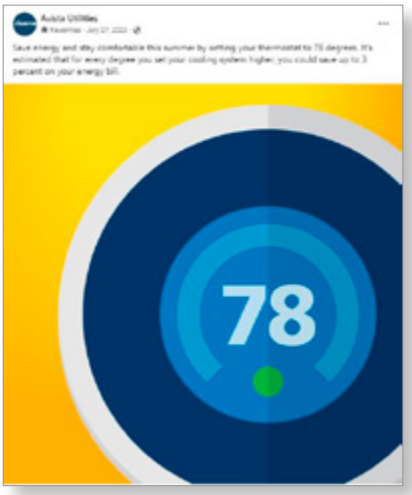


FIGURE 30 – RESIDENTIAL AUGUST 2023 CONNECTIONS NEWSLETTER

AVISTA

Connections

August 2023 | Washington • Idaho

Get cash back on energy-saving home products

Want to lower your energy bill? Start by improving your home's energy efficiency. Adding insulation and getting new windows and doors can help save on heating and cooling costs by preventing air from getting in or out of your house. Upgrade to a smart thermostat and ENERGY STAR® appliances for even more savings. Avista offers cash-back rebates to make these improvements more affordable. Start saving energy and money today at myavista.com/getrebates.

Summer is heating up

Lisa explains ways to keep cool indoors

During the summer months, my old 1910 house really starts to heat up, especially in the afternoons, when the sun beats down on my roof. When this happens, I turn to Avista's website to look for tips to stay cool while being energy efficient.

This page has a lot of great information, myavista.com/summercooling, including how to program your thermostat during the summer months, how to use fans to stay cool (rather than cranking the air conditioner), and how to ventilate your home.

If you have a cooling system, set your thermostat as high as you can, while still feeling comfortable. In the summer, an adjustment of just three degrees higher can result in 10% of energy savings. If you have a programmable thermostat, you can set it according to your schedule, so when you come home you will be nice and cool, while not using a lot of energy cooling an empty home when you are gone.

Think about upgrading to a smart thermostat that has Wi-Fi connectivity and an app for your smartphone. You can even get a rebate that may pay for the cost of your smart thermostat at myavista.com/getrebates. You should also think about hiring a service to check your heating and cooling system before each season to make sure it is running smoothly.

I rely on a lot of fans in the summer. I have a ceiling fan and I make sure that the blades are

Lisa, an Avista customer, bought her 1910 house because she loved the old-world character, some of which doesn't make her house very energy efficient. Over the last two years, Lisa shared her experience on taking some simple do-it-yourself improvements to inspire others. Now, she's highlighting helpful information you can find on the Avista website.

Continued on back

Continued from front

Summer is heating up

turning counterclockwise in the summer to force the air down. Fans don't cool the air but will circulate the air to cool you. A fan uses about 1% of the energy that an air conditioner does. To save energy, be sure to turn off the fans when the rooms aren't occupied.

I also like to open windows upstairs at night, when outside temperatures drop, to let cool air in and hot air out. I use a fan to keep the air circulating through the room.

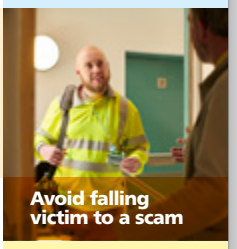
For more energy-saving tips, visit myavista.com/summercooling.

Need help with your energy bill?

Avista partners with community agencies to help customers manage their energy costs. If you need help paying your home energy bill, you may be eligible for financial assistance. Please call us at (800) 227-9187 to see if you qualify. Find an agency near you and learn more at myavista.com/assistance.

Your safety matters

We, at Avista, want to keep you, your family and neighbors safe around electricity and natural gas. That's why we created some useful and informational safety videos. You can find these at myavista.com/safetyvideos. Questions, please call us at (800) 227-9187.



Avoid falling victim to a scam

Be alert to anyone who shows up at your home and uses high-pressure tactics to demand immediate payment to avoid having your service disconnected. Scammers can try to appear legitimate by carrying a walkie-talkie and wearing a hard hat and orange vest. Avista employees and our authorized contractors, however, all carry an Avista photo ID badge. Our authorized contractors will have vehicle signs showing they are under contract with us and will carry Avista program materials. For more information, visit myavista.com/doortodoor.

Summer is here!

Summer weather is here, and in response to the hot, dry conditions, Avista changes operations in some areas to decrease the potential for wildfires. This shift, called Fire Safety Mode, means we change our system to turn off automatic re-energization when a fault occurs. Avista's line personnel will physically patrol an outage area before a line is placed back into service. It means you might experience longer outage times, but it keeps everyone safer.

We have been implementing this response to hot, dry weather for more than 20 years. Recently, Avista has expanded Fire Safety Mode by pairing it with our fire-weather monitoring system. This allows Avista to make the lines even more sensitive during times when high wind is predicted. If we decide to elevate the settings, you will be notified at the email and phone associated with your Avista account. Avista will return the distribution system to normal as soon as weather permits and fire potential decreases. Learn more about our wildfire resiliency plan myavista.com/wildfire.

Connect with us

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Toll-Free: (800) 227-9187 | Web Site: myavista.com | Email: ask@myavista.com

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FIGURE 31 – RESIDENTIAL NOVEMBER 2023 CONNECTIONS NEWSLETTER

AVISTA

Connections

November 2023 | Washington • Idaho

Holiday Lights

Bright, twinkling lights are one of the joys of the season, whether on the eaves of your home or strung on trees. While those merry little lights are a delight for many, incorrect usage can cause fires, injuries from falls or electrical shocks.

To keep the holidays festive and fun, follow these safety tips while decorating outdoors:

- Use lights — and if needed, extension cords — that are approved for outdoor use.
- Before decorating, check all light strands for damages and burned-out lights. Frayed insulation, exposed wires and broken plugs are all hazards and should be discarded. When replacing bulbs, unplug the strand.
- Consider purchasing miniature or LED lights as they use less energy and are long lasting. LED lights are also shatterproof and present no fire hazard.
- To avoid accidentally leaving your lights on, consider a timer. Make sure the timer you use is rated to handle the total wattage of your lights.

Visit myavista.com/safety for more safety tips.

Energy-saving tips for fall

The weather outside is changing and you may find yourself tempted to crank up the heat. Before you do, consider that during cooler months, heating is responsible for 40-60% of the energy use most of our customers see on their bills. Although you can't control the weather, there are ways you can manage your use.

Use this checklist to reduce energy use and improve comfort:

- **Adjust thermostat** — Set it at 68° in the winter. Lowering it even further, by just three additional degrees, can save 10% more on energy used for heating.
- **Change furnace filter and remove buildup on baseboard heaters** — Dust and debris block air from moving freely so even if your heater kicks on, rooms won't warm up efficiently.
- **Seal drafts and leaks** — Window plastic, caulk and weather stripping can help keep your warm air in and the cold air out.
- **Check fireplace dampers** — When not in use, a chimney with an open damper can allow up to 25% of the heated air in your house to escape.
- **Check water heater** — Set it at 120°. Water heating is often the second largest energy user in your home.

Find more energy-saving tips at myavista.com/energytips.

Know the signs

From the exhaust produced by your family vehicle to the fuel source of your home's heating system, carbon monoxide (CO) can live within your home without you even realizing it. CO is a colorless, odorless, poisonous gas that is produced by the incomplete burning of various fuels, including charcoal, oil, kerosene, propane, diesel fuel, coal, wood and natural gas.

Because CO is undetectable to the human senses, it is important for people to know the signs of CO exposure. These symptoms are similar to the flu and can include:

- Headache
- Fatigue
- Shortness of breath
- Nausea
- Dizziness

To protect yourself and your family, consider installing carbon monoxide detectors throughout your home. These devices monitor CO levels and alert you should the gas reach dangerous levels. That's why CO detectors are needed and are a legal requirement in some states. CO detectors are available at most home retail outlets.

We recommend you only buy UL-listed models and follow the manufacturer's instructions for installation and operation. The Consumer Product Safety Commission recommends installing at least one detector in a hallway near your sleeping area. By having your heating system and equipment serviced by a qualified technician at regular intervals or by the manufacturer's recommendation, you can reduce the risk of CO being present in your home or business.

Potential sources of CO that shouldn't be used indoors under any circumstances include portable generators, barbeques and charcoal grills. Items to consider for servicing inside your home or business include your water heater and any gas, oil, wood or coal-burning heaters. If you suspect that you or someone else is experiencing CO poisoning, get to fresh air immediately.

Leave the home and call for assistance from a safe place. Get medical attention immediately and inform medical staff that CO poisoning is suspected. Call 911, then call Avista at (800) 227-9187 and do not reenter the home until we can ensure your safety.

Visit myavista.com/resngsafety for more information on CO and natural gas safety.

Need help with your energy bill?

Avista partners with local community agencies to help customers with their energy costs. In Washington, income-eligible customers can now qualify for a new monthly bill discount program called My Energy Discount. In Idaho, financial assistance may be available through your local community action agency. Learn more about your options at myavista.com/assistance or by calling us at (800) 227-9187.

Want to avoid bill related surprises?

Sign up for Billing Alerts to get notified when you have a new statement, your payment is due, and your payment is past due.

Customers in Washington with an AMI Smart Meter can also sign up for Budget Alerts. You choose a dollar amount, and we'll let you know if your monthly bill is expected to be higher than the dollar amount you set. Visit myavista.com/alerts to learn more and sign up.

Connect with us

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FIGURE 32 – RESIDENTIAL WINTER BILL GOOGLE DISPLAY ADS

FIGURE 33 – RESIDENTIAL WINTER BILL GOOGLE DISPLAY ADS, SPANISH

At Home with Lisa

Many Avista customers live in older, energy-inefficient homes. Since 2020, the company has partnered with Lisa, an Avista customer who bought her 1910 house because she loved its old-world character – then quickly discovered it wasn't very energy-friendly. She attended an Avista energy fair and discovered how easy implementing some efficiency measures could be. Lisa began writing weekly features sharing her experience with simple do-it-yourself projects around her house to help improve her energy use and comfort. Most of Lisa's articles focused on low- or no-cost energy-saving tips that customers can do on their own, regardless of their home's fuel type or heating system. Titled "At Home with Lisa," her articles are hosted on Avista's website in the *Connections* blog. They also continue to be shared on Avista's social media pages and in its *Connections* newsletters.

In 2022, Avista expanded the "At Home with Lisa" series to include a digital campaign using static ads and short videos. In the videos, Lisa walks viewers through the simple DIY projects she is completing in her effort to reduce her home energy use and improve comfort. Projects include everything from thermostat control to mail slot fixes, hot water heater wrap to window plastic, door sweeps to insulated drapes, and kitchen appliance tips to lighting.

Lisa's digital campaign proved successful, increasing traffic to Avista's energy-efficiency web pages. In 2023, Avista furthered Lisa's reach, continuing its digital presence and including search ads. In total, Lisa content exceeded 45.4 million impressions in 2023. The web page containing her DIY videos was the sixth most-viewed web page on Avista's website (up from fourteenth the previous year), with over 311,000 total views. Averaging nearly 26,000 views each month and consistently remaining in the top ten most-viewed pages is an accomplishment, considering transactional (payment, outage reporting, etc.) pages typically dominate the company's page rankings.

The company is continuing to partner with Lisa and identify additional opportunities to take advantage of interest in receiving energy-saving information through the voice and experience of a fellow customer.

FIGURE 34 – RESIDENTIAL AT HOME WITH LISA GOOGLE DISPLAY ADS

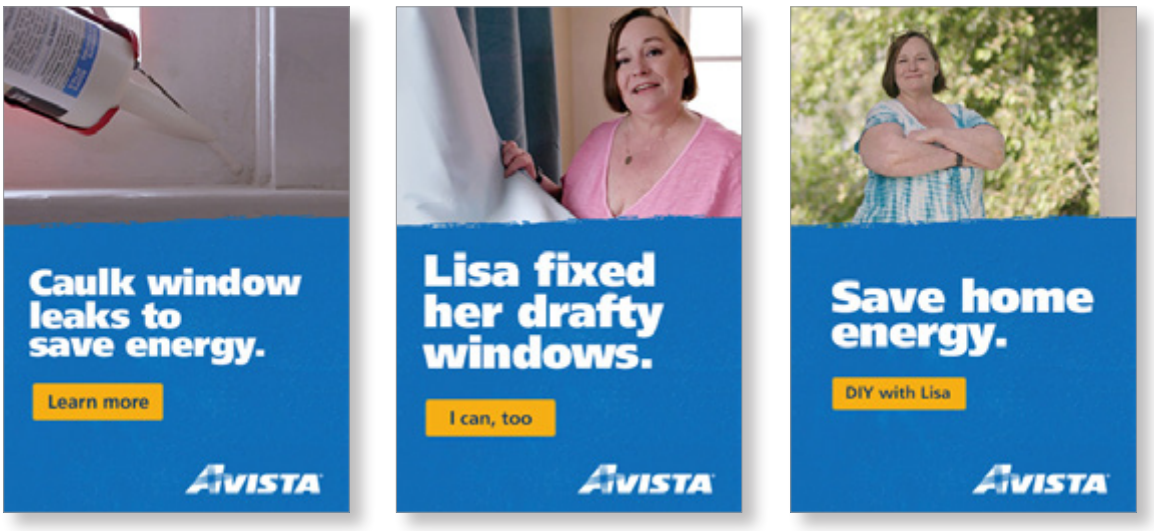


FIGURE 35 – RESIDENTIAL AT HOME WITH LISA FACEBOOK POSTS

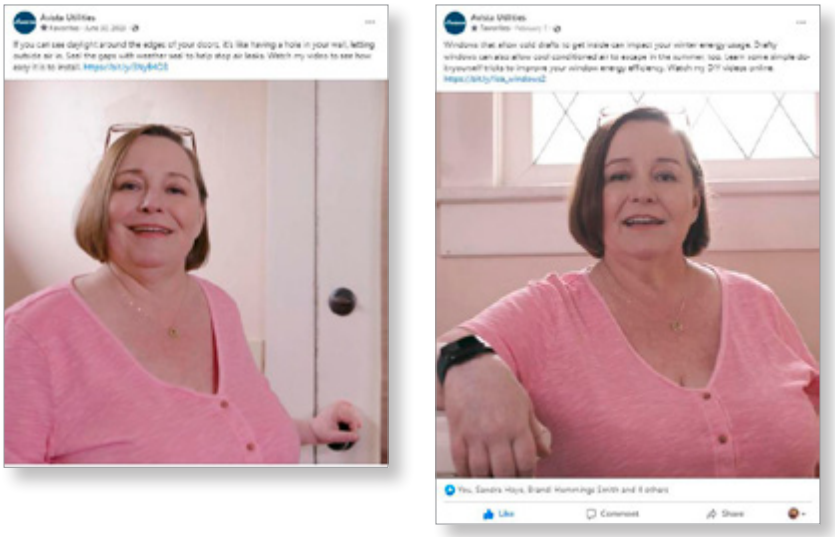


FIGURE 36 – RESIDENTIAL AT HOME WITH LISA VIDEO SERIES

The At Home with Lisa video series now includes more than 25 short videos that cover topics such as:

- window plastic and caulking
- insulated drapes and honeycomb shades
- outside window shades
- weather seals and door sweeps
- water heater insulation
- water temperature and use
- kitchen appliance use
- home heating and cooling

Impact Evaluation: Residential Sector

The residential sector saw lower-than-expected realization rates in 2023, due primarily to low realization rates with the Midstream Program. These realization rates are discussed in more detail on page 58 and in Appendices A and B. Savings realization rates were as follows:

- ***Electric***: Total verified savings of 1,727,220 kWh with a realization rate of 66 percent.
- ***Natural Gas***: Evaluated natural gas savings show a realization rate of 64 percent on savings of 167,464 therms.

Complete impact evaluations for electric and natural gas are included as Appendices A and B.

Performance and Savings Goals

The electric program portfolio achieved 56 percent of the 2023 savings goal. The Multifamily Direct-Install Program continued to be impacted by COVID-19 restrictions, operating on a limited basis with no projects completed in 2023. The Multifamily Weatherization and the Fuel-Efficiency Programs also had lower-than-expected savings, driven by lower-than-expected participation.

Although the Fuel-Efficiency Program did not meet its target, it still accounted for 11 percent of total residential sector savings. Midstream measures accounted for 40 percent of savings. The Appliances Program far surpassed its kWh saving goal, contributing 5 percent of residential savings.

Table 27 shows savings goals assigned to Avista's residential sector programs for 2023, as well as reported savings and the goal portion achieved in 2023.

TABLE 27 – RESIDENTIAL PROGRAMS VERIFIED ELECTRIC SAVINGS

Program	Savings Goals (kWh)	Verified Savings (kWh)	Percentage of Goal
Water Heat	26,351	4,066	15%
HVAC	600,836	307,573	51%
Shell	725,781	155,539	21%
Fuel Efficiency	539,240	193,123	36%
ENERGY STAR Homes	63,464	47,508	75%
Multifamily Weatherization	542,594	81,535	15%
Appliances	41,522	81,599	197%
Midstream	–	683,356	–
Multifamily Direct-Install	520,289	172,921	33%
Residential Total	**3,060,078**	**1,727,220**	**56%**

The natural gas segment of the portfolio achieved 50 percent of the goal for 2023.

The following shows the percentage of residential evaluated savings provided by each program:

- The HVAC Program accounted for 51 percent of residential natural gas savings.
- The Midstream Program accounted for 29 percent of residential natural gas savings.
- The Shell Program accounted for 11 percent of residential natural gas savings.

Table 28 shows savings goals assigned to Avista's residential sector programs for 2023, as well as reported savings and percentage of goal achieved in 2023.

TABLE 28 – RESIDENTIAL PROGRAMS REPORTED NATURAL GAS SAVINGS

Program	Savings Goals (Therms)	Verified Savings (Therms)	Percentage of Goal
Prescriptive Programs	301,274	162,020	54%
Multifamily Weatherization	33,353	5,445	16%
Residential Total	**334,627**	**167,465**	**50%**

Cost-Effectiveness

Tables 29 and 30 show the residential sector cost-effectiveness results by fuel type. Note that these values are inclusive of both the prescriptive programs and the Multifamily Direct-Install Programs.

TABLE 29 – RESIDENTIAL ELECTRIC COST-EFFECTIVENESS RESULTS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 3,434,404	$ 2,341,695	1.47
Utility Cost Test (UCT)	$ 2,844,719	$ 1,058,041	2.69
Participant Cost Test (PCT)	$ 6,222,228	$ 1,283,654	4.85
Ratepayer Impact (RIM)	$ 2,844,719	$ 6,690,584	0.43

TABLE 30 – RESIDENTIAL NATURAL GAS COST-EFFECTIVENESS RESULTS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 1,642,344	$ 6,167,894	0.27
Utility Cost Test (UCT)	$ 1,526,609	$ 1,256,435	1.22
Participant Cost Test (PCT)	$ 21,366,135	$ 4,911,459	4.35
Ratepayer Impact (RIM)	$ 1,526,609	$ 22,506,835	0.07

Midstream Program

TABLE 31 – RESIDENTIAL MIDSTREAM PROGRAM METRICS

Midstream Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		263
Overall kWh Savings		683,356
Incentive Spend	$	115,290
Non-Incentive Utility Costs	$	198,035
Idaho Energy Efficiency Rider Spend	$	313,325
Midstream Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		578
Overall Therm Savings		48,830
Incentive Spend	$	242,550
Non-Incentive Utility Costs	$	74,783
Idaho Energy Efficiency Rider Spend	$	317,333

Description

Avista's Midstream Program moves traditional utility incentives up the supply chain to target the market actors that have the greatest influence on equipment sales. Avista's approach with the Midstream Program is to work with distributors, who influence the majority of equipment sales in any given region. Avista works with its vendor, Energy Solutions, to encourage the inflow of high-efficiency and efficient equipment into its market.

The Midstream Program uses a flexible approach in which the distributor may use the incentive to reduce the cost to the contractor and customer or for activities such as marketing or training. Incentives for residential and small commercial customers utilize a pass-through model. Midstream combines several elements that were previously individual programs. This includes commercial and residential HVAC, water heating equipment, and commercial foodservice equipment.

The initial midstream claims were processed in July 2023. Claims and savings continuing to grow exponentially, and distributors continued to join the program through the end of 2023. Ongoing messaging to contractors about the new process and their role contributed to this growth.

Program Activities

Avista's Midstream Program formally began in 2023, with a sunsetting of corresponding downstream and site-specific measures. Given that the program was new, significant effort was required in early 2023 for data exchange systems setup, policy development, measure review and finalization and training/marketing material development. Additional program activities included reaching out to potential distributor partners, completing legal participation agreements with distributors, and onboarding participating distributors and contractors.

- ***Electric***: Savings of 683,356 kWh in 2023, which accounted for 40 percent of the overall residential savings
- ***Natural Gas***: Savings of 48,830 therms in 2023, or 29 percent of the overall residential savings.

Program Announcement

Commercial and residential customers were notified of the pending transition to a midstream approach and the end of various downstream measures beginning in early 2023. Avista's rebate forms and website included messaging regarding the pending transition, and commercial customers received multiple notifications of the transition by email.

Impact Evaluation

The Midstream Program's realization rate of 54 percent for residential electric was a large contributor to the overall low residential realization rate. This discrepancy in expected savings for the Midstream Program was attributable to differences between the baseline of the implementer-assigned expected savings values using minimum code and the baseline of the RTF-implemented market practice. The evaluators used engineering algorithms to assess this program, based on purchased equipment efficiency level. They also applied RTF market practice baseline equivalents to the engineering algorithms to maintain consistency with evaluation methods between the downstream and midstream programs, while taking into account the often higher efficiency values of the purchased equipment. Although the evaluators noted instances where the implementer's engineering algorithms were applied incorrectly in calculating the expected savings values, the market practice baseline adjustment resulted in the largest downward adjustment, leading to a low realization rate for the program.

The Residential Midstream Program, which contributed 53 percent of the expected natural gas savings, resulted in a realization rate of 35 percent. The other programs resulted in a combined realization rate of 107 percent. The Midstream Program contributed to a 43 percent decrease in the overall residential sector.

Recommendations

Evaluators recommend the following for the Midstream Program:

- Administrators should verify that unit energy savings (UES) and savings multipliers are applied consistently across measures.
- Avista should verify baseline efficiency assumptions for food equipment.
- The evaluators suggest that program implementors calculate expected savings for HVAC measures using prescriptive algorithms and measure-specific characteristics. Capacities and efficiency levels vary considerably within these measures, and current planning materials only produce general savings estimates.

- Avista should update annual water usage estimates for storage and instantaneous water heaters.
- Avista should refer to RTF savings estimates for griddles.
- Avista should work with the implementer of the Midstream Program to update expected savings values in the implementer TRM to adjust for market practice baseline and more accurately predict program-level savings in future program cycles.
- Within the Midstream Program, Avista should reexamine how expected savings UES are developed, particularly for food service equipment. Current expected savings UES are significantly higher than the same configurations specified in the RTF.

Avista acknowledges the recommendations and is working with the implementor and evaluator to coordinate the appropriate midstream design for evaluation.

Plans for 2024

During 2024, Avista anticipates continuing to refine program implementation and seek new distribution partners. Although participation within the HVAC sector is broad, there are additional opportunities to expand the program in commercial foodservice, including the addition of ultra-low temperature freezers. The initiation of market share reports to participating distributors in 2024 will incentivize increased performance through healthy competition.

Residential Shell Program

TABLE 32 – RESIDENTIAL SHELL PROGRAM METRICS

Shell Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		158
Overall kWh Savings		155,539
Incentive Spend	$	81,921
Non-Incentive Utility Costs	$	45,075
Idaho Energy Efficiency Rider Spend	$	126,996
Shell Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		383
Overall Therm Savings		18,117
Incentive Spend	$	204,553
Non-Incentive Utility Costs	$	27,746
Idaho Energy Efficiency Rider Spend	$	232,299

Description

Avista encourages residential customers to improve their home's building envelope by adding insulation or storm windows or upgrading existing windows or doors. The Residential Shell Program has the same annual energy usage requirements as the HVAC program. Idaho residential electric customers who heat their homes with Avista electric and use at least 4,000 kWh a year are eligible to apply, as are Idaho residential natural gas customers with an annual home heating usage of 120 therms. This rebate approach issues payment to the customer following installation.

Rebates are offered for insulation of attics, floors, and walls, with each type of insulation having specific pre- and post-installation R-value requirements. Required contractor documentation includes an invoice and contractor verification of the square footage of the space insulated and both pre- and post-installation R-values.

Replacement windows must have a U-factor rating of .29 or lower to qualify, and supporting documentation must include the invoice, along with window dimensions and U-factor ratings.

Contractor-installed storm windows must be ENERGY STAR certified or have a glazing material emissivity less than 0.22 with a solar transmittance greater than 0.55. Required documentation includes the invoice and window dimensions.

Program Activities

- ***Electric***: Savings of 155,539 kWh in 2023 (nine percent of the overall residential savings), a 13 percent increase over the 137,338 kWh achieved in 2022.
- ***Natural Gas***: Savings of 18,117 therms in 2023, or 11 percent of the overall residential savings. The program had an 11 percent decrease in savings relative to the 20,360 therms achieved in 2022.

Savings derived from the Residential Shell Program for both natural gas and electric homes are primarily attributed to single-pane window replacements.

Program participants have generally been inclined to replace existing windows with regular windows rather than with storm windows.

Program Changes

The minimum usage requirement was lowered for Avista customers who heat their homes with electricity. Those who use at least 4,000 kWh a year are eligible to apply, as are Idaho residential natural gas customers with an annual home heating usage of 120 therms. This is a reduction from the previous requirement of 8,000 kWhs or 340 therms.

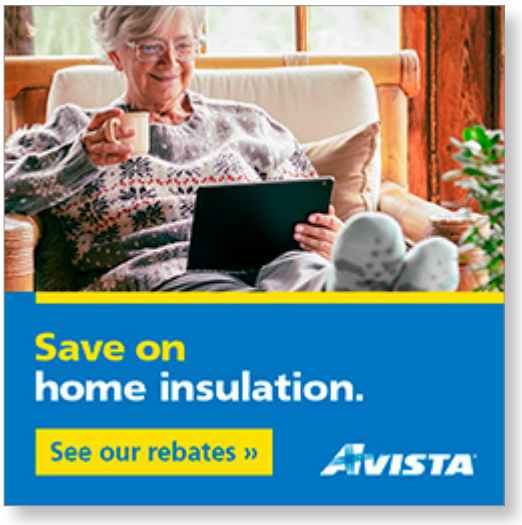
An option was added to the storm window rebate for windows that are not ENERGY STAR certified. They must have a glazing material emissivity of less than 0.22 with a solar transmittance of greater than 0.55.

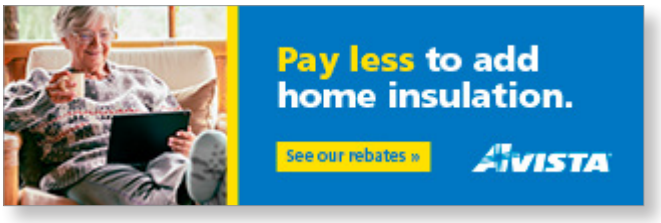
A new rebate option was implemented for self-installed windows that offers customers in rural areas additional choices for installing energy efficient windows. All window rebate requirements are consistent, but customers can install their own windows. The incentive amount is lower for this option.

Program Marketing

The program was included in the winter heating campaign to increase awareness and drive participation (see pages 46-52). Marketing efforts built awareness of opportunities in the home and directed customers to the website for rebate information. Additional efforts to encourage program participation included promotion on Avista's website and bill inserts.

FIGURE 37 – RESIDENTIAL SHELL PROGRAM INSULATION REBATES GOOGLE DISPLAY ADS





Impact Evaluation

For the electric program, the lack of granularity in the Avista TRM data led to a low electric realization rate for attic insulation, wall insulation, and window measures. For attic and wall savings calculations, the expected savings appeared to use a value of 2 kWh per square foot, while Avista's TRM used a value of 1.86 kWh per square foot. Similarly, the difference between RTF savings and the Avista TRM value for window replacements was drastic, with the RTF indicating much lower savings for the window replacements, based on U-values and double- versus single-pane values.

The natural gas program displayed verified savings of 18,117 therms, with a realization rate of 93 percent against the expected savings for the program. The realization rate for the natural gas savings in the Shell Program was less than 100 percent because of differences in quantities between the Avista tracking database and the verified documents. The evaluators conducted a billing analysis for the attic insulation and window replacement measures, but they chose to verify savings through the Avista TRM because savings estimates were unexpectedly low.

Recommendations

In the Shell Program, evaluators recommend that Avista updates the single- and double-pane window TRM values to the appropriate RTF UES value. Avista's TRM uses 1.5 kwh per square foot, whereas the RTF displays 1 kWh per square foot for most projects. Similarly, the difference between RTF savings and the Avista TRM value for window replacements is drastic, with the RTF indicating much lower savings for the window replacements, based on U-values and single- versus double-pane values. Evaluators recommend that Avista ensures the correct RTF UES values are used to calculate expected savings and incorporates more granularity by climate zone, heating type, U-value, and single- versus double-pane-specific savings into Avista's TRM.

Starting in 2024 Avista has altered this program to provide rebates on a per window basis. This issue will be resolved with the new structure of the Shell Program.

Plans for 2024

In 2024, Avista will adjust how window rebates are provided. As of April 1, 2024, windows will be rebated on a per window basis. The incentives and savings are based on the u-factor of the installed window, with lower u-factors rebated at a higher amount. Savings have been adjusted to reflect whether the new windows are replacing single- or double-pane windows. A new rebate will be offered for sliding glass doors, which will follow the same requirements as windows.

Residential Home Energy Audit Program

Description

The Home Energy Audit Program completed its first full year as a program in 2023. The program entails a home energy auditor going into the customer's home for a clipboard style inspection. This is a visual inspection that looks for opportunities for energy-efficient upgrades in the customer's home. Customers complete an application to participate at no cost to them. Customers have the option to pay an additional fee if they wish to have a blower-door test. After the audit is completed, the customer receives a written Home Performance Report detailing the auditors' recommendations for their home, estimated project costs, potential energy savings, directions for installation of some energy saving measures, and leave-behind materials.

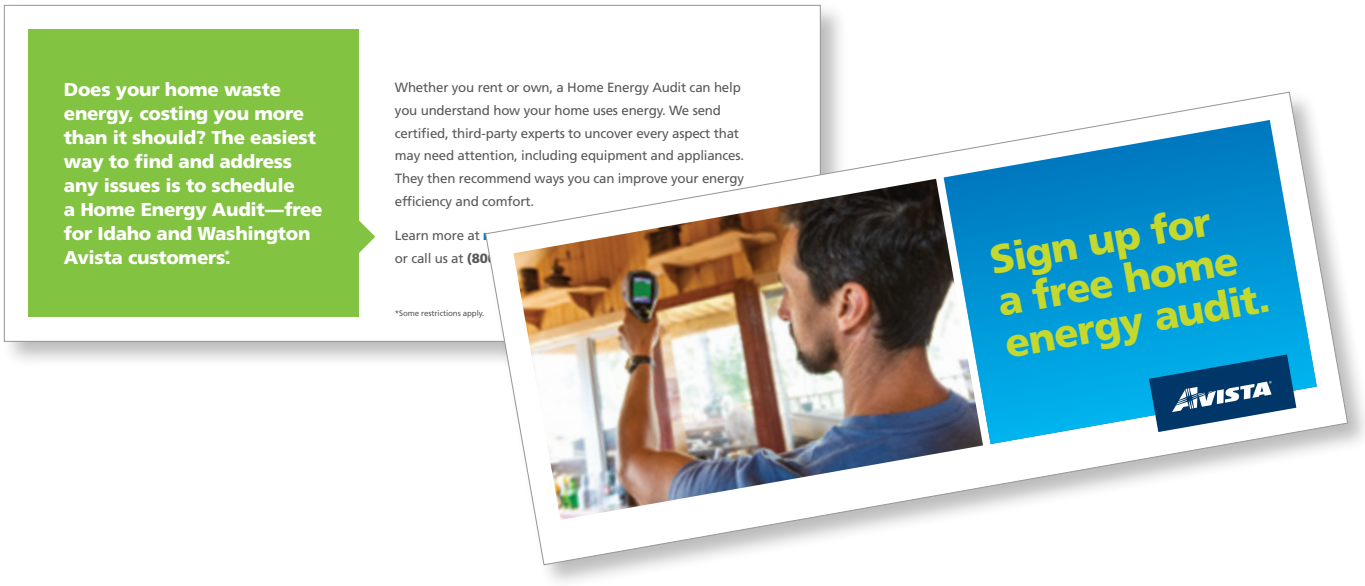
Program Activities

The program is offered across Avista's Idaho and Washington service territories. Initially, Avista projected that the program would conduct an estimated 500 audits between both states in 2023. The projection was close, with 463 audits completed by the end of 2023. Applications drastically increased, as outside temperatures abruptly decreased. The high demand exceeded Avista's ability to schedule all requested audits prior to the end of 2023.

Program Marketing

Due to program interest that exceeded fulfillment capacity, marketing for the Home Energy Audit Program was limited. A bill insert was sent to all Idaho and Washington residential customers in October, aligning with National Energy Awareness Month.

FIGURE 38 – RESIDENTIAL HOME ENERGY AUDIT BILL INSERT



Plans for 2024

Avista estimates program participation will be around 1,000 audits annually across both Idaho and Washington in 2024. Initial marketing in January of 2024 was wildly successful and generated approximately 400 audit requests. Staffing has increased to meet demand with the goal of completing 40 audits per week.

Residential Smart Thermostat Program

Description

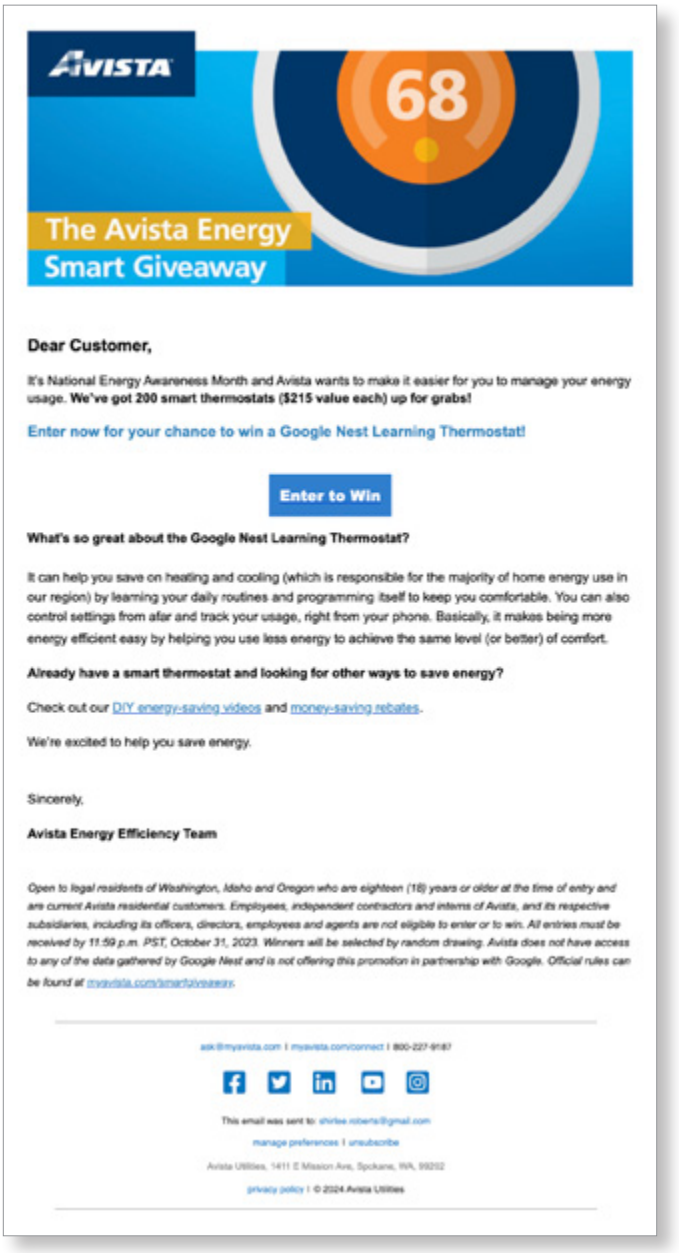
Smart thermostats offer a wide range of options that can assist the customer with reducing their energy usage. A smart thermostat is a Wi-Fi enabled device that automatically adjusts heating and cooling temperature settings in the home for optimal performance. This program requires that the smart thermostat be connected to the customer's in-home Wi-Fi and have a smartphone application available to download or access via the internet. This program is available for new construction and existing homes.

Program Marketing

The Smart Thermostat Program was promoted throughout the year as part of broader residential rebates communications via bill inserts, *Connections* newsletters, social media posts, direct emails, and more. Three separate digital ads helped drive customers to the program, as did search ads. In October, in support of National Energy Awareness Month, Avista offered the Energy Smart Giveaway to its residential customers. The giveaway provided the opportunity for 200 customers to win a smart thermostat. It was promoted via direct email and *Connections* newsletters. More than 9,700 customers registered for the giveaway. Although only 200 won, every customer who entered was mailed an energy-saving tips brochure and a card with information about the program.

FIGURE 39 – RESIDENTIAL SMART THERMOSTAT REBATE GOOGLE DISPLAY ADS

FIGURE 40 – RESIDENTIAL REBATES DIRECT EMAIL



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68

The Avista Energy Smart Giveaway

Dear Customer,

It's National Energy Awareness Month and Avista wants to make it easier for you to manage your energy usage. **We've got 200 smart thermostats ($215 value each) up for grabs!**

Enter now for your chance to win a Google Nest Learning Thermostat!

Enter to Win

What's so great about the Google Nest Learning Thermostat?

It can help you save on heating and cooling (which is responsible for the majority of home energy use in our region) by learning your daily routines and programming itself to keep you comfortable. You can also control settings from afar and track your usage, right from your phone. Basically, it makes being more energy efficient easy by helping you use less energy to achieve the same level (or better) of comfort.

Already have a smart thermostat and looking for other ways to save energy?

Check out our DIY energy-saving videos and money-saving rebates.

We're excited to help you save energy.

Sincerely,

Avista Energy Efficiency Team

Open to legal residents of Washington, Idaho and Oregon who are eighteen (18) years or older at the time of entry and are current Avista residential customers. Employees, independent contractors and interns of Avista, and its respective subsidiaries, including its officers, directors, employees and agents are not eligible to enter or to win. All entries must be received by 11:59 p.m. PST, October 31, 2023. Winners will be selected by random drawing. Avista does not have access to any of the data gathered by Google Nest and is not offering this promotion in partnership with Google. Official rules can be found at myavista.com/smartgiveaway.

ask@myavista.com | myavista.com/connect | 800-227-9187

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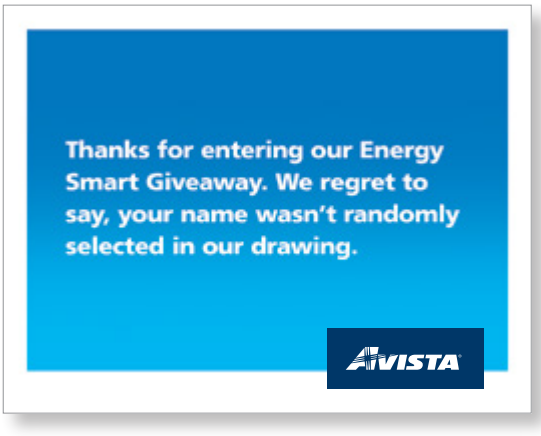
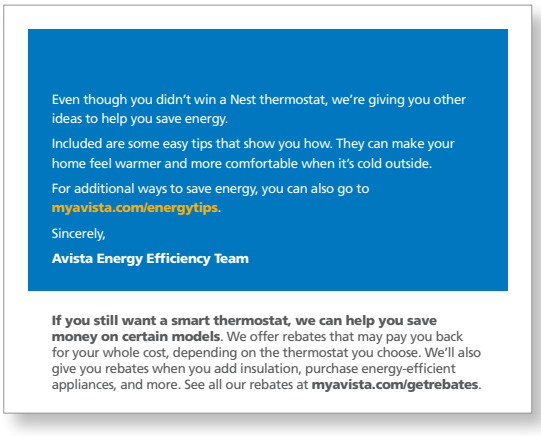
FIGURE 41 – RESIDENTIAL ENERGY SMART GIVEAWAY TIPS CARD





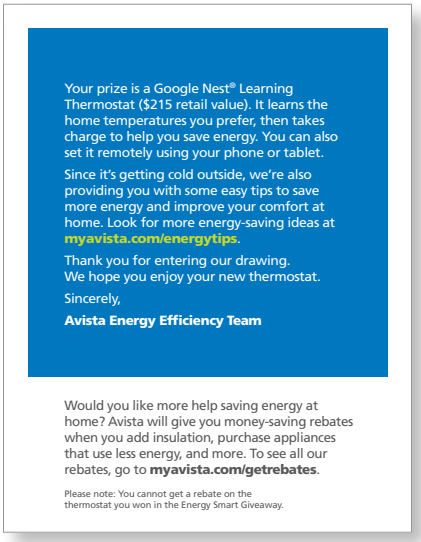
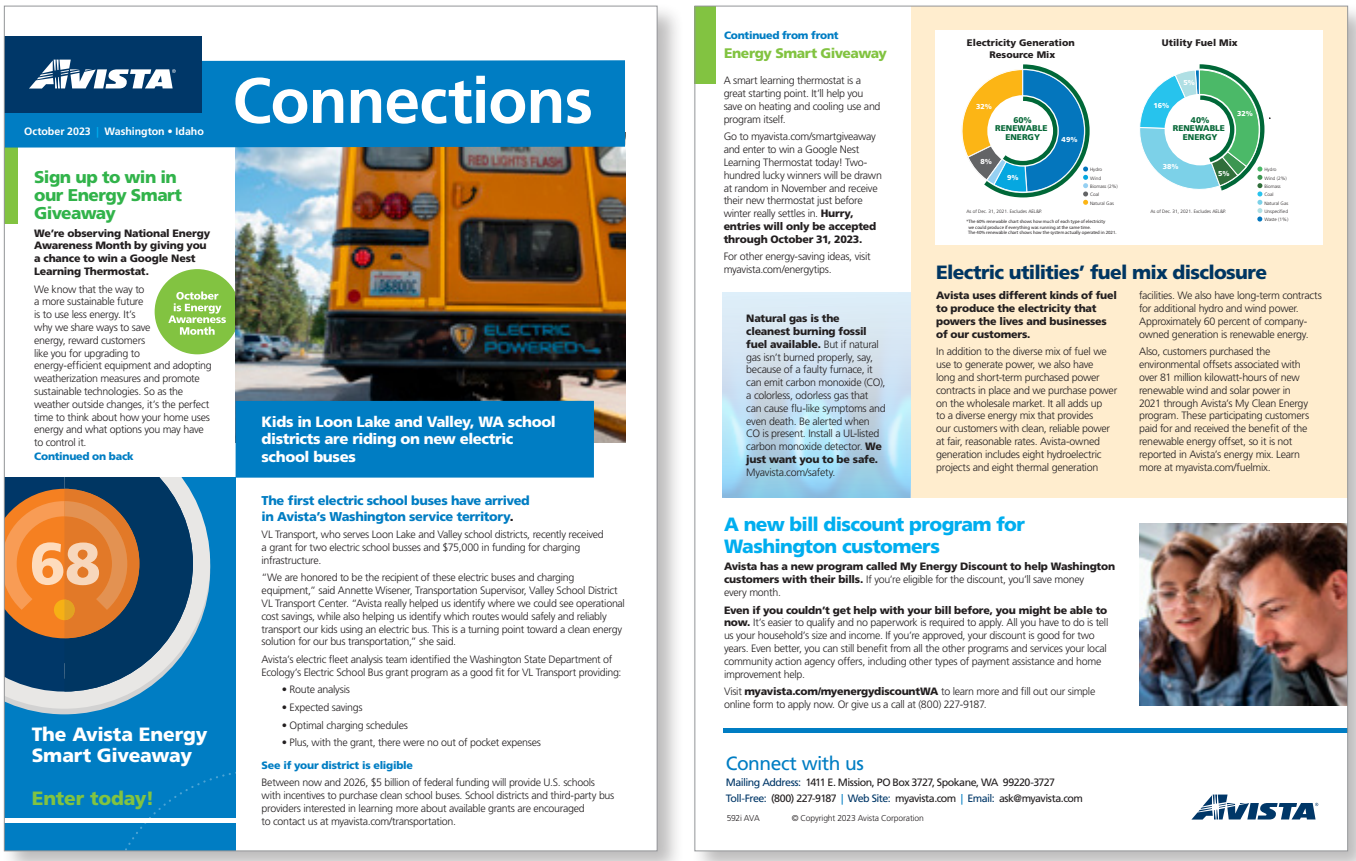


FIGURE 42 – RESIDENTIAL ENERGY SMART GIVEAWAY, OCTOBER 2023 CONNECTIONS NEWSLETTER



AVISTA

Connections

October 2023 | Washington • Idaho

Sign up to win in our Energy Smart Giveaway

We're observing National Energy Awareness Month by giving you a chance to win a Google Nest Learning Thermostat.

We know that the way to a more sustainable future is to use less energy. It's why we share ways to save energy, reward customers like you for upgrading to energy-efficient equipment and adopting weatherization measures and promote sustainable technologies. So as the weather outside changes, it's the perfect time to think about how your home uses energy and what options you may have to control it.

October is Energy Awareness Month

Continued on back

Kids in Loon Lake and Valley, WA school districts are riding on new electric school buses

68

The Avista Energy Smart Giveaway

Enter today!

The first electric school buses have arrived in Avista's Washington service territory.

VL Transport, who serves Loon Lake and Valley school districts, recently received a grant for two electric school busses and $75,000 in funding for charging infrastructure.

"We are honored to be the recipient of these electric buses and charging equipment," said Annette Wisener, Transportation Supervisor, Valley School District VL Transport Center. "Avista really helped us identify where we could see operational cost savings, while also helping us identify which routes would safely and reliably transport our kids using an electric bus. This is a turning point toward a clean energy solution for our bus transportation," she said.

Avista's electric fleet analysis team identified the Washington State Department of Ecology's Electric School Bus grant program as a good fit for VL Transport providing:

- Route analysis
- Expected savings
- Optimal charging schedules
- Plus, with the grant, there were no out of pocket expenses

See if your district is eligible

Between now and 2026, $5 billion of federal funding will provide U.S. schools with incentives to purchase clean school buses. School districts and third-party bus providers interested in learning more about available grants are encouraged to contact us at myavista.com/transportation.

Continued from front

Energy Smart Giveaway

A smart learning thermostat is a great starting point. It'll help you save on heating and cooling use and program itself.

Go to myavista.com/smartgiveaway and enter to win a Google Nest Learning Thermostat today! Two-hundred lucky winners will be drawn at random in November and receive their new thermostat just before winter really settles in. **Hurry, entries will only be accepted through October 31, 2023.**

For other energy-saving ideas, visit myavista.com/energytips.

Natural gas is the cleanest burning fossil fuel available. But if natural gas isn't burned properly, say, because of a faulty furnace, it can emit carbon monoxide (CO), a colorless, odorless gas that can cause flu-like symptoms and even death. Be alerted when CO is present. Install a UL-listed carbon monoxide detector. **We just want you to be safe.** Myavista.com/safety.

Electric utilities' fuel mix disclosure

Avista uses different kinds of fuel to produce the electricity that powers the lives and businesses of our customers.

In addition to the diverse mix of fuel we use to generate power, we also have long and short-term purchased power contracts in place and we purchase power on the wholesale market. It all adds up to a diverse energy mix that provides our customers with clean, reliable power at fair, reasonable rates. Avista-owned generation includes eight hydroelectric projects and eight thermal generation facilities. We also have long-term contracts for additional hydro and wind power. Approximately 60 percent of company-owned generation is renewable energy.

Also, customers purchased the environmental offsets associated with over 81 million kilowatt-hours of new renewable wind and solar power in 2021 through Avista's My Clean Energy program. These participating customers paid for and received the benefit of the renewable energy offset, so it is not reported in Avista's energy mix. Learn more at myavista.com/fuelmix.

A new bill discount program for Washington customers

Avista has a new program called My Energy Discount to help Washington customers with their bills. If you're eligible for the discount, you'll save money every month.

Even if you couldn't get help with your bill before, you might be able to now. It's easier to qualify and no paperwork is required to apply. All you have to do is tell us your household's size and income. If you're approved, your discount is good for two years. Even better, you can still benefit from all the other programs and services your local community action agency offers, including other types of payment assistance and home improvement help.

Visit **myavista.com/myenergydiscountWA** to learn more and fill out our simple online form to apply now. Or give us a call at (800) 227-9187.

Connect with us

Mailing Address: 1411 E. Mission, PO Box 3727, Spokane, WA 99220-3727
Toll-Free: (800) 227-9187 | Web Site: myavista.com | Email: ask@myavista.com

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Impact Evaluation

For the Smart Thermostat Program, realization rates for the Smart Thermostat DIY with Electric Heat and Smart Thermostat Paid Install with Electric Heat were lower than 100 percent because the Avista TRM used an average of heating type savings values, as well as an average across heating types, while the evaluators assigned the appropriate RTF UES value for each heating zone.

Recommendations

The evaluators recommend that Avista checks the source Air-Conditioning, Heating, and Refrigeration Institute (AHRI) documentation and product level documentation to verify efficiency prior to incentivizing installation of the measure. Evaluators also recommend providing a qualified product list for customers to ensure that the smart thermostats they purchase meet program requirements. In addition, evaluators recommend that Avista verifies each program rebate to confirm qualifications after rebates are submitted.

Avista acknowledges the recommendation to check the source AHRI documentation. This documentation, however, no longer applies because Avista moved HVAC systems to its Midstream Program and now requires smart thermostats to be ENERGY STAR certified. Per the recommendation to provide a qualified product list, Avista made a program change as of April 1, 2024 that requires smart thermostats to be ENERGY STAR certified to qualify for a rebate. In June of 2024, Avista submitted a request to iEnergy to update the library, and the program manager requested that it continue to be updated on a quarterly basis.

Plans for 2024

Beginning in April 2024, Avista will require that smart thermostats be ENERGY STAR certified to be eligible for rebate incentives. This is to ensure consistency of functionality of the thermostats installed.

Residential ENERGY STAR / NEEM Manufactured Homes Program

TABLE 33 – RESIDENTIAL ENERGY STAR HOMES PROGRAM METRICS

ENERGY STAR Homes Program Summary – Electric	2023
Participation, Savings, and Costs	
Conservation Projects	14
Overall kWh Savings	47,508
Incentive Spend	$ 14,000
Non-Incentive Utility Costs	$ 13,768
Idaho Energy Efficiency Rider Spend	$ 27,768
ENERGY STAR Homes Program Summary – Natural Gas	**2023**
Participation, Savings, and Costs	
Conservation Projects	1
Overall Therm Savings	134
Incentive Spend	$ 600
Non-Incentive Utility Costs	$ 205
Idaho Energy Efficiency Rider Spend	$ 805

Description

Any Idaho residential electric customer who purchases a new ENERGY STAR manufactured home as certified by Northwest Energy-Efficient Manufactured (NEEM) with Avista electric and/or Avista natural gas for space and water heating is eligible for the rebate.

NEEM-certified homes provide energy savings beyond code requirements for space heating, water heating, shell measures, lighting, and appliances. Space-heating equipment may include electric forced air, an electric heat pump, or a natural gas furnace. This rebate encompasses the whole home and may not be combined with other Avista individual measure rebate offers (such as high-efficiency water heaters).

The ENERGY STAR Manufactured Homes Program promotes a sustainable, low-operating-cost, environmentally friendly structure as an alternative to traditional home construction to both builders and homeowners. In Idaho, Avista offers both electric and natural gas energy-efficiency programs; as a result, the company has structured the program to account for homes where either a single fuel or both fuels are used for space and water heating needs. Avista continues to support the regional program to encourage sustainable building practices.

Program Activities

- ***Electric***: Savings were 47,508 kWh in 2023, accounting for 3 percent of the residential electric savings portfolio.
- ***Natural Gas***: Savings were 134 therms in the program in 2023.

The 2023 incentive for ENERGY STAR manufactured homes was $1,000 for homes using either Avista's electric service or both its electric and natural gas, and $600 for homes using Avista's natural gas only.

Impact Evaluation

For the ENERGY STAR Homes Program, the evaluators found that realization rates differed from 100 percent because of the application of heating zone and cooling zone via the RTF, which the Avista TRM lacks. In addition, the evaluators found that realization rates differed from 100 percent due to savings value application. Program application forms commonly lacked information about the home's primary and secondary space and water heating type.

Recommendations

The evaluators recommend updating the Avista measure savings database to match the primary heating type for dual fuel households. The evaluators also recommend updating the document data aggregation to provide consistent database values between the database and the provided rebate forms (primary heating type) and to determine whether the customer is an Avista electric and/or natural gas customer before providing an incentive for dual fuel. Finally, the evaluators recommend updating Avista's measure savings to reflect heating zone-specific RTF measure savings rather than averaging savings from heating zones together.

Avista has updated the verbiage on the website to ensure it aligns with the program design.

Plans for 2024

There are no substantial measure changes planned for this program in 2023. Avista will, however, include a TRM savings value of 43kWh for natural gas-heated ENERGY STAR homes.

Residential Multifamily Weatherization Program

TABLE 34 – RESIDENTIAL MULTIFAMILY WEATHERIZATION PROGRAM METRICS

Multifamily Weatherization Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		63
Overall kWh Savings		81,535
Incentive Spend	$	13,078
Non-Incentive Utility Costs	$	23,629
Idaho Energy-Efficiency Rider Spend	$	36,707
Multifamily Weatherization Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		69
Overall Therm Savings		5,445
Incentive Spend	$	34,857
Non-Incentive Utility Costs	$	8,339
Idaho Energy-Efficiency Rider Spend	$	43,196

Description

After previous efforts to include small homes in this program resulted in customer confusion, the program returned to focusing on multifamily properties in 2023. For multifamily residences (five-plex or larger), owners and developers may choose to make efficiency improvements to the entire complex through the Commercial Site-Specific Program or to single units through the Multifamily Direct-Install Program approach. Energy savings claimed are less than the traditional residential rebate program. Savings were determined by considering lower estimated energy use and home square footage.

Program Activities

The Multifamily Weatherization Program accounted for 5 percent of program savings for electric and three percent of savings for natural gas programs.

- ***Electric***: Savings of 81,535 kWh in 2023, an increase of 335 percent compared to 18,754 kWh achieved in 2022.
- ***Natural Gas***: Savings of 5,445 therms in 2023, an increase of 470 percent over the 955 therms achieved in 2022.

Program Changes

Due to customer confusion, the small home portion of the Multifamily Weatherization Program was eliminated as of January 1, 2023. Small homes are now served by the Single-Family Program. Usage requirements were eliminated in 2023 to drive throughput and to eliminate a barrier for properties with a lower square footage footprint that have lower energy usage. As of April 1, 2024, line-voltage thermostats were discontinued as a program offering.

Impact Evaluation

In the Multifamily Weatherization Program, evaluators found that many projects (14) exceeded Avista's definition of "small home" as a single-family home with less than 1,000 square feet or a multifamily home with five or more units. Although quantities in the Customer Care and Billing (CC&B) database were consistent, the Avista TRM savings values differed from verified RTF UES values for each of the projects. Most projects displayed realization rates that differed from 100 percent due to variations in home type. The evaluators verified the home type via Zillow to apply correct RTF workbook savings from the single family, multifamily, and manufactured home RTF workbooks. These adjustments led to high and low realization rates across each measure. Many of the measures (ductless heat pump, attic insulation, and door insulation) displayed low realization rates due to the exclusion of heating and cooling zone specifications in the Avista TRM.

The evaluators found that the tracking database did not track square footage data consistently for insulation measures.

Recommendations

The evaluators recommend that Avista performs additional quality assurance (QA) and quality control (QC) efforts to ensure square footage is tracked properly, especially for multiple insulation projects.

Avista has noted the evaluators' recommendation and will continue to work on improving the QA/QC process. The evaluators recommend updating Avista TRM values to incorporate expected downward adjustment based on heating and cooling zone distribution among its participants rather than taking a simple average of all zones. This change will improve realization rates in future evaluation periods. They also recommend removing expected savings for this measure in the future. The evaluators found that the realization rate for ENERGY STAR certified refrigerators and freezers was low because a subset of rebates were for bottom-mount refrigerators, which caused the RTF savings to reflect a lower value. The realization rate for the smart thermostats was low because one of the two thermostats was verified to lack RTF qualification since it didn't have occupancy sensor or geolocation capabilities and the RTF UES value is 75 percent of the amount of the Avista TRM value. The evaluators recommend updating the Avista TRM value for smart thermostats to match the expected RTF UES values.

Plans for 2024

In 2024, the Multifamily Weatherization Program will include homes with shared interior walls.

Residential Appliances Program

TABLE 35 – RESIDENTIAL APPLIANCES PROGRAM METRICS

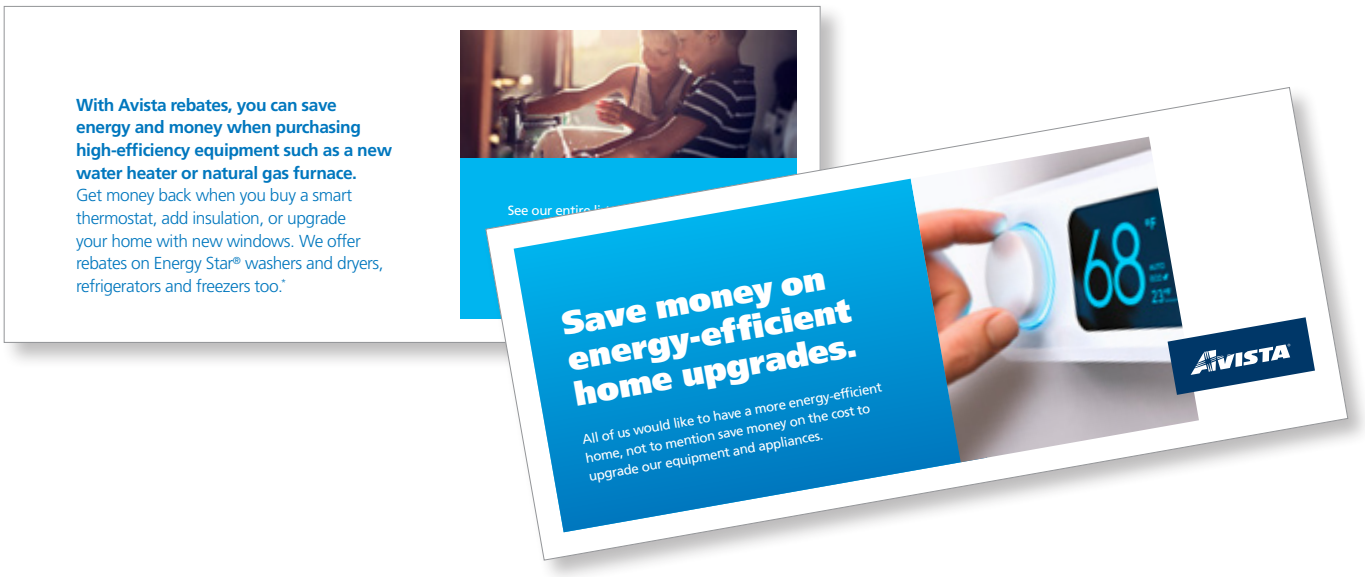
Appliances Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		555
Overall kWh Savings		81,599
Incentive Spend	$	38,100
Non-Incentive Utility Costs	$	23,647
Idaho Energy Efficiency Rider Spend	$	61.747
Appliances Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		115
Overall Therm Savings		396
Incentive Spend	$	5,450
Non-Incentive Utility Costs	$	606
Idaho Energy Efficiency Rider Spend	$	6,056

Description

Avista has historically offered incentives for high-efficiency appliances such as residential washers, dryers, refrigerators, and freezers through various avenues, such as point-of-sale programs and prescriptive paths. Beginning in 2022 and continuing in 2023, the company's prescriptive offerings included rebates for ENERGY STAR certified appliances, such as:

- front-load and top-load washers
- electric and gas dryers
- refrigerators/freezers
- freezers

FIGURE 43 – RESIDENTIAL APPLIANCE PROGRAM BILL INSERT



Program Activities

- ***Electric***: Savings of 81,599 kWh in 2023 (5 percent of the overall portfolio), a 151 percent increase over the 32,467 kWh achieved in 2022.
- ***Natural Gas***: Savings of 396 therms in 2023, a 14 percent decrease from the 457 therms achieved in 2022.

Program Changes

In 2023, ENERGY STAR certified top-load washers were added to the program, although with notably less energy savings than front-load models.

Impact Evaluation

For the Residential Appliance Program, evaluators noted that the Avista TRM defined appropriate unit energy savings for the refrigerator-freezer and upright freezer measures. They found that program verified savings resulted in a 95 percent realization rate due to the attribution of 0 kWh per unit savings to the ENERGY STAR certified top load washer. The evaluators removed savings for this measure because the RTF clothes washer workbook estimated that savings for this measure are negative, and there are therefore no proven RTF savings. All refrigerator-freezer projects were verified to be ENERGY STAR certified. In addition, the expected savings for the ENERGY STAR certified clothes dryer measure were lower than the RTF workbook unit savings by nearly 8 percent. The evaluators noted that the tracking database did not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions.

The natural gas program displayed a realization rate of 66 percent at 396 therms saved in the 2023 program year. The realization rate for the natural gas savings in the Appliance Program deviated from 100 percent due to the removal of savings from the top load washer measure and inflated savings from the ENERGY STAR certified clothes dryer measure. The expected savings utilized a 2.72 therms savings value for clothes dryers, but the appropriate RTF UES value was 9.59 therms. The evaluators recommend updating the clothes dryer measure to align with the RTF UES value. They noted that the tracking database did not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions.

Recommendations

The evaluators recommend that Avista reconsiders including this measure in its program offerings and eliminates top-load washers because zero savings have been assigned to them. Per this recommendation, Avista removed top-load washers as an offering in April 2024. The evaluators recommend incorporating cubic volume in the Appliance Program tracking database and updating clothes dryer expected savings to align with RTF UES values.

Plans for 2024

Avista discontinued the top-load washer rebate as of April 1, 2024. The company will update its TRM in accordance with recommendations.

Residential Multifamily Direct-Install Program and Supplemental Lighting Program

TABLE 36 – RESIDENTIAL MULTIFAMILY DIRECT-INSTALL PROGRAM AND SUPPLEMENTAL LIGHTING PROGRAM METRICS

Multifamily Direct-Install Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		2,744
Overall kWh Savings		172,921
Incentive Spend	$	101,263
Non-Incentive Utility Costs	$	50,112
Idaho Energy-Efficiency Rider Spend	$	151,375
Multifamily Direct-Install Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		68
Overall Therm Savings		227
Incentive Spend	$	880
Non-Incentive Utility Costs	$	348
Idaho Energy-Efficiency Rider Spend	$	1,228

Note that the MFDI program has been tracked by total measures installed, which include LED lamps, faucet aerators, showerheads, and smart strips.

Description

The Multifamily Direct-Install (MFDI) Program is designed to help hard-to-reach customers save energy. Field installers coordinate with property managers of multifamily complexes with five or more units to directly install small energy-savers such as LED lamps, faucet aerators, showerheads, smart power strips, and vending misers in common areas. During the first site visit at properties, installers audit the complex not only for tenant needs, but also for any eligible common area lighting, which would include stairwell lighting used 24/7, exterior lamps and fixtures on a daylight sensor, and conversions from interior fluorescent T12s and T8s to LEDs used 24/7. Direct installations are completed at the complex, and the supplemental lighting information is passed on to lighting contractors working in various areas. Lighting contractors communicate with the property managers to audit and put together project data that is sent to SBW, the program implementer, and Avista to ensure the project is cost-effective, after which the project is completed.

Program Activities

The MFDI Program began in 2018 and ran as designed until March 2020, at which time it was paused due to the COVID-19 pandemic. In April 2022, the program resumed direct installation as originally designed and wrapped up in December of 2023.

- ***Electric***: Savings of 172,921 kWh in 2023 (10 percent of the overall portfolio), an 889 percent increase over the 17,478 kWh achieved in 2022.
- ***Natural Gas***: MFDI had savings of 227 therms in 2023.

FIGURE 44 – RESIDENTIAL MULTIFAMILY DIRECT-INSTALL PROGRAM AND SUPPLEMENTAL LIGHTING PROGRAM FLYER

Impact Evaluation

For the Multifamily Direct-Install Program, the per unit savings value for the lighting measures did not align with the per unit value in the methodology of Avista's implementor, SBW, or with the RTF UES values. The precise reason for these discrepancies was unclear. The evaluators applied SBW TRM values to estimate verified savings for the quantity of each measure claimed. These discrepancies led to deviations from a 100 percent realization rate for lighting measures. Evaluators assessed the faucet and kitchen aerator values using RTF UES values and found no discrepancy between the savings values in the tracking database and the RTF UES values. Therefore, these measures had a realization rate of 100 percent. There was a difference between the calculated expected savings and verified savings because the SBW TRM was applied to the consistently validated quantity of measures. The lighting measures displayed discrepancies in the kWh per unit values used to calculate savings. The reason for these discrepancies was unclear. The screw base LED lamp (A-line 60W) makes up 33 percent of total program savings yet displayed a realization rate of 138 percent, which led to inflated savings for the program overall.

Recommendations

The evaluators recommend that Avista applies the SBW UES to the tracking database accurately and consistently across all lighting measures. In addition, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The evaluators recommend verifying space heating type in the tracking data to apply more specific savings values to each project.

SBW will note the heating type by space and adjust the HVAC savings penalties following the RTF standard lighting savings calculation methods for first year savings for the Multifamily Energy Excellence Program (MEEP).

Plans for 2024

Avista ended the program in December 2023.

Residential HVAC Program

TABLE 37 – RESIDENTIAL HVAC PROGRAM METRICS

HVAC Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		266
Overall kWh Savings		307,573
Incentive Spend	$	128,179
Non-Incentive Utility Costs	$	89,134
Idaho Energy Efficiency Rider Spend	$	217,313
HVAC Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		1,641
Overall Therm Savings		85,264
Incentive Spend	$	454,975
Non-Incentive Utility Costs	$	130,581
Idaho Energy Efficiency Rider Spend	$	585,556

Description

Avista's residential rebate program provides a variety of options to assist customers with multiple energy-efficiency improvements for the home. Various rebates are available to provide comprehensive solutions for space and water heating systems, the building shell, and appliances.

Idaho residential electric customers (Schedule 1) who heat their homes with Avista electricity may be eligible for a rebate to convert their electric straight-resistance space heating to an air-source heat pump or ductless heat pump system. Annual energy use in the home pre-upgrade must show 4,000 kWh or more (and less than 340 therms if natural gas is also available) of heating use. To qualify for the program, air source or ductless heat pumps must have a heating season performance factor (HSPF) of 9 or higher.

Idaho natural gas customers (Schedule 101) who heat their homes with Avista natural gas may be eligible for a rebate for installing a high-efficiency natural gas furnace or boiler. To qualify for the program, high-efficiency natural gas furnaces and boilers must have an annual fuel utilization efficiency (AFUE) of 95 percent or higher, and high-efficiency natural gas wall furnaces must have an AFUE of 90 percent or higher. The supporting documentation required for participation includes, but may not be limited to, copies of project invoices and AHRI certification.

The rebate is paid to the customer after the measure has been installed and documentation has been received. Energy-efficiency marketing efforts build awareness of opportunities in the home and drive customers to the website for rebate information. Vendors generate participation using the Avista rebate as a sales tool for their services.

Program Activities

The annual usage requirement was lowered from 8,000 kWhs to 4,000 kWhs to encourage further participation and account for homes with smaller footprints. As of July 1, 2023, HVAC and water heating rebates moved to Avista's new Midstream Program. The only remaining HVAC prescriptive rebate is for converting from Avista-provided electricity to Avista-provided natural gas.

- ***Electric***: Savings of 307,573 kWh in 2023 (18 percent of the overall portfolio), a 41 percent decrease from the 517,702 kWh achieved in 2022.
- ***Natural Gas***: Savings of 85,264 therms in 2023 (51 percent of the overall portfolio), a 61 percent decrease from the 216,236 therms achieved in 2022. These savings, however, only account for approximately half of the year because program activities transitioned to the Midstream Program.

Impact Evaluation

The evaluators matched Avista's measures in this program to RTF measures and relied on the RTF savings assumptions, which differed from Avista's TRM in some cases. This adjustment led to lower-than-expected savings for some measures and higher-than-expected savings for others. For example, the electric-to-ductless heat pump measure displayed a 22 percent realization rate because the Avista TRM assigned Idaho-based ductless heat pumps a savings value of 4,000 kWh. The RTF, in comparison, assigned a savings value between 856 kWh and 908 kWh, depending on heating and cooling zones. Despite this specific adjustment downward, there was an overall upward adjustment of savings for measures in this program.

Recommendations

The evaluators recommend updating the Avista TRM value for Idaho-based unit energy savings to match the Washington-based savings values and therefore align with RTF values. Additionally, since six of the eight smart thermostats rebated were verified to not qualify for RTF UES due to lack of occupancy sensors, savings for these projects would be zeroed out.

Plans for 2024

The HVAC program ended in mid-2023, with all measures moving to the Midstream Program, which will continue to be offered in 2024.

Residential Water Heat Program

TABLE 38 – RESIDENTIAL WATER HEAT PROGRAM METRICS

Water Heat Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		7
Overall kWh Savings		4,066
Incentive Spend	$	1,615
Non-Incentive Utility Costs	$	1,178
Idaho Energy Efficiency Rider Spend	$	2,793
Water Heat Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		156
Overall Therm Savings		9,051
Incentive Spend	$	56,100
Non-Incentive Utility Costs	$	13,862
Idaho Energy Efficiency Rider Spend	$	69,962

Description

Idaho customers who use either electricity or natural gas to heat their water are eligible for participation in the Residential Water Heat Program. Three different types of water heaters are available: a high-efficiency electric heat pump water heater with an efficiency rating of 2.9 or higher, a natural gas tankless water heater with an efficiency of 0.82 or higher, or a natural gas high-efficiency storage tank water heater with an efficiency of 0.65 or higher. Efficiency ratings for all equipment are verified according to the contractor invoice or the AHRI certification and should be included with the customer's rebate application.

Program Activities

- ***Electric***: Savings of 4,066 kWh in 2023, an 85 percent decrease from the 27,769 kWh achieved in 2022.
- ***Natural Gas***: Savings of 9,051 therms in 2023, a 68 percent decrease in savings from the 28,408 therms achieved in 2022. These savings, however, only account for approximately half of the year because program activities transitioned to the Midstream Program.

Program Changes

As of July 1, 2023, HVAC and water heating rebates moved to Avista's new Midstream Program. The only remaining HVAC prescriptive rebate is for converting from Avista-provided electricity to Avista-provided natural gas.

Impact Evaluation

For the Water Heat Program, the evaluators found that Avista TRM savings values were slightly lower than the RTF savings assigned for the appropriate water heater tank size and tier efficiency. They found that most of the water heaters were tier 3 or higher, but the Avista TRM only includes savings for a combination of tier 2 and tier 3 savings. In addition, the Avista TRM assigned the savings values for water heaters of any size. During document review, the evaluators found that most of the water heaters had a storage tank under 55 gallons, which has a higher savings value in the RTF than water heaters with unknown tank sizes. The evaluators applied the RTF UES value for the associated tank size and tier found for each model number in the sampled rebates.

Recommendations

The evaluators recommend that Avista documents the tier rating and tank size of heat pump water heaters to ensure proper validation of savings.

Plans for 2024

This program ended in mid-2023 and was replaced by the Midstream Program, which will continue to be implemented in 2024.

Residential Fuel-Efficiency Program

TABLE 39 – RESIDENTIAL FUEL-EFFICIENCY PROGRAM METRICS

Fuel-Efficiency Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		28
Overall kWh Savings		193,123
Incentive Spend	$	64,050
Non-Incentive Utility Costs	$	55,967
Idaho Energy Efficiency Rider Spend	$	120,017

Description

Avista's residential rebate program provides a variety of options to assist customers with multiple energy-efficiency improvements for the home. Various rebates are available to provide comprehensive solutions for space and water heating systems, the building shell, and appliances.

Idaho residential electric customers (Schedule 1) who heat their homes with Avista electricity may be eligible for a rebate to convert their electric straight-resistance space heating a natural gas system. Annual energy use in the home pre-upgrade must show 4,000 kWh or more (and less than 340 therms if natural gas is also available) of heating use. The supporting documentation required for participation includes, but may not be limited to, copies of project invoices and AHRI certification.

The rebate is paid to the customer after the measure has been installed and documentation has been received. Energy-efficiency marketing efforts build awareness of opportunities in the home and drive customers to the website for rebate information. Vendors generate participation using the Avista rebate as a sales tool for their services.

Program Activities

- ***Electric***: Savings of 193,123 kWh in 2023 (11 percent of the overall residential savings), a 41 percent decrease from the 326,625 kWh achieved in 2022.

Program Changes

The annual usage requirement was lowered from 8,000 kWhs to 4,000 kWhs to encourage further participation and account for homes with smaller footprints. With the implementation of the Midstream Program, all electric resistance heating to heat pump conversions were eliminated from the program offerings.

Impact Evaluation

For the Fuel Efficiency Program, the evaluators found that the realization rate deviated from 100 percent because three of the AHRI AFUE values were reported at 80 percent, which does not meet the criteria to qualify for calculated savings. Although the applied Avista TRM prescriptive savings value and the verified savings aligned in the tracking data, the removal of savings from these three projects caused the realization rate to drop down to 86 percent for the program overall.

Recommendations

The evaluators recommend updating the Avista tracking database to capture previous heating types for conversion measures; requiring home previous heating type, existing cooling type, and home type as inputs on the rebate application forms; and enforcing required documents for all rebates, including the AHRI documentation and/or full model number in order to verify measure efficiency.

Plans for 2024

Avista will consider making changes to this program as suggested by program evaluators.

Wallace, Idaho

LOW-INCOME SECTOR

Program-by-Program Summaries

Low-Income Program

TABLE 40 – LOW-INCOME PROGRAM METRICS

Low-Income Program Summary – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		142
Overall kWh Savings		171,311
Incentive Spend	$	745,060
Non-Incentive Utility Costs	$	243,421
Idaho Energy Efficiency Rider Spend	$	989,320
Low-Income Program Summary – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		62
Overall Therm Savings		2,025
Incentive Spend	$	344,129
Non-Incentive Utility Costs	$	17,009
Idaho Energy Efficiency Rider Spend	$	361,124

For 2023, the Low-Income Program served 142 electric and 62 natural gas customers. Program participation for low-income programs is quantified in the number of installed units or square feet of installed insulation or windows.

Description

Avista partners with a community action partnership (CAP) agency to deliver energy-efficiency programs to low-income residents in ten Idaho counties within the company's service territory in Idaho. The CAP has the infrastructure in place to income-qualify customers, as well as provide access to a variety of funding sources to make energy-efficiency improvements to their homes. The agency serving Avista's Idaho territory receives an annual funding amount of $875,000, with an additional $75,000 allocated for conservation education and outreach efforts.

The agency may spend the contract amount at its discretion on either electric or natural gas efficiency measures. The home must demonstrate a minimum level of annual energy use of either Avista electricity or natural gas for space-heating purposes to be eligible for improvements to the residential shell (e.g., insulation, windows, and roof). For conversions from electric resistive heat to a heat pump or to a natural gas furnace, an annual kilowatt hour use of 4,000 is required. For customers who use natural gas as their main heating source, the home must demonstrate a minimum natural gas baseline of annual energy use of at least 340 therms. The annual funding allocation includes a 15 percent reimbursement for administrative costs. The agency may also choose to use up to 15 percent of its annual allocation for home repair, as well as other health and safety improvements (e.g. bathroom fans, carbon dioxide monitors, and other appropriate measures).

To guide the agencies toward projects that are most beneficial to Avista's energy-efficiency efforts, the company provides an approved list of measures that are considered cost-effective and allow for full reimbursement of the installation.

A list of acceptable measures allows for partial reimbursement of those efficiency improvements that may not be cost-effective but may be vital for the home's functionality. These measures are compensated with an amount that is equal to the utility's avoided cost of the energy savings associated with the improvement.

Program Activities

In 2023, the program achieved 86,539 kWh of verified electric savings and 1,954 of verified natural gas savings in Idaho. Table 41 shows Avista savings goals for the low-income sector for 2023, as well as reported savings and goal portions achieved.

TABLE 41 – LOW-INCOME PROGRAM EVALUATED SAVINGS

Program	Savings Goals	Verified Savings	Percentage of Goal
Electric (kWh)	198,995	171,311	86%
Natural Gas (Therms)	5,690	2,025	36%

Avista continued to reimburse the agencies for 100 percent of the cost for installing most energy-efficiency measures defined on the approved measure list (see Table 42). The company deemed these measures cost-effective during the development of the 2023 Annual Conservation Plan.

TABLE 42 – LOW-INCOME PROGRAM APPROVED MEASURE LIST

Electric Efficiency Measures	Natural Gas Efficiency Measures
Air Infiltration Attic Insulation Doors – ENERGY STAR-Rated Duct Insulation Duct Sealing Electric to Air-Source Heat Pump (9 HSPF) Electric to Ductless Heat Pump (10 HSPF) Electric to Natural Gas Furnace Conversion Floor Insulation LED Lamps Refrigerator – ENERGY STAR-Rated Wall Insulation Windows – ENERGY STAR-Rated, u-factor .30 or less	Boiler (96% AFUE) Doors – ENERGY STAR-Rated Furnace (95% AFUE) Water Heater (storage) <55 gallon .65 EF Water Heater (tankless) .82 EF Windows – ENERGY STAR-rated, u-factor .30 or less

The agency could receive partial reimbursement for the installation of measures that are on the acceptable measures list but did not meet the cost-effectiveness test. The amount of reimbursement is equal to the avoided cost-energy value of the improvement. This approach focuses the agency toward installing measures that had the greatest cost-effectiveness from the utility's perspective. To allow for additional flexibility, the agency may use the health and safety dollars to fully fund the cost of the measures on the acceptable measures list.

TABLE 43 – LOW-INCOME PROGRAM QUALIFIED REBATE MEASURE LIST

Electric Efficiency Measures	Natural Gas Efficiency Measures
Air-Source Heat Pump Replacement (9 HSPF): $636.45 Door Sweep: $3.00 Electric to Natural Gas Space & Water Heat: $3,211.14 Electric to Natural Gas Hot Water Heat: $376.35 Heat Pump Water Heat (Tier 2-3 any size): $281.10	Air Infiltration: $73.44 Attic Insulation: $1.25 sq/ft Door Sweep: $1.00 sq/ft Duct Insulation: $.096 sq/ft Duct Sealing: $157.82 Floor Insulation: $.97 sq/ft Smart Thermostat: $75.00 Storm Windows: $1.00 sq/ft Wall Insulation: $.75 sq/ft

Program Changes

A new program manager was hired in February 2023, replacing a predecessor who served in the position for more than 28 years.

Customer Outreach

Avista's outreach coordinator retired in April of 2023. With a new program manager taking on this role, Avista concurrently determined that it was necessary to begin engaging in a post-COVID refresh of the company's outreach strategy. Avista therefore paused outreach activities in April 2023 to onboard new staff and develop a new outreach strategy. A new outreach plan will be launched in 2024.

Customers who participate in the Low-Income Weatherization Program are often referred through the partner agency's energy-assistance program. Avista also provides a handful of referrals each year from its internal departments, including energy efficiency and customer service, as well as its Customer Assistance Referral and Evaluation Services (CARES) Program, which provides support for disabled, elderly, and low-income customers, or customers experiencing hardships related to employment, health, or finances.

Other referrals are the result of various outreach events Avista hosts or is invited to attend. In partnership with the company's energy-efficiency efforts, its community and economic vitality department conducts conservation education and outreach for low-income customers, seniors, individuals living with disabilities, and veterans. The Avista outreach team reaches this target population through workshops, energy fairs, and mobile and general outreach. Each method includes demonstrations and distribution of low- and no-cost materials with a focus on energy efficiency, conservation tips and measures, and information regarding energy assistance that may be available through Community Action Agencies (CAA). A primary outreach goal is to increase awareness of energy assistance programs such as the Low-Income Home Energy Assistance Program (LIHEAP) and Project Share.

Avista recognizes several educational strategies as efficient and effective ways to deliver energy efficiency and conservation outreach:

- Energy conservation workshops for senior and low-income Avista customers.
- Mobile outreach through the Avista energy resource vans, where visitors can learn about effective tips to manage their energy use, bill payment options, and community assistance resources.
- General outreach through energy management information and resources at events (such as resource fairs) and through partnerships that reach the target populations. General outreach also includes outlining bill payment options and assistance resources in senior and low-income publications.

Emerging from the pandemic in 2023, Avista cautiously revamped outreach activity to ensure public and staff safety and well-being. To serve customers in a safe manner, the outreach team dropped off energy-saving items and information at food banks, participated in mobile food bank drive-through events, and partnered with community-based organizations to provide home energy kits to their clients. Kits were delivered to multiple community partners, including food banks.

The team conducted and participated in 27 events that reached 5,065 Idaho residents, resulting in the distribution of 287 LED lightbulbs for these customers. Table 44 shows an overview of outreach activities even during a slight outreach pause.

TABLE 44 – LOW-INCOME PROGRAM OUTREACH EVENT AND LED BULB DISTRIBUTION SUMMARY

Description	Number of Events/ Activities	Contacts	LEDs
Direct Outreach through Flyers	5	2,546	
General Outreach	11	84	0
Mobile Outreach	5	56	125
Fairs	6	2,379	162
Total	**27**	**5,065**	**287**

Avista continues to gather information and data about where these customer groups reside and how the weatherization message is best delivered. This occurs through a variety of ways, including input from the company's Energy Efficiency Advisory Group, interactions with stakeholders, and the use of data to assist in locating Avista customers with a high energy burden.

Program Marketing

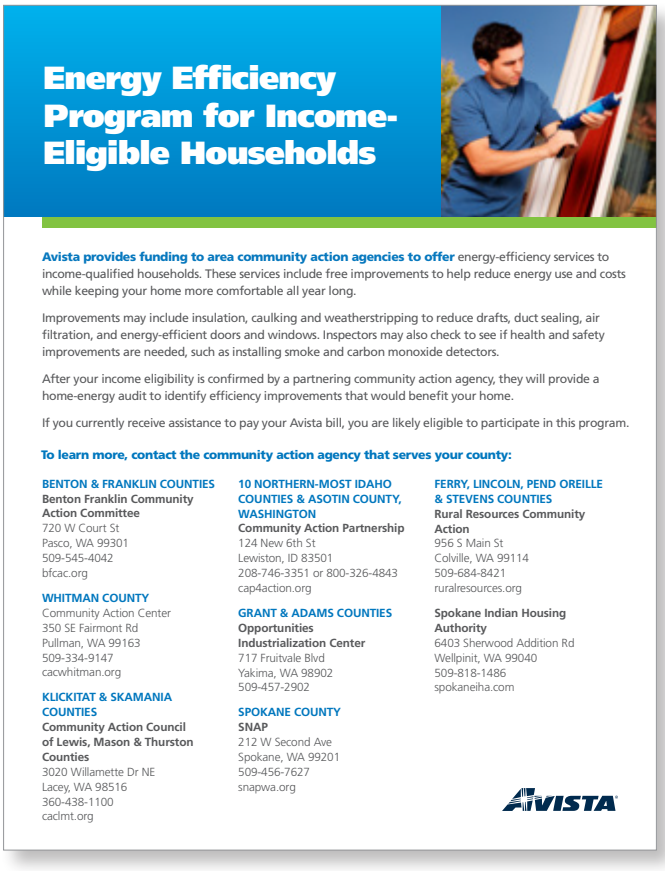
Avista provided support to agencies to increase awareness of its weatherization programs throughout the year. The primary goal of these marketing activities was to connect eligible households to their local agency for weatherization services. Marketing tactics included flyers for agencies to circulate and print, and weatherization information on Avista's website for customers also seeking bill assistance. Marketing collateral was published in both English and Spanish. Avista's energy resource van was also marketed as a resource for agencies to request at their events or sites. The van is staffed by Avista employees who share low- and no-cost energy saving tips as well as bill assistance options with attendees.

FIGURE 45 – LOW-INCOME PROGRAM HOME ENERGY SAVINGS KIT BROCHURE

FIGURE 46 – LOW-INCOME PROGRAM ENERGY USE GUIDE

FIGURE 47 – KIDS CAN SAVE ENERGY TOO COLORING AND ACTIVITY BOOK

FIGURE 48 – LOW-INCOME PROGRAM WEATHERIZATION FLYER



Energy Efficiency Program for Income-Eligible Households

Avista provides funding to area community action agencies to offer energy-efficiency services to income-qualified households. These services include free improvements to help reduce energy use and costs while keeping your home more comfortable all year long.

Improvements may include insulation, caulking and weatherstripping to reduce drafts, duct sealing, air filtration, and energy-efficient doors and windows. Inspectors may also check to see if health and safety improvements are needed, such as installing smoke and carbon monoxide detectors.

After your income eligibility is confirmed by a partnering community action agency, they will provide a home-energy audit to identify efficiency improvements that would benefit your home.

If you currently receive assistance to pay your Avista bill, you are likely eligible to participate in this program.

To learn more, contact the community action agency that serves your county:

BENTON & FRANKLIN COUNTIES
Benton Franklin Community Action Committee
720 W Court St
Pasco, WA 99301
509-545-4042
bfcac.org

WHITMAN COUNTY
Community Action Center
350 SE Fairmont Rd
Pullman, WA 99163
509-334-9147
cacwhitman.org

KLICKITAT & SKAMANIA COUNTIES
Community Action Council of Lewis, Mason & Thurston Counties
3020 Willamette Dr NE
Lacey, WA 98516
360-438-1100
caclmt.org

10 NORTHERN-MOST IDAHO COUNTIES & ASOTIN COUNTY, WASHINGTON
Community Action Partnership
124 New 6th St
Lewiston, ID 83501
208-746-3351 or 800-326-4843
cap4action.org

GRANT & ADAMS COUNTIES
Opportunities Industrialization Center
717 Fruitvale Blvd
Yakima, WA 98902
509-457-2902

SPOKANE COUNTY
SNAP
212 W Second Ave
Spokane, WA 99201
509-456-7627
snapwa.org

FERRY, LINCOLN, PEND OREILLE & STEVENS COUNTIES
Rural Resources Community Action
956 S Main St
Colville, WA 99114
509-684-8421
ruralresources.org

Spokane Indian Housing Authority
6403 Sherwood Addition Rd
Wellpinit, WA 99040
509-818-1486
spokaneiha.com

AVISTA

Cost-Effectiveness

Tables 45 and 46 show the low-income sector cost-effectiveness results by fuel type.

TABLE 45 – LOW-INCOME COST-EFFECTIVENESS RESULTS – ELECTRIC

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 6,797,188	$ 862,886	7.88
UCT	$ 278,060	$ 989,320	0.28
PCT	$ 7,144,764	$ (126,434)	N/A*
RIM	$ 278,060	$ 1,614,956	0.17

* Participant Cost Test is not appropriate to apply to Low Income benefits and costs. These totals include Low Income totals aggregated with Residential and Commercial totals.

TABLE 46 – LOW-INCOME COST-EFFECTIVENESS RESULTS – NATURAL GAS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 204,151	$ 46,299	4.41
UCT	$ 19,095	$ 361,124	0.05
PCT	$ 484,091	$ (314,825)	N/A*
RIM	$ 19,095	$ 660,159	0.03

* Participant Cost Test is not appropriate to apply to Low Income benefits and costs. These totals include Low Income totals aggregated with Residential and Commercial totals.

Impact Evaluation

The Low-Income Program achieved a realization rate of 77 percent for electricity and 95 percent for natural gas savings in 2023.

Evaluators note that most deviations from a 100 percent realization rate are attributable to errors in applying the Avista TRM values. For electric measures, this is because of inaccurate TRM values for conversion to air source heat pumps and conversion to natural gas furnaces. For natural gas measures, this is because of inaccurate TRM values for attic insulation. Evaluators recommend that the company works to ensure that the Avista TRM rates are properly applied.

Recommendations

Evaluators note that most deviations from a 100 percent realization rate in the program are attributable to slight discrepancies between the reported savings and the Avista TRM, as well as some measures where 20 percent annual household energy caps were improperly applied. Evaluators recommend verifying that the Avista TRM values and the 20 percent household cap are properly applied when calculating measure savings with available household billing data.

Plans for 2024

The agencies will continue to implement weatherization measures in the next two-year contracting cycle, coinciding with the first year of Avista's Biennial Conservation Plan. As part of the eligibility review, each CAA will continue to identify potential customers with a large energy burden. Avista will work with each agency to identify potential customers that may fall into the high-energy-burden category. As mentioned previously, the measures that appear on the approved and acceptable measure lists may fluctuate annually based on utility cost-effectiveness tests. The flexibility given to how the dollars are used for the health, safety, and repair allocation does allow for non-cost-effective measures to be fully funded. For 2024 and 2025, the Low-Income Weatherization Program received an additional $500k for the biennial budget to help increase customer energy efficiency while reducing their energy bills due to various weatherization projects.

Avista will continue to revisit UES assumptions for measures as part of its annual business planning process. The company also continues to re-evaluate the units used to set program participation goals for the year. Finally, Avista will ensure that the TRM is updated to reflect any UES adjustments.

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McEuen Park, Coeur d'Alene, Idaho

PILOT PROGRAMS

Program-by-Program Summaries

Active Energy Management

Description

Consistent with Avista's goals to be carbon-neutral by 2030 and carbon-free by 2045 – and also aligning with efficiency requirements on commercial buildings – the Active Energy Management (AEM) pilot focuses on the exploration of clean energy transformation for commercial buildings. AEM can be defined in industry terms as a strategic energy management program that employs monitoring-based commissioning processes and fault detection and diagnostic tools.

For this pilot, Avista has partnered with Edo, a building efficiency and grid optimization business that is a joint investment between Avista Development and McKinstry. The AEM pilot uses the newly built eco-district's communication networks, cloud services, and data-mining algorithms to capture, process, and disseminate actionable information to participants in the program. The technology platform provides a framework to evaluate building performance.

The energy management pilot represents an enhanced approach to utility customer solutions. Specifically, the pilot provides high-touch energy management services and education to customers to complete identified energy conservation measures. This is a three-year, full service, no-cost pilot program that will conclude the end of 2024. Before the pilot term ends, Avista will evaluate the pilot thoroughly to determine whether this service can be offered more broadly as a full program.

Goals of the pilot include the following:

- Achieve 4.8 million kWh of energy savings over the pilot term.
- Acquire rich facility operating information that can inform future rate or program design, particularly focused on future load flexibility programs.
- Increase customer satisfaction for participating building owners and operators.
- Gain insight into customer willingness to participate in future demand flexibility programs.
- Demonstrate non-energy benefits from program participation, including occupant comfort, reduced greenhouse gas emissions, and improved equipment life expectancy.

Program Activities

Most of the participants have been involved in the pilot since 2022, with the exception of two customers added at the end of 2023 in an effort to broaden the building diversity from which to learn. Building types participating in the pilot include large and small office buildings, retail space, medical centers, hospitals, community centers, grocery stores, and universities. Participants in the program have unlimited access to Edo's Torrens Platform to view facility portfolio performance over time and identify energy conservation measures and utility billing data. The Torrens Platform also has an interactive tool participants can use to find trends and irregularities in HVAC system operations. Monthly business review meetings occur for all of the pilot participants individually that include Edo, Avista, and customers. These meetings allow for individualized customer project discussion and guidance with energy conservation measures and any additional help the customer may need to complete them. During these meetings, Avista promotes its other energy-efficiency incentive programs when the energy conservation measures being considered will qualify.

Customers receive an annual report describing activities and energy savings within their buildings as a result of pilot participation. Facility operators find this report beneficial in communicating the value of the program and energy efficiency with their leadership.

Program Changes

No pilot changes are being proposed at this time.

Plans for 2024

The pilot will be evaluated in mid-2024 to determine whether a program should be offered.

Inland Northwest Center for Energy and Decarbonization

In 2023, Avista led a cross-sector collaboration to establish the Inland Northwest Center for Energy and Decarbonization (INTENT) by pursuing funds from the U.S. National Science Foundation (NSF) through its Regional Innovation Engines program. In May 2023, the center was awarded $996,490 through Avista's partner, Urbanova, to further develop a vision that would accelerate innovation and sustained economic growth by building on the existing energy sector in the Inland Northwest.

The scope of the NSF Engines Development Award is to advance energy and decarbonization technologies in the Inland Northwest. The project will ultimately serve 28 counties in Idaho and Washington. Its overarching goal is to inclusively build the economy, nurture effective investments in innovation, grow and sustain a capable workforce, and draw use-inspired research and development into building economic opportunities for all residents of the region. Initially, committed partners include Avista, tribal governments, land grant research universities, national laboratories, a regional workforce council, non-profits leading in energy and equity, public and private universities, public utility districts, angel investment groups, intellectual property experts, state agencies, other economic cluster organizations, and sector-leading for-profit companies.

Several Idaho entities in Avista's service territory are participating in INTENT, including the University of Idaho, North Idaho College, the Coeur d'Alene Tribe, and the Nez Perce Tribe.

Avista has not requested research and development (R&D) funds to support research activities related to this project to date. The INTENT partnership could, however, easily be leveraged in the future to pursue efficiency-specific R&D projects, particularly if INTENT receives full funding to build out the center. As instructed in Order No. 35129 of Case Nos. AVU-E-20-13 and AVU-G-20-08, Avista will continue to explore additional prospects for an R&D program that includes measurable targets and metrics that can be met and monitored, and it will file a proposed updated R&D program if such an opportunity is established.

University of Idaho, Moscow, Idaho

REGIONAL MARKET TRANSFORMATION

Avista's local energy-efficiency portfolio consists of programs and supporting infrastructure designed to enhance and accelerate the saturation of energy-efficiency measures throughout its service territory through a combination of financial incentives, technical assistance, program outreach, and education.

It is not feasible for Avista to independently have a meaningful impact on regional or national markets. Consequently, utilities within the Pacific Northwest have worked together through the Northwest Energy Efficiency Alliance (NEEA) to address opportunities that are beyond the ability or reach of individual utilities. Avista has been participating in and funding NEEA since it was founded in 1997.

Table 47 shows 2023 NEEA savings and the associated costs for Idaho, which exclude internal administrative costs associated with participation in the various NEEA activities and studies. NEEA's costs include all expenditures for operations and value delivery; energy savings initiatives; investments in market training and infrastructure; stock assessments, evaluations, data collection, and other regional and program research; emerging technology research and development; and all administrative costs.

TABLE 47 – NEEA ENERGY SAVINGS AND PARTICIPATION COSTS

Fuel Type	2023 NEEA Energy Savings		2023 NEEA Participation Costs	Avista 2020-2024 Funding Share
Electric	5,957 MWh (0.68 aMW)	$	523,920	1.69%
Natural Gas	217,045 therms	$	175,093	3.55%

Avista will continue to work closely with NEEA and other regional entities to identify overlapping priorities and objectives while simultaneously deploying a more thorough and customized market transformation strategy to its local market – including additional investment and direct coordination with the supply chain.

Electric Energy Savings Share

Values provided in NEEA's 2023 annual report represent the amounts allocated to Avista's service territory, which is a combination of site-based energy savings data (where available), or an allocation of savings based on funding share. NEEA estimates savings at the state level and allocates results to funders based on their share of state residential accounts from the Energy Information Administration (Form EIA-861).

Natural Gas Energy Savings Share

Of the 217,045 therms acquired through NEEA natural gas savings in Idaho in 2023, 216,883 therms (99.9%) were attributed to changes to the residential code. The remaining 161 therms came from commercial products and standards.

NEEA Evaluation Results

Avista's criteria for funding NEEA's market transformation portfolio calls for it to deliver incrementally cost-effective resources beyond what could be acquired through Avista's local portfolio alone. In 2022, in accordance with Idaho Public Utilities Commission (IPUC) Order Number 35129 in AVU-E-20-13/AVU-G-20-08, and in collaboration with Idaho Power, Avista retained a third party to evaluate NEEA's program activities – including savings calculation methodologies, allocation methods of those savings to Idaho Power and Avista, and cost-effectiveness of NEEA savings. This report, which was completed in April of 2023, is included Appendix I. While the evaluators found that NEEA programs are cost-effective overall, they issued a series of nine recommendations concerning allocation methodologies and savings calculation methodologies. Of these nine recommendations, NEEA accepted and incorporated eight. The ninth recommendation, which pertains to attribution percentage of code savings, is being evaluated through NEEA's Cost-Effectiveness Advisory Committee (CEAC), with a proposed resolution and plan of action to be issued by the end of 2024.

The company will continue to be active in the organizational oversight of NEEA to ensure that resource acquisition goals of market transformation are met, savings remain cost-effective, and NEEA programs continue to benefit Idaho customers.

Brio Eastside Collaborative Market Transformation

Since 2019, Avista has participated in an Eastside Collaborative with Idaho Power. The purpose of this collaboration is to investigate new market transformation efforts with a specific focus on energy-efficiency measures and solutions that work well in northern Idaho and eastern Washington. The focus of this effort, a complimentary engagement to NEEA's regional initiatives, was to assess opportunities in regional, smaller scale efforts that focused on customer and trade ally engagement. The Eastside Collaborative's activities were extended by a year due to COVID-related supply chain delays.

In 2023, the collaborative was able to conduct an initial Ductless Heat Pump (DHP) Market Transformation Pilot. The purpose of the pilot was to gauge regional appetite for a locally focused market transformation effort.

Collectively, the pilot resulted in investment from the market of over $1.5 million across both utility territories, with sales in Avista's service territory increasing by 48 percent from January 2022 to April 2023. Overall, 212 DHP units were incentivized, sold, and installed through pilot program installation partners during the pilot period. Of those units, 72 were installed within Avista's service territory, and 38 of the 72 were installed in Phase I of the pilot, which included promotions with Arefco, Carrier, and Bryant. The other 34 were installed during Phase II, with promotions from Thermal Supply and Daikin.

Although Avista saw value in partnering with local trade allies to market incentive programs, the company has opted to pursue a similar type of partnership with distributors through its Midstream Program. As such, there are no plans currently for future market transformation pilots through the Eastside Collaborative; however, the company may explore implementing this model in future program years.

Table 48 summarizes the DHP unit sales from the engagement:

TABLE 48 – DHP UNIT SALES THROUGH BRIO MARKET TRANSFORMATION INITIATIVE

Participating Distributor & Branch	Utility	Phase I Promotional Period	Total DHP Sales for Participating Distributor & Branch	Sales by Distributor Participating in the Pilot	Number of Units Receiving $300 Incentive (adjusted using DSAT)
Thermal Supply	Idaho Power	Oct '21 – Apr '22	1,395 (Oct – Jun)	48*	N/A
Sigler Idaho	Idaho Power	Apr – Aug 2023	364 (Apr – Aug)	169	167
Airefco Spokane	Avista	May – Sept 2023	865 (May – Sept)	329	212
Totals			**2,624**	**546**	**379****

* This figure assumes installs from two Thermal Supply branches in Idaho (Meridian and Twin Falls) based on contractor self-reported sales, Daikin warranty data, and incentive data from Idaho Power.

** This figure includes Thermal Supply's sales in December's report, overlooking that it did not request incentives from Idaho Power in Phase I.

In Avista's service territory, 25 percent of units sold through the participating dealer were incentivized through this program. In conversations with Brio, the participating distributor expressed enthusiasm about participating in the program, but did report some confusion about promotion requirements, which may have resulted in lower initial rebates than expected.

In early 2023, Brio began offering additional orientation webinars for dealers, in order to clarify promotion requirements. In Phase II of the pilot, which extended into 2023, Airefco expanded participation to additional dealers. All distributors who participated in Phase I continued into Phase II. To support Phase II activities, Brio developed a toolkit for dealers to aid in dealer recruitment, which includes draft emails for distributors to send to territory managers, an overview presentation of the pilot to circulate to interested parties, draft emails for territory managers to send to dealers, and templates to collect contact information for participating dealers.

GLOSSARY OF TERMS

Pend Oreille River, Priest River, Idaho

GLOSSARY OF TERMS

active energy management (AEM): The implementation of continuous building monitoring to improve building performance in real time.

adjusted market baseline (AMB): Based on the RTF guidelines; represents a measurement between the energy-efficient measure and the standard efficiency case that is characterized by current market practice or the minimum requirements of applicable codes or standards, whichever is more efficient. When applying an AMB, no net-to-gross factor would be applied since the resultant UES amount would represent the applicable savings to the grid.

advanced metering infrastructure (AMI): Systems that measure, collect, and analyze energy usage from advanced devices such as electricity meters, natural gas meters, or water meters through various communication media on request or on a predetermined schedule.

advisory group: Avista's group of external stakeholders who comment about the company's energy-efficiency activities.

Air-Conditioning, Heating, and Refrigeration Institute (AHRI): The trade association representing manufacturers of HVAC and water heating equipment.

aMW: The amount of energy that would be generated by one megawatt of capacity operating continuously for one full year. Equals 8,760 MWhs of energy.

American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE): Devoted to the advancement of indoor-environment-control technology in the heating, ventilation, and air-conditioning (HVAC) industry, ASHRAE's mission is "to advance technology to serve humanity and promote a sustainable world."

Annual Conservation Plan (ACP): An Avista-prepared resource document that outlines the company's conservation offerings and its approach to energy efficiency, as well as details on verifying and reporting savings.

Annual Conservation Report (ACR): An Avista-prepared resource document that summarizes its annual energy-efficiency achievements.

annual fuel utilization efficiency (AFUE): A measurement of how efficiently a furnace or boiler uses its fuel.

Applied Energy Group (AEG): A consulting service that provides a wide range of energy efficiency and demand response-related management services to assist clients in designing and implementing programs for their customers.

avoided cost: An investment guideline describing the value of conservation and generation resource investments in terms of the cost of more expensive resources that would otherwise have to be acquired.

baseline: Conditions, including energy consumption, that would have occurred without implementation of the subject's energy-efficiency activity. Baseline conditions are sometimes referred to as "business-as-usual" conditions.

baseline efficiency: The energy use of the baseline equipment, process, or practice that is being replaced by a more efficient approach to providing the same energy service. It is used to determine the energy savings obtained by the more efficient approach.

baseline period: The period of time selected as representative of facility operations before an energy-efficiency activity takes place.

Biennial Conservation Plan (BCP): An Avista-prepared resource document that outlines Avista's conservation offerings and its approach to energy efficiency, as well as details on verifying and reporting savings for a two-year period.

Building Owners & Managers Association (BOMA): An international federation of local associations and global affiliates that represents the owners, managers, service providers, and other property professionals of all commercial building types.

Business Partner Program (BPP): An outreach effort designed to raise awareness of utility programs and services that can assist rural small-business customers in managing their energy bills.

British thermal unit (Btu): The amount of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit (3,413 Btu are equal to one kilowatt-hour).

busbar: The physical electrical connection between the generator and transmission system. Typically load on the system is measured at busbar.

capacity: The maximum power that a machine or system can produce or carry under specified conditions. The capacity of generating equipment is generally expressed in kilowatts or megawatts. In terms of transmission lines, capacity refers to the maximum load a line can carry under specified conditions.

coefficient of performance (COP): A ratio of useful heating or cooling provided to work (energy) required for heat pumps, refrigerators, or air-conditioning systems. Higher COPs equate to more efficient systems and lower operating costs.

community action agency (CAA): General term for Community Action Programs, Community Action Agencies, and Community Action Centers that provide services such as low-income weatherization through federal and state and other funding sources (e.g., utility constitutions).

conservation: According to the Northwest Power Act, any reduction in electric power consumption because of increases in the efficiency of energy use, production, or distribution.

conservation potential assessment (CPA): An analysis of the amount of conservation available in a defined area. Provides savings amounts associated with energy-efficiency measures to input into the company's IRP process.

cooling degree days: A measure of how hot the temperature was on a given day or during a period of days. A day with a mean temperature of 80°F has fifteen cooling degree days. If the next day has a mean temperature of 83°F, it has eighteen cooling degree days. Historically, the fixed temperature has been set at 65°F, the outdoor temperature above which cooling was typically needed.

cost-effective: According to the Northwest Power Act, a cost-effective measure or resource must be forecast to be reliable and available within the time it is needed, and to meet or reduce electrical power demand of consumers at an estimated incremental system cost no greater than that of the least-costly, similarly reliable, and available alternative or combination of alternatives.

curtailment: An externally imposed reduction of energy consumption due to a shortage of resources.

customer/customer classes: A category(ies) of customer(s) defined by provisions found in tariff(s) published by the entity providing service, approved by the PUC. Examples of customer classes are residential, commercial, industrial, agricultural, local distribution company, core, and non-core.

decoupling: In conventional utility regulation, utilities make money based on how much energy they sell. A utility's rates are set largely based on an estimation of costs of providing service over a certain set time period, with an allowed profit margin, divided by a forecasted amount of unit sales over the same time period. If the actual sales turn out to be as forecasted, the utility will recover all fixed costs and its set profit margin. If the actual sales exceed the forecast, the utility will earn extra profit.

deemed savings: Primarily referenced as UES, an estimate of an energy savings for a single unit of an installed energy-efficiency measure that (a) has been developed from data sources and analytical methods that are widely considered acceptable for the measure and purpose, and (b) is applicable to the situation being evaluated.

demand: The load that is drawn from the source of supply over a specified interval of time (in kilowatts, kilovolt-amperes, or amperes). Also, the rate at which natural gas is delivered to or by a system, part of a system, or piece of equipment and expressed in cubic feet, therms, Btu or multiples thereof, for a designated period such as during a 24-hour day.

demand response (DR): A voluntary and temporary change in consumers' use of electricity when the power system is stressed.

demand-side management (DSM): The process of helping customers use energy more efficiently. Used interchangeably with energy efficiency and conservation, although conservation technically means using less while DSM and energy efficiency means using less while still having the same useful output of function.

direct load control (DLC): The means by which a utility can signal a customer's appliance to stop operations to reduce the demand for electricity. Such rationing generally involves a financial incentive for the affected customer.

discount rate: The rate used in a formula to convert future costs or benefits to their present value.

distribution: The transfer of electricity from the transmission network to the consumer. Distribution systems generally include the equipment to transfer power from the substation to the customer's meter.

distributed generation (DG): An approach that employs a variety of small-scale technologies to both produce and store electricity close to the end users of power.

effective useful life (EUL): Sometimes referred to as measure life and often used to describe persistence. EUL is an estimate of the duration of savings from a measure.

emergency operating plan (EOP): A plan that assigns responsibility to organizations and individuals for carrying out specific actions to respond to an emergency. An EOP sets forth lines of authority, lays out organizational roles and responsibilities during an emergency, and illustrates how actions will be coordinated. An EOP also describes how people and property will be protected in emergencies and natural disasters, and identifies personnel, equipment, facilities, and supplies to use during recovery operations.

end-use: A term referring to the final use of energy; it often refers to the specific energy services (e.g., space heating), or the type of energy-consuming equipment (e.g., motors).

Energy Assistance Advisory Group (EAAG): An ongoing energy assistance program advisory group to monitor and explore ways to improve Avista's Low-Income Rate Assistance Program (LIRAP).

Energy Efficiency Advisory Group (EEAG): A group which advises investor-owned utilities on the development of integrated resource plans and conservation programs.

Equity Advisory Group (EAG): Provides consultation for various endeavors across the company to ensure that all customers are benefiting from the transition to clean energy through the equitable distribution of energy and non-energy benefits and reduced energy burdens to vulnerable populations and high-impacted communities.

energy-efficiency measure: Refers to either an individual project conducted or technology implemented to reduce the consumption of energy at the same or an improved level of service. Often referred to as simply a "measure."

Energy Independence Act (EIA): Requires electric utilities serving at least 25,000 retail customers to use renewable energy and energy conservation.

energy use intensity (EUI): A metric – energy per square foot per year – that expresses a building's energy use as a function of its size or other characteristics.

evaluation: The performance of a wide range of assessment studies and activities aimed at determining the effects of a program (or portfolio) and understanding or documenting program performance, program, or program-related markets and market operations, program-induced changes in energy-efficiency markets, levels of demand or energy savings, or program cost-effectiveness. Market assessment, monitoring and evaluation, and verification are aspects of evaluation.

Evaluation, Measurement, and Verification (EM&V): Term for evaluation activities at the measure, project, program or portfolio level; can include impact, process, market or planning activities. EM&V is distinguishable from Measurement and Verification (M&V), defined later.

ex ante savings estimate: Forecasted savings value used for program planning or savings estimates for a measure; Latin for "beforehand."

ex-post evaluated estimated savings: Savings estimates reported by an independent, third-party evaluator after the energy impact evaluation has been completed. If only the term "ex-post savings" is used, it will be assumed that it is referring to the ex-post evaluation estimate, the most common usage; from Latin for "from something done afterward."

external evaluators (a.k.a. third-party evaluators): Independent professional efficiency person or entity retained to conduct EM&V activities. Consideration will be made for those who are certified M&V professionals (CMVPs) through the Association of Energy Engineers (AEE) and the Efficiency Evaluation Organization (EVO).

free rider: A common term in the energy-efficiency industry meaning a program participant who would have installed the efficient product or changed a behavior regardless of any program incentive or education received. Free riders can be total, partial, or deferred.

generation: The act or process of producing electricity from other forms of energy.

Green Motors Practices Group (GMPG): A nonprofit corporation governed by electric motor service center executives and advisers whose goal is the continual improvement of the electric motor repair industry.

gross savings: The change in energy consumption or demand that results from energy-efficiency programs, codes, and standards, and naturally occurring adoption which have a long-lasting savings effect, regardless of why they were enacted.

heating degree days: A measure of the amount of heat needed in a building over a fixed period, usually a year. Heating degree days per day are calculated by subtracting from a fixed temperature the average temperature over the day. Historically, the fixed temperature has been set at 65°F, the outdoor temperature below which heat was typically needed. As an example, a day with an average temperature of 45°F would have twenty heating degree days, assuming a base of 65°F.

Heating Seasonal Performance Factor (HSPF): Defined as the ratio of heat output over the heating season to the amount of electricity used in air-source or DHP equipment.

Heating, Ventilation, and Air-Conditioning (HVAC): Sometimes referred to as climate control, HVAC is particularly important in the design of medium to large industrial and office buildings where humidity and temperature must all be closely regulated while maintaining safe and healthy conditions within.

high-intensity discharge (HID) fixture: A fixture that is bright and powerful enough to throw a high amount of lumens an extremely long distance; often used in very large spaces such as manufacturing facilities or sports stadiums.

HOU: Hours of use (an annual estimation of lighting or HVAC equipment operation hours).

Idaho Public Utilities Commission (IPUC): Regulators of investor-owned or privately owned utilities that provide natural gas, water, electricity, or some telephone services for profit.

impact evaluation: Determination of the program-specific, directly or indirectly induced, changes (e.g., energy or demand usage) attributable to an energy-efficiency program.

implementer: Avista employee whose responsibilities are directly related to operations and administration of energy-efficiency programs and activities, and who may have energy savings targets as part of their employee goals or incentives.

incremental cost: The difference between the cost of baseline equipment or services and the cost of alternative energy-efficient equipment or services.

installation verification (IV) report: A detailed report documenting installed conservation measures on a site-specific project.

Integrated Resource Plan (IRP): An IRP is a comprehensive evaluation of future electric or natural gas resource plans. The IRP must evaluate the full range of resource alternatives to provide adequate and reliable service to a customer's needs at the lowest possible risk-adjusted system cost. These plans are filed with the state public utility commissions on a periodic basis.

Integrated Resource Plan Technical Advisory Committee (IRP TAC): Advisory committee for the IRP process that includes internal and external participants.

International Performance Measurement and Verification Protocol (IPMVP): A guidance document with a framework and definitions describing the four M&V approaches; a product of the Energy Valuation Organization (www.evo-world.org).

investor-owned utility (IOU): A utility that is organized under state law as a corporation to provide electric power service and earn a profit for its stockholders.

kilowatt (kW): The electrical unit of power that equals 1,000 watts.

kilowatt-hour (kWh): A basic unit of electrical energy that equals one kilowatt of power applied for one hour.

kilo British thermal unit (kBtu): Btu, which stands for British thermal units, measures heat energy. Each Btu equals the amount of heat needed to raise one pound of water one degree Fahrenheit; the prefix kilo means 1,000, which means that a kBtu equals 1,000 Btu.

Levelized Cost of Energy (LCOE): The present value of a resource's cost (including capital, financing, and operating costs) converted into a stream of equal annual payments. This stream of payments can be converted to a unit cost of energy by dividing them by the number of kilowatt-hours produced or saved by the resource in associated years. By levelizing costs, resources with different lifetimes and generating capabilities can be compared.

line losses: The amount of electricity lost or assumed lost when transmitting over transmission or distribution lines. This is the difference between the quantity of electricity generated and the quantity delivered at some point in the electric system.

Low-Income Home Energy Assistance Program (LIHEAP): Federal energy assistance program available to qualifying households based on income, usually distributed by CAAs or partnerships.

Low-Income Rate Assistance Program (LIRAP): LIRAP provides funding (collected from Avista's tariff rider) to CAAs for distribution to Avista customers who are least able to afford their utility bill.

market effect evaluation: An evaluation of the change in the structure or functioning of a market, or the behavior of participants in a market, that results from one or more program efforts. Typically, the resultant market or behavior change leads to an increase in the adoption of energy-efficient products, services, or practices.

measure (also energy-efficiency measure, or EEM): Installation of a single piece of equipment, subsystem or system, or single modification of equipment, subsystem, system, or operation at an end-use energy consumer facility, for the purpose of reducing energy or demand (and, hence, energy or demand costs) at a comparable level of service.

measure life: See Effective Useful Life (EUL).

Measurement and Verification (M&V): A subset of program impact evaluation that is associated with the documentation of energy savings at individual sites or projects, using one or more methods that can involve measurements, engineering calculations, statistical analyses, or computer simulation modeling. M&V approaches are defined in the International Performance Measurement and Verification Protocol (available at www.evo-world.org).

megawatt (MW): The electrical unit of power that equals one million watts or one thousand kilowatts.

megawatt-hour (MWh): A basic unit of electrical energy that equals one megawatt of power applied for one hour.

net savings: The change in energy consumption or demand that is attributable to an energy-efficiency program. This change in energy use or demand may include, implicitly or explicitly, consideration of factors such as free drivers, non-net participants (free riders), participant and non-participant spillover, and induced market effects. These factors may be considered in how a baseline is defined or in adjustments to gross savings values.

non-energy benefit/non-energy impact (NEB/NEI): The quantifiable non-energy impacts (NEIs) associated with program implementation or participation; also referred to as non-energy benefits (NEBs) or co-benefits. Examples of NEIs include water savings, non-energy consumables, and other quantifiable effects. The value is most often positive, but may also be negative (e.g., the cost of additional maintenance associated with a sophisticated, energy-efficient control system).

Northwest Energy Efficiency Alliance (NEEA): A nonprofit organization that works to accelerate energy efficiency in the Pacific Northwest through the adoption of energy-efficient products, services, and practices.

Northwest Power and Conservation Council (NWPCC): An organization that develops and maintains both a regional power plan and a fish and wildlife program to balance the environmental and energy needs of the Pacific Northwest.

outside air temperature (OAT): Refers to the temperature of the air around an object, but unaffected by the object.

on-bill repayment/financing (OBR): A financing option in which a utility or private lender supplies capital to a customer to fund energy efficiency, renewable energy, or other generation projects. It's repaid through regular payments on an existing utility bill.

Participant Cost Test (PCT): The PCT measures quantifiable costs and benefits to the customer participating in a program – including, for example, the incentive paid by the utility under the program, as well as non-energy impacts. Since many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.

portfolio: Collection of all programs conducted by an organization. In the case of Avista, its portfolio includes electric and natural gas programs in all customer segments. Portfolio can also be used to refer to a collection of similar programs addressing the market. In this sense of the definition, Avista has an electric portfolio and a natural gas portfolio with programs addressing the various customer segments.

prescriptive: A prescriptive program is a standard offer of incentives for the installation of an energy-efficiency measure. Prescriptive programs are generally applied when the measures are employed in relatively similar applications.

process evaluation: A systematic assessment of an energy-efficiency program or program component for the purposes of documenting operations at the time of the examination, and identifying and recommending improvements to increase the program's efficiency or effectiveness for acquiring energy resources while maintaining high levels of participant satisfaction.

program: An activity, strategy, or course of action undertaken by an implementer. Each program is defined by a unique combination of program strategy, market segment, marketing approach, and energy-efficiency measure(s) included. Examples are a program to install energy-efficient lighting in commercial buildings and residential weatherization programs.

project: An activity or course of action involving one or multiple energy-efficiency measures at a single facility or site.

ratepayer impact (RIM): A cost-effectiveness test that measures how customer bills or rates are affected by the changes in utility revenues and operating costs caused by the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels. Lower values equate to less impact on customer bills.

Regional Technical Forum of the Northwest Power and Conservation Council (RTF): A technical advisory committee to the NWPCC established in 1999 to develop standards to verify and evaluate energy-efficiency savings.

realization rate (RR): Ratio of ex ante reported savings to ex-post evaluated estimated savings. When realization rates are reported, they are labeled to indicate whether they refer to comparisons of (1) ex ante gross reported savings to ex-post gross evaluated savings, or (2) ex ante net reported savings to ex-post net evaluated savings.

reliability: When used in energy-efficiency evaluation, the quality of a measurement process that would produce similar results on (a) repeated observations of the same condition or event, or (b) multiple observations of the same condition or event by different observers. Reliability refers to the likelihood that the observations can be replicated.

reported savings: Savings estimates reported by Avista for an annual (calendar) period. These savings will be based on best available information.

request for proposal (RFP): Business document that announces and provides details about a project, as well as solicits bids from potential contractors.

retrofit: To modify an existing generating plant, structure, or process. The modifications are done to improve energy efficiency, reduce environmental impacts, or to otherwise improve the facility.

rigor: The level of expected confidence and precision. The higher the level of rigor, the more confident one is that the results of the evaluation are both accurate and precise, i.e., reliable.

R-value or R-factor (resistance transfer factor): Measures how well a barrier, such as insulation, resists the conductive flow of heat.

Schedules 90 and 190: Rate schedules that show energy-efficiency programs.

Schedules 91 and 191: Rate schedules that are used to fund energy-efficiency programs.

sector(s): The economy is divided into four sectors for energy planning. These are the residential, commercial (e.g., retail stores, office, and institutional buildings), industrial, and agriculture (e.g., dairy farms, irrigation) sectors.

service territory: The areas in Idaho, Washington, and Oregon served by Avista to provide either natural gas or electric service (or both).

site-specific: A commercial/industrial program offering individualized calculations for incentives upon any electric or natural gas efficiency measure not incorporated into a prescriptive program.

simple payback: The time required before savings from a particular investment offset costs, calculated by investment cost divided by value of savings (in dollars). For example, an investment costing $100 and resulting in a savings of $25 each year would be said to have a simple payback of four years. Simple paybacks do not account for future cost escalation or other investment opportunities.

spillover: Reductions in energy consumption or demand caused by the presence of an energy-efficiency program, beyond the program-related gross savings of the participants and without direct financial or technical assistance from the program. There can be participant or non-participant spillover (sometimes referred to as "free drivers"). Participant spillover is the additional energy savings that occur because of the program's influence when a program participant independently installs incremental energy-efficiency measures or applies energy-saving practices after having participated in the energy-efficiency program. Non-participant spillover refers to energy savings that occur when a program non-participant installs energy-efficiency measures or applies energy savings practices because of a program's influence.

Technical Reference Manual (TRM): An Avista-prepared resource document that contains Avista's (ex ante) savings estimates, assumptions and sources for those assumptions, guidelines, and relevant supporting documentation for its natural gas and electricity energy-efficiency prescriptive measures. This document is populated and vetted by the RTF and third-party evaluators.

total resource cost (TRC): A cost-effectiveness test that assesses the impacts of a portfolio of energy-efficiency initiatives regardless of who pays the costs or who receives the benefits. The test compares the present value of costs of efficiency for all members of society (including all costs to participants and program administrators) compared to the present value of all quantifiable benefits, including avoided energy supply and demand costs and non-energy impacts.

transmission: The act or process of long-distance transport of electric energy, generally accomplished by elevating the electric current to high voltages. In the Pacific Northwest, Bonneville operates most of the high-voltage, long-distance transmission lines.

uniform energy factor (UEF): A measurement on how efficiently a water heater utilizes its fuel.

unit estimated savings: Defines the first-year kWh savings value for an energy-efficiency measure.

U-value or U-factor: The measure of a material's ability to conduct heat, numerically equal to one divided by the value of the material. Used to measure the rate of heat transfer in windows. The lower the U-factor, the better the window insulates.

uncertainty: The range or interval of doubt surrounding a measured or calculated value within which the true value is expected to fall within some degree of confidence.

utility cost test (UCT): One of the four standard practice tests commonly used to evaluate the cost-effectiveness of DSM programs. The UCT evaluates the cost-effectiveness based upon a program's ability to minimize overall utility costs. The primary benefits are the avoided cost of energy in comparison to the incentive and non-incentive utility costs.

variable frequency drive (VFD): A type of motor drive used in electro-mechanical drive systems to control AC motor speed and torque by varying motor input frequency and voltage.

verification: An assessment that the program or project has been implemented per the program design. For example, the objectives of measure installation verification are to confirm (a) the installation rate, (b) that the installation meets reasonable quality standards, and (c) that the measures are operating correctly and have the potential to generate the predicted savings. Verification activities are generally conducted during on-site surveys of a sample of projects. Project site inspections, participant phone and mail surveys, or implementer and consumer documentation review are typical activities association with verification. Verification may include one-time or multiple activities over the estimated life of the measures. It may include review of commissioning or retro-commissioning documentation. Verification can also include review and confirmation of evaluation methods used, samples drawn, and calculations used to estimate program savings. Project verification may be performed by the implementation team, but program verification is a function of the third-party evaluator.

vulnerable population: Communities that experience a disproportionate cumulative risk from environmental burdens.

weather normalized: This is an adjustment that is made to actual energy usage, stream-flows, etc., which would have happened if "normal" weather conditions would have taken place.

weighted average cost of capital (WACC): A calculation of a firm's cost of capital in which each category of capital is proportionately weighted. All sources of capital, including common stock, preferred stock, bonds, and any other long-term debt, are included in a WACC calculation.

8760: Total number of hours in a year.

APPENDICES AND SUPPLEMENTS

Palouse, Idaho

APPENDIX A – 2023 ELECTRIC IMPACT EVALUATION REPORT

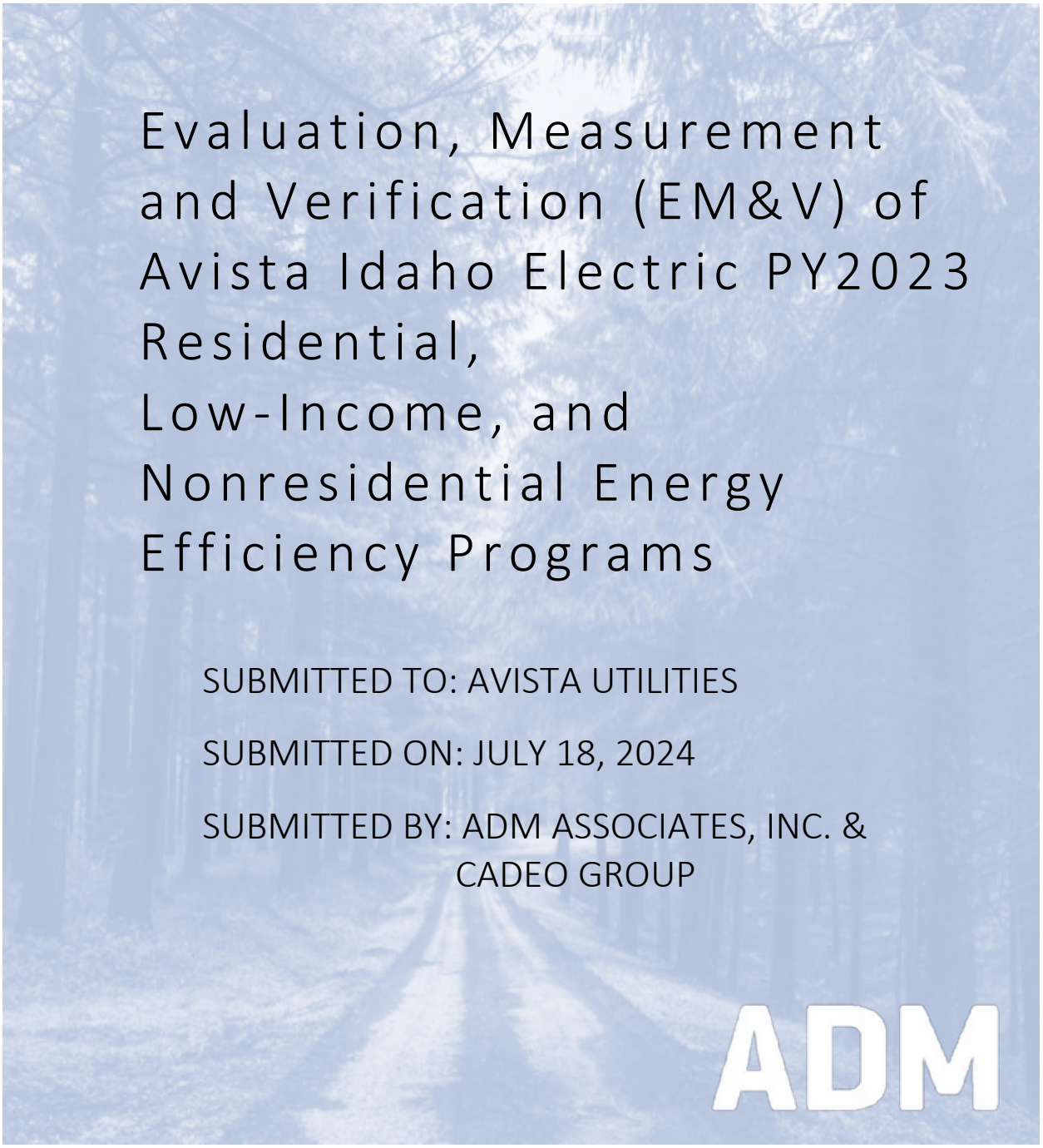

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Table of Contents

List of Tables

1. Executive Summary

This report is a summary of the Residential and Low-Income Electric Evaluation, Measurement, and Verification (EM&V) effort of the 2023 program year (PY2023) portfolio of programs for Avista Corporation (Avista) in the Idaho service territory. The evaluation was administered by ADM Associates, Inc. and Cadeo Group, LLC (herein referred to as the "Evaluators").

1.1 Savings Results

The Evaluators conducted an impact evaluation for Avista's Residential and Low-Income programs for PY2022. The Residential portfolio savings amounted to 1,727,219kWh with a 66.06% realization rate. The Low-Income portfolio savings amounted to 171,311 kWh with a 76.78% realization rate. The Nonresidential savings amounted to 13,631,759 with a 95.6% realization rate. The Evaluators summarize the Residential, Low-Income, and Nonresidential portfolio verified savings in Table 1-1 through Table 1-3, respectively.

Table 1-1: Residential Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Water Heat	5,272	4,066	77.12%
HVAC	544,847	307,573	56.45%
Shell	238,446	155,539	65.23%
Fuel Efficiency	223,587	193,123	86.37%
ENERGY STAR Homes	45,531	47,508	104.34%
Small Home & MF Weatherization	66,305	81,535	122.97%
Multifamily Direct Install	140,349	172,921	123.21%
Appliances	85,586	81,599	95.34%
Midstream	1,264,821	683,356	54.03%
Total Res	**2,614,744**	**1,727,219**	**66.06%**

Table 1-2: Low-Income Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Low-Income	223,111	171,311	76.78%
Total Low-Income	**223,111**	**171,311**	**76.78%**

Table 1-3: Nonresidential Verified Impact Savings by Program

Program	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Prescriptive Lighting	8,374,096	8,374,096	7,978,849	95.3%
Small Business Lighting	3,135,108	2,956,164	2,956,164	94.3%
HVAC	42,924	42,924	42,924	100.0%
Food Service Equipment	No PY2023 Participation			
Grocer	1,928	1,928	1,928	100.0%
Shell	3,458	37,320	37,320	1079.2%
Green Motors	No PY2023 Participation			
Midstream	142,927	58,355	58,355	40.8%
Site-Specific	2,576,031	2,576,031	2,556,219	99.2%
Total Non-Residential:	**14,276,472**	**14,046,818**	**13,631,759**	**95.5%**

Table 1-4 summarizes the electric programs offered to residential, low-income, and nonresidential customers in the Idaho Avista service territory in PY2023 as well as the Evaluators' evaluation tasks and impact methodology for each program.

Table 1-4: Impact Evaluation Activities by Program and Sector

Sector	Program	Database Review	Survey Verification	Impact Methodology
Residential	Water Heat	✓	✓	RTF UES
Residential	HVAC	✓	✓	RTF UES
Residential	Shell	✓		RTF UES
Residential	Fuel Efficiency	✓	✓	RTF UES
Residential	ENERGY STAR® Homes	✓		RTF UES
Residential	Small Home & MF Weatherization	✓	✓	RTF UES
Residential	Appliances	✓	✓	RTF UES
Residential	Multifamily Direct Install	✓		SBW TRM
Residential	Midstream	✓		RTF UES
Low-Income	Low-Income	✓		Avista TRM
Nonresidential	Lighting	✓	✓	Avista TRM
Nonresidential	HVAC	✓		Avista TRM
Nonresidential	Food Service Equipment	✓		RTF UES, Avista TRM
Nonresidential	Grocer	✓		RTF UES
Nonresidential	Shell	✓		Avista TRM
Nonresidential	Green Motors	✓		RTF UES
Nonresidential	Site-Specific	✓		IPMVP

1.2 Conclusions and Recommendations

The following section details the Evaluators' conclusions and recommendations for each the Residential Portfolio, Low-Income Portfolio, and Nonresidential Portfolio program evaluations.

1.2.1 Conclusions

The following section details the Evaluator's findings resulting from the program evaluations for each the Residential Portfolio, Low-Income Portfolio, and Nonresidential Portfolio.

1.2.1.1 Residential Programs

The Evaluators provide the following conclusions regarding Avista's Residential electric programs:

- The Evaluators found the Residential portfolio to demonstrate a total of 1,727,219 kWh with a realization rate of 66.06%.
- The Residential Portfolio impact evaluation resulted in a realization rate of 65.91% due to discrepancy in expected savings for the Midstream Program and due to differences between the implementer-assigned expected savings values using minimum code baseline and the RTF-implemented market practice baseline. The Evaluators utilized engineering algorithms to evaluate this program based on purchased equipment efficiency level. The Evaluators also applied RTF market practice baseline equivalents to the engineering algorithms in order to maintain consistency with evaluation methods between the downstream and midstream programs, while taking into account the often higher efficiency values of the purchased equipment. Although the Evaluators note instances in which the implementer's engineering algorithm were applied incorrectly in the calculation of the expected savings values, the market practice baseline adjustment led to the largest downward adjustment, leading to a low realization rate for the program.
- The Evaluators conducted verification surveys for a random sample of customers who had participated in the residential prescriptive rebates programs. The Evaluators calculated in-service rates for measures in which in-service rates are not typically 100% (water heaters, furnaces, clothes washers and dryers, smart thermostats, etc.). The Evaluators found that all surveyed measures responses indicated in-service rates of between 97 to 100% except for the E Smart Thermostat DIY with Electric Heat, which displayed ISRs of 67% across 3 respondents. These values were applied to impact analysis results to estimate verified savings through the programs.
- The Midstream Program, which contributes 49% of the expected savings, resulted in a realization rate of 54.03% whereas each of the other programs resulted in a combined 96% realization rate. The Midstream Program contributed to a 23% decrease in the overall residential sector, which displayed a realization rate of 65.91%.
- The Evaluators conducted verification surveys via web survey to collect information from customers who participated in the Water Heat, HVAC, Fuel Efficiency, Small Home and Weatherization, and Appliance Programs. The Evaluators collected information including the functionality of the efficient equipment, and the functionality of the replaced equipment. The Evaluators calculated in-service rates for the measures within these programs in order to apply findings to the verified savings results for each program.

- In the Water Heat Program, the Evaluators found that Avista TRM savings values are slightly lower than the RTF savings assigned for the appropriate water heater tank size and tier efficiency. The Evaluators found a majority of water heaters to be Tier 3 or higher, but the Avista TRM only includes savings for a combination of Tier 2 and Tier 3 savings. In addition, the Avista TRM assigns the savings values for water heaters of any size. During document review, the Evaluators found most of the water heaters to have a storage tank under 55 gallons, which has a higher savings value in the RTF than water heaters with unknown tank sizes. The Evaluators applied the RTF UES value for the associated tank size and tier found for each model number in the sampled rebates. The Evaluators recommend that Avista document tier rating and tank size of heat pump water heaters to ensure proper validation of savings.
- In the HVAC Program, the E Smart Thermostat DIY with Electric Heat and E Smart Thermostat Paid Install with Electric Heat realization rates are lower than 100% because the Avista TRM uses an average of heating type savings values as well as an average across heating types, while the Evaluators assigned the appropriate RTF UES value for each heating zone. In addition, the E Electric To Air Source Heat Pump verified savings vary largely based on home type (single family vs. multifamily). The appropriate categories in the RTF led to a lower-than-expected savings and higher than expected savings across individual projects within these measures, with an overall upward adjustment for these measures. The E Electric to Ductless Heat Pump displays 22% realization rate because the Avista TRM assigns Idaho-based ductless heat pumps a savings value of 4,000 kWh whereas the RTF assigns between 856 kWh to 908 kWh, depending on heating and cooling zones. The Evaluators recommend updating the Idaho-based unit energy savings Avista TRM value to match the Washington-based savings values and therefore align with RTF values. Additionally, 6 of the 8 smart thermostats rebated were verified to not be qualified for RTF UES due to lack of occupancy sensors and therefore savings were zeroed out for these projects.
- In the Shell Program, the lack of granularity in the Avista TRM data lead to a low realization rate for attic insulation, wall insulation and window measures. The expected savings also appeared to use a value of 2 kWh per square foot for attic and wall savings calculations while Avista's TRM uses 1.86 kWh per square foot. Similarly, the difference between RTF savings and the Avista TRM value for window replacements is drastic, with the RTF indicating much lower savings for the window replacements, based on U-values and double vs. single pane values. The Evaluators recommend that Avista ensure that the correct RTF UES values are used to calculate expected savings and that Avista incorporate more granularity by climate zone, heating type, U-value, and single vs. double pane-specific savings into Avista's TRM. The Evaluators found minimal discrepancy in square footage values between the tracking data and project-level documents provided. These differences, similar to the conclusions in the previous impact evaluation report, led to an overall realization rate of 65% for the Shell Program.
- In the Fuel Efficiency Program, the Evaluators found that the realization rate deviates from 100% due to three of the AHRI AFUE values reported being at 80% which does not meet the criteria to qualify for calculated savings. The applied Avista TRM prescriptive savings value and the verified

savings aligned in the tracking data, however, the removal of savings from these three projects caused the realization rate to drop down to 86.37% for the program overall. The Evaluators recommend updating the Avista tracking database to capture previous heating types for conversion measures, requiring home previous heating type, existing cooling type, and home type as inputs on the rebate application forms, and lastly to enforce required documents for all rebates, such as the AHRI documentation and/or full model number in order to verify measure efficiency.

- In the ENERGY STAR Homes Program, the Evaluators found that realization rates differed from 100% due to application of heating zone and cooling zone via the RTF, which the Avista TRM lacks. In addition, the Evaluators found that realization rates differed from 100% due to savings value application. Program application forms commonly lacked information about home primary and secondary space and water heating type. The Evaluators recommend updating the Avista measure savings database to match the primary heating type for duel fuel households. In addition, the Evaluators recommend updating the document data aggregation to provide consistent database values between database and the provided rebate forms (primary heating type) and determine if the customer is an Avista electric and/or gas customer before providing an incentive for dual fuel. The Evaluators recommend updating Avista measure savings to reflect heating zone-specific RTF measure savings rather than averaging savings from heating zones together.
- In the Small Home & MF Weatherization Program, the Evaluators found that many projects (14) exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). Although quantity in the CC&B database were consistent, the Avista TRM savings values differed from verified RTF UES values for each of the projects. The majority of projects displayed realization rates that differ to 100% due to differences in home type. The Evaluators verified home type via Zillow to apply correct RTF workbook savings from the single family, multifamily, and manufactured home RTF workbooks. These adjustments led to high and low realization rates across each measure. The Evaluators recommend Avista verify home type prior to applying Avista TRM values in order to ensure proper categorization of measure savings. Many of the measures (ductless heat pump, attic insulation, and door insulation) displayed low realization rates due to exclusion of heating and cooling zone specifications in the Avista TRM. The Evaluators recommend Avista update Avista TRM values to incorporate expected downward adjustment based on heating and cooling zone distribution among its participants rather than taking a simple average of all zones. This change will improve realization rates in future evaluation periods. The Evaluators recommend removing expected savings for this measure in the future. The Evaluators found the realization rate for Energy Star Certified Refrigerators and Freezers to because the Evaluators found a subset of rebates to be bottom-mounted which caused the RTF savings to reflect a lower value hence the low realization rate. The realization rate for the smart thermostats is low because one of the two thermostats were verified to lack RTF qualification due to lack of occupancy sensor or geolocation capabilities and because the RTF UES is 75% the magnitude of the Avista TRM value. The Evaluators recommend Avista update the smart thermostat Avista TRM value to match

expected RTF UES values. The Evaluators found that the tracking database does not currently track square footage data consistently for insulation measures. The Evaluators recommend these values are tracked consistently for this program to ensure savings are calculated accurately for each measure. The Evaluators recommend Avista incorporate a u-value field to the tracking database and add additional QA/QC procedures for documenting square footage for these measures in the program.

- In the Multifamily Direct Install Program, the per unit savings value for the lighting measures did not align with the per unit value in SBW's methodology or the RTF UES values. The precise reason for these discrepancies was unclear. The Evaluators applied SBW TRM values to estimate verified savings for each quantity of each measure claimed. These discrepancies led to deviations from 100% realization rate for the lighting measures. The Evaluators evaluated the faucet and kitchen aerator values using RTF UES values and found there was no discrepancy between the savings values in the tracking database and the RTF UES values leading to a realization rate of 100% for these measures. The difference between calculated expected savings and verified savings are due to the application of the SBW TRM to the consistently validated quantity of measures. The lighting measures displayed discrepancies in kWh/unit values used to calculate savings. The reason for the discrepancies was unclear. The Screw-in LED lamp (A-line 60W) makes up 33% of total program savings, yet displayed a realization rate of 138%, leading to inflated savings for this program overall. The Evaluators recommend Avista apply the SBW UES to the tracking database accurately and consistently across all lighting measures. In addition, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data to apply more specific savings values to each project.
- In the Appliance Program, the Evaluators note that Avista TRM defines appropriate unit energy savings for the fridge-freezer and upright freezer measures. The Evaluators found the program verified savings resulted in a 95% realization rate due the attribution of 0 kWh/unit savings to the E Energy Star Rated Top Load Washer. The Evaluators removed savings for this measure because the RTF clothes washer workbook estimates that savings for this measure are negative and therefore there are no proven RTF savings for this measure. All fridge-freezer projects were verified to be ENERGY STAR-qualified. In addition, the E Energy Star Rated Clothes Dryer measure expected savings is lower than the RTF workbook unit savings by nearly 8%. The Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions. The Evaluators recommend incorporating cubic volume in the Appliance Program tracking database and updating clothes dryer expected savings to align with RTF UES values.
- The Evaluators evaluated the Midstream Program in its launch year of PY2023. The program started in summer 2023. Through this program, Avista effectively converted several water heater and HVAC residential appliances from a downstream measure into a midstream delivery, effectively removing the barriers for end-use customers by removing the requirement to deliver

rebate applications to Avista. The program is implemented by Energy Solutions. The implementer defined expected savings for each measure delivered in the program, which displayed savings drastically higher than the Avista TRM and RTF UES documented savings. Therefore, the realization rates for the program are about 50% of expected savings. The Evaluators reviewed program documentation and found that the implementer TRM UES were inflated due to incorporating code minimum baselines whereas the RTF and Avista TRM incorporate estimated market baseline. In addition, the Evaluators found that the implementer TRM UES were not applied properly, leading to even further inflated savings. The Evaluators note that, had the program utilized the Avista TRM to evaluate expected savings for the program, the realization rate for the program would have been near-100%. The Evaluators recommend that Avista and the implementers update the expected savings calculation methodology to incorporate market practice baseline rather than minimum code baseline values in order to remain consistent with the baseline methods utilized in the downstream measure programs and more accurately estimate expected savings in future iterations of this program.

1.2.1.2 Low-Income Programs

The Evaluators provide the following conclusions regarding Avista's Low-Income electric programs:

- The Evaluators found the Low-Income portfolio to demonstrate a total of 171,311 kWh with a realization rate of 76.78%.
- The Low-Income Portfolio impact evaluation resulted in a 86% realization rate. The Low-Income Program makes up the total of the Low-Income portfolio. The realization rate for this program deviates from 100% due to differences between the Avista TRM values applied to the quantities displayed in the tracking data. The Evaluators note several instances in which the tracking data displayed correct quantity values, but the expected savings calculated for the project did not indicate Avista TRM values were applied properly to the quantities. The Evaluators applied the correct Avista TRM values for the Low-Income Program. Verified savings were estimated using the Avista TRM savings values to each measure along with adjustments found during document verification of the sampled projects. The largest contributor to discrepancy of savings is the application of the 20% annual kWh and Therm usage cap on project-level savings. When implemented, this led to a reduction of savings for a number of projects.
- The Evaluators attempted to estimate measure-level Low-Income Program energy savings through billing analysis regression with a counterfactual group selected via propensity score matching. The Evaluators attempted to isolate each unique measure. However, participation for the Low-Income program resulted in a small number of customers with isolated measures and therefore the Evaluators conducted a whole-home billing analysis for all the electric measures combined. The results of the billing analysis indicated non-statistically significant results. Therefore, the Avista TRM was utilized to estimate verified savings for the Low-Income Program.
- The Evaluators received a lower number of project documents than intended due to the CAP agency having low bandwidth for fulfilling these time consuming paperwork requests. During

the review, the Evaluators found there were several projects with missing data. In total, eight projects were unable to be verified due to missing or incomplete data.

- The information required to complete verification activities and proper expected savings calculations are: measure installed square footage for insulation measures, measure quantity for appliance measures, and total building annual energy usage in order to calculate proper building savings cap at 20% annual energy usage. The Evaluators found a number of sampled projects lacked annual kWh and Therms usage values. The Evaluators recommend Avista track each participant's annual energy usage in the program tracking database in order to accurately apply the 20% cap for savings when necessary.

1.2.1.3 Nonresidential Programs

The Evaluators provide the following conclusions regarding Avista's Nonresidential electric programs:

- The verified savings for the Prescriptive Lighting Program is 7,978,849 kWh with a realization rate of 95.3%. Two factors affected the overall realization rate: The first is that annual hours in expected savings calculations were calculated using 365 days/year, which does not account for leap years. Verified savings calculations developed hours using 365.25 days/year, slightly raising realization. However, claimed savings calculations did not include in-service rates. The Evaluators used the RTF Midstream Lighting work books and assigned ISRs according to the rates, resulting in slightly lower verified savings than expected.
- The verified savings for the Small Business Lighting Program is 2,956,164 kWh with a realization rate of 94.3%. For measures without occupancy sensors, realization is ±1% of expectations, with any differences likely due to rounding. For measures with occupancy sensor, the Evaluators found that expected savings were calculated by applying the occupancy sensor reduction factor both the operating hours and the connected load of the lighting retrofit , slightly 'double counting' savings. To account for occupancy sensor savings in verified calculations, the Evaluators applied the 32% reduction to the operation of the post-install equipment, then added this value to the retrofit savings, resulting in slightly lower verified savings.
- Recommendations for Future Program Cycles:
    - Report savings from lighting retrofits and sensor installation separately.
    - Specify the type of control method employed.
    - In tracking data, denote the wattage controlled by each installed occupancy sensor.
    - If possible, record building type, vintage and HVAC configuration to calculate and include additional savings resulting from HVAC interactive effects.
- The verified savings for the Prescriptive HVAC program is 42,924 kWh with a realization rate of 100.00%.
- The Food Service Equipment Program had no PY2023 participation.
- The verified savings for the Grocery Program is 1,928 kWh with a realization rate of 100.00%.

- The verified savings for the Shell Program is 37,320 kWh with a realization rate of 1,079%. Verified savings was developed using the Avista TRM, which specified higher savings values than those used in ex ante estimate. Savings for Shell measures are calculated using a per-square foot multiplier based on insulation type, beginning and final R-values and HVAC configuration. The table below shows the insulation type rebated through the PY2023 program year, the multiplier used in ex ante savings calculations and the multiplier from the Avista TRM, used in verified savings calculations. TRM values are significantly higher, leading to the high program realization rate.
- The Green Motors Rewind program has no PY2023 participation.
- The verified savings for the Midstream Program is 58,355 kWh with a realization rate of 40.8%.
    - With the exception of Mini/Multi Splits, which were analyzed using standard engineering algorithms and equipment-specific inputs, verified savings was sourced from the respective RTF workbooks associated with each measure. In most cases, expected savings estimates far exceeded RTF estimates. No background information relating to how planning estimates were developed was included in program materials, precluding a thorough explanation of differences, though a weighted average of expected savings show these values to be approximately 186% of RTF estimates.
- The Site-Specific Program in total displays a realization rate of 99.2% with 2,556,219 kWh verified electric energy savings in the Idaho service territory.
    - For project SSLP_82041 Expected savings calculations assumed 3,120 annual hours of operation, hours extrapolated for the operating schedule collected during the on-site visit yielded approximately 2,870 annual hours and slightly reduced realized kWh.
    - Additionally, ex ante calculations for all lighting projects assumed an 80% chance that lighting would operate during times of peak demand. The Evaluators found that for multiple projects the lighting fixtures runs continuously, so there is a 100% chance of them operating during the peak period. The coincidence factor was adjusted from 80% to 100% for these measures.
    - Individual reports for each sampled site are included in Appendix C: Site-Specific Program Project Reports.

1.2.2 Recommendations

The following section details the Evaluator's recommendations resulting from the program evaluations for each the Residential Portfolio, Low-Income Portfolio, and Nonresidential Portfolio.

1.2.2.1 Residential Programs

The Evaluators offer the following recommendations regarding Avista's Residential electric programs:

- The Evaluators imputed home type and space heating type for a large number of sampled rebates, as the tracking database does not contain values for these characteristics or remain

outdated. The mail-in rebates collect this information; however, it does not seem to be required to complete the rebate and therefore many rebates are missing this information. The Evaluators recommend verifying home type and space heating type during rebate application approval in order to apply correct savings values to each project.

- The Evaluators found a handful of instances in which the rebated equipment did not meet the program minimum requirements for efficiency. The Evaluator recommend Avista check the source AHRI documentation and product level documentation to verify efficiency prior to incentivizing installation of the measure. For example, 6 of the 8 smart thermostats did not qualify for RTF savings and two appliances were verified to lack ENERGY STAR qualifications.
- The Evaluators found that many projects claimed under the Small Home & MF Weatherization Program exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). The Evaluators recommend verifying whether a home is qualified for the Small Home & MF Weatherization Program prior to fulfilling the rebate incentive. For projects that are larger than 1,000 SQFT, the incentives shall be claimed from the Shell Program.
- In the Shell Program, the Evaluators recommend Avista update the single and double pane window Avista TRM values to the appropriate RTF UES value. Avista's TRM uses 1.5 kwh per square foot, whereas the RTF displays 1 kWh per square foot for most projects. Similarly, the difference between RTF savings and the Avista TRM value for window replacements is drastic, with the RTF indicating much lower savings for the window replacements, based on U-values and double vs. single pane values. The Evaluators recommend that Avista ensure that the correct RTF UES values are used to calculate expected savings and that Avista incorporate more granularity by climate zone, heating type, U-value, and single vs. double pane-specific savings into Avista's TRM.
- The ENERGY STAR Homes Program, the verified savings applied largely depends on space heating type. The program realization rate differs from 100% due to changes in heating zone/cooling zone savings assignment as well as verified space heating type (electric vs. natural gas). The Evaluators recommend updating the Avista measure savings database to match the primary heating type for duel fuel households. In addition, the Evaluators recommend updating the document data aggregation to provide consistent database values between database and the provided rebate forms (primary heating type) and determine if the customer is an Avista electric and/or gas customer before providing an incentive for dual fuel.
- A number of smart thermostat rebates included equipment that did not meet RTF measure specifications to receive verified savings through the RTF workbooks, which the Avista TRM values are drawn from. The Evaluators recommend providing a qualified product list for customers to ensure purchased smart thermostat meets program requirements. In addition, the Evaluators recommend Avista verify each program rebate to verify qualifications after rebates are submitted.
- In the Appliances Program, the Evaluators found that the RTF found negative savings for the top loading clothes washers and therefore zero savings are assigned for any rebated top load

clothes washers. The Evaluators recommend Avista reassess the inclusion of this measure in its program offerings.

- In the Water Heat Program, the Evaluators found that Avista TRM savings values are slightly lower than the RTF savings assigned for the appropriate water heater tank size and tier efficiency. The Evaluators found a majority of water heaters to be Tier 3 or higher, but the Avista TRM only includes savings for a combination of Tier 2 and Tier 3 savings. In addition, tank size is not currently incorporated into Avista TRM savings values. The Evaluators recommend that Avista document tier rating and tank size of heat pump water heaters to ensure proper validation of savings.
- In the Small Home & MF Weatherization Program, the Evaluators found that many projects (14) exceed the "Small Home" definition from Avista The Evaluators recommend Avista verify home type prior to applying Avista TRM values in order to ensure proper categorization of measure savings. In addition, U-values for window measures were not consistently tracked, which is an important savings unit assignment requirement. The Evaluators recommend Avista incorporate a u-value field to the tracking database and add additional QA/QC procedures for documenting square footage for these measures in the program.
- In the Multifamily Direct Install Program, the per unit savings value for the lighting measures did not align with the per unit value in SBW's methodology or the RTF UES values. The precise reason for these discrepancies was unclear. The Evaluators recommend Avista apply the SBW UES to the tracking database accurately and consistently across all lighting measures. In addition, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data to apply more specific savings values to each project.
- In the Appliance Program, the Evaluators found the program verified savings resulted in a 95% realization rate due the attribution of 0 kWh/unit savings to the E Energy Star Rated Top Load Washer. The Evaluators recommend removing savings for this measure because the RTF clothes washer workbook estimates that savings for this measure are negative and therefore there are no proven RTF savings for this measure. The Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions. The Evaluators recommend incorporating cubic volume in the Appliance Program tracking database.
- The Evaluators evaluated the Midstream Program in its launch year of PY2023. The Evaluators reviewed program documentation and found that the implementer TRM UES were inflated due to incorporating code minimum baselines whereas the RTF and Avista TRM incorporate estimated market baseline. In addition, the Evaluators found that the implementer engineering algorithms were not applied properly, leading to even more inflated savings. The Evaluators note that, had the program utilized the Avista TRM to evaluate expected savings for the program, the realization rate for the program would have been near-100%. The Evaluators recommend Avista work with the implementer of the Midstream Program to update expected

savings values in the implementer TRM in order to adjust for market practice baseline and therefore more accurately predict program-level savings in future program cycles.

1.2.2.2 Low-Income Programs

The Evaluators offer the following recommendations regarding Avista's Low-Income electric programs:

- The Evaluators found that most deviations from 100% realization rate for the Low-Income Program is due to errors in application of the Avista TRM values. The Evaluators recommend that Avista conduct quality control for the applied Avista TRM values in the tracking dataset.
- The Evaluators found that the remaining deviations from 100% realization rate for the Low-Income Program is due to incomplete application of the 20% annual savings cap across projects. The Evaluators recommend Avista track each participant's annual energy usage in the program tracking database in order to accurately apply the 20% cap for savings when necessary. The Evaluators recommend additional QA/QC efforts are completed to ensure the program is properly applying the 20% annual household cap by using available household billing data.

1.2.2.3 Nonresidential Programs

The Evaluators offer the following recommendations regarding Avista's Nonresidential electric programs:

- Within the Prescriptive Lighting Program, the Evaluators recommend collecting space HVAC configuration information and use interactive HVAC effects factors when calculating prescriptive lighting savings for interior spaces.
- Within the Grocer Program, when collecting measure information for ECM measures, the Evaluators recommend collecting information about the motor power of the baseline motor.
- Within the Shell program, reassign expected savings multipliers to align with the Avista TRM.
- Within the Midstream program, reexamine how expected savings UES are developed, particularly for food service equipment. Current expected savings UES are significantly higher than the same configurations specified in the RTF.

2. General Methodology

The Evaluators performed an impact evaluation on each of the programs summarized in Table 1-4. The Evaluators used the following approaches to calculate energy impact defined by the International Performance Measurement and Verification Protocols (IPMVP)[1] and the Uniform Methods Project (UMP)[2]:

- Simple verification (web-based surveys supplemented with phone surveys)
- Document verification (review project documentation)
- Deemed savings (RTF UES and Avista TRM values)
- Whole facility billing analysis (IPMVP Option C)
- Appropriate IPMVP Option (for Site-Specific, depending on project)

The Evaluators completed the above impact tasks for each the electric impacts and the natural gas impacts for projects completed in the Idaho Avista service territory.

The M&V methodologies are program-specific and determined by previous Avista evaluation methodologies as well as the relative contribution of a given program to the overall energy efficiency impacts. Besides drawing on IPMVP, the Evaluators also reviewed relevant information on infrastructure, framework, and guidelines set out for EM&V work in several guidebook documents that have been published over the past several years. These include the following:

- Northwest Regional Technical Forum (RTF)[3]
- National Renewable Energy Laboratory (NREL), United States Department of Energy (DOE) The Uniform Methods Project (UMP): Methods for Determining Energy Efficiency Savings for Specific Measures, April 2013[4]
- International Performance Measurement and Verification Protocol (IPMVP) maintained by the Efficiency Valuation Organization (EVO) with sponsorship by the U.S. Department of Energy (DOE)[5]

The Evaluators kept data collection instruments, calculation spreadsheets, and monitored/survey data available for Avista records.

2.1 Glossary of Terminology

As a first step to detailing the evaluation methodologies, the Evaluators have provided a glossary of terms to follow:

[1] https://www.nrel.gov/docs/fy02osti/31505.pdf
[2] https://www.nrel.gov/docs/fy18osti/70472.pdf
[3] https://rtf.nwcouncil.org/measures
[4] Notably, The Uniform Methods Project (UMP) includes the following chapters authored by ADM. Chapter 9 (Metering Cross-Cutting Protocols) was authored by Dan Mort and Chapter 15 (Commercial New Construction Protocol) was Authored by Steven Keates.
[5] Core Concepts: International Measurement and Verification Protocol. EVO 100000 – 1:2016, October 2016.

- **Deemed Savings** – An estimate of an energy savings outcome (gross savings) for a single unit of an installed energy efficiency measure. This estimate (a) has been developed from data sources and analytical methods that are widely accepted for the measure and purpose and (b) are applicable to the situation being evaluated.
- **Expected Savings** – Calculated savings used for program and portfolio planning purposes.
- **Adjusted Savings** – Savings estimates after database review and document verification has been completed using deemed unit-level savings provided in the Avista TRM. It adjusts for such factors as data errors and installation rates.
- **Verified Savings** – Savings estimates after the unit-level savings values have been updated and energy impact evaluation has been completed, integrating results from billing analyses and appropriate RTF UES and Avista TRM values.
- **Gross Savings** – The change in energy consumption directly resulting from program-related actions taken by participants in an efficiency program, regardless of why they participated.
- **Free Rider** – A program participant who would have implemented the program measure or practice in absence of the program.
- **Net-To-Gross** – A factor representing net program savings divided by gross program savings that is applied to gross program impacts to convert them into net program load impacts.
- **Net Savings** – The change in energy consumption directly resulting from program-related actions taken by participants in an efficiency program, with adjustments to remove savings due to free ridership.
- **Non-Energy Benefits** – Quantifiable impacts produced by program measures outside of energy savings (comfort, health and safety, reduced alternative fuel, etc.).
- **Non-Energy Impacts** – Quantifiable impacts in energy efficiency beyond the energy savings gained from installing energy efficient measures (reduced cost for operation and maintenance of equipment, reduced environmental and safety costs, etc.).

2.2 Summary of Approach

This section presents our general cross-cutting approach to accomplishing the impact evaluation of Avista's Residential, Low-Income, and Nonresidential programs listed in Table 1-4. The Evaluators start by presenting our general evaluation approach. This chapter is organized by general task due to several overlap across programs.

The Evaluators outline the approach to verifying, measuring, and reporting the residential portfolio impacts as well as cost-effectiveness and summarizing potential program and portfolio improvements. The primary objective of the impact evaluation is to determine ex-post verified net energy savings. On-site verification and equipment monitoring was not conducted during this impact evaluation due to stay-at-home orders due to the COVID19 pandemic.

Our general approach for this evaluation considers the cyclical feedback loop among program design, implementation, and impact evaluation. Our activities during the evaluation estimate and verify annual energy savings and identify whether a program is meeting its goals. These activities are aimed to provide guidance for continuous program improvement and increased cost effectiveness for the 2022 and 2023 program years.

The Evaluators employed the following approach to complete impact evaluation activities for the programs. The Evaluators define major approaches to determining net savings for Avista's programs:

- A *Deemed Savings* approach involves using stipulated savings for energy conservation measures for which savings values are well-known and documented. These prescriptive savings may also include an adjustment for certain measures, such as lighting measures in which site operating hours may differ from RTF values.
- A *Billing Analysis* approach involves estimating energy savings by applying a linear regression to measured participant energy consumption utility meter billing data. Billing analyses included billing data from nonparticipant customers. This approach does not require on-site data collection for model calibration. This approach aligns with the IPMVP Option C.
- A *Semi-Custom* approach, used for the Prescriptive Lighting program, where savings are quantified by a standard engineering algorithm with key performance parameter(s), such as pre/post wattage, quantity and annual hours of use. This approach aligns with IPMVP Option A.
- A *Custom* approach, used for the Site-Specific program involves selecting the appropriate IPMVP option to apply to the specific measure or project. Typically, this is Option A, as most projects in the program are lighting retrofits, however Options B, C and D are also employed, depending upon the project. Specific methods are discussed in each site report.

The Evaluators accomplished the following quantitative goals as part of the impact evaluation:

- Verify savings with 10% precision at the 90% confidence level;
- Where appropriate, apply the RTF to verify measure impacts; and
- Where available data exists, conduct billing analysis with a suitable comparison group to estimate measure savings.
- Used IPMVP analysis methods for custom projects.

For each program, the Evaluators calculated adjusted savings for each measure based on the Avista TRM and results from the database review. The Evaluators calculated verified savings for each measure based on the RTF UES, Avista TRM, or billing analysis in combination with the results from document review. For the HVAC, Water Heat, Fuel Efficiency, Small Home & MF Weatherization, and Appliances programs, the Evaluators also applied in-service rates (ISRs) from verification surveys.

The Evaluators assigned methodological rigor level for each measure and program based on its contribution to the portfolio savings and availability of data.

The Evaluators analyzed billing data for all electric measure participants in the Shell, HVAC, Water Heat, Midstream, and Low-Income programs. The Evaluators applied billing analysis results to determine evaluated savings only for measures where savings could be isolated (that is, where a sufficient number of participants could be identified who installed only that measure). Program-level realization rates for the HVAC, Water Heat, and Fuel Efficiency programs incorporate billing analysis results for some measures.

2.2.1 Database Review

At the outset of the evaluation, the Evaluators reviewed the databases to ensure that each program tracking database conforms to industry standards and adequately tracks key data required for evaluation.

Measure-level net savings were evaluated primarily by reviewing measure algorithms and values in the tracking system to assure that they are appropriately applied using the Avista TRM. The Evaluators then aggregated and cross-check program and measure totals.

The Evaluators reviewed program application documents for a sample of incented measures to verify the tracking data accurately represents the program documents. The Evaluators ensured the home installed measures that meet or exceed program efficiency standards.

2.2.2 Verification Methodology

In this section, the Evaluators summarize the verification methods used to ensure project-level details were indeed completed and to the efficiency levels detailed in the program-level tracking data.

The Evaluators summarize the methods for each verification effort:

- Sampling methodology for most programs
- Sampling methodology for the Site-Specific Program
- Document-based verification
- Survey-based verification
- On-site visits

2.2.2.1 Sampling Methodology for Most Programs

The Evaluators verified a sample of participating households for detailed review of the installed measure documentation and development of verified savings. The Evaluators verified tracking data by reviewing invoices and surveying a sample of participant customer households. The Evaluators also conducted a verification survey for program participants.

The Evaluators used the following equations to estimate sample size requirements for each program and fuel type. Required sample sizes were estimated as follows:

Equation 2-1: Sample Size for Infinite Sample Size

$$n = \left(\frac{Z \times CV}{d}\right)^2$$

Equation 2-2: Sample Size for Finite Population Size

$$n_0 = \frac{n}{1 + \left(\frac{n}{N}\right)}$$

Where,

- n = Sample size
- Z = Z-value for a two-tailed distribution at the assigned confidence level.
- CV = Coefficient of variation
- d = Precision level
- N = Population

For a sample that provides 90/10 precision, *Z* = 1.645 (the critical value for 90% confidence) and *d* = 0.10 (or 10% precision). The remaining parameter is *CV*, or the expected coefficient of variation of measures for which the claimed savings may be accepted. A *CV* of .5 was assumed for residential programs due to the homogeneity of participation[6], which yields a sample size of 68 for an infinite population. Sample sizes were adjusted for smaller populations via the method detailed in Equation 2-2.

The following sections describe the Evaluator's methodology for conducting document-based verification and survey-based verification.

2.2.2.2 Sampling Methodology for the Site-Specific Program

For the Site-Specific program, Simple Random Sampling is not an effective sampling methodology as the CV values observed in business programs are typically very high because the distributions of savings are generally positively skewed. Often, a relatively small number of projects account for a high percentage of the estimated savings for the program.

To address this situation, we use a sample design for selecting projects for the M&V sample that considers such skewness. With this approach, we select several sites with large savings for the sample with certainty and take a random sample of the remaining sites. To improve the precision, non-certainty sites are selected for the sample through systematic random sampling. That is, a random sample of sites remaining after the certainty sites have been selected is selected by ordering them according to the magnitude of their savings and using systematic random sampling. Sampling systematically from a list that is ordered according to the magnitude of savings ensures that any sample selected will have some units with high savings, some with moderate savings, and some with low savings. Samples cannot result that have concentrations of sites with atypically high savings or atypically low savings. Specific sampling characteristics are shown in the Site-Specific section of this report.

The following sections describe the Evaluator's methodology for conducting document-based verification and survey-based verification.

[6] Assumption based off California Evaluation Framework: https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/EE_and_Energy_Savings_Assist/CAEvaluationFramework.pdf

2.2.2.3 Document-Based Verification

The Evaluators requested rebate documentation for a subset of participating customers. These documents included invoices, rebate applications, pictures, and AHRI certifications for the following programs.

- Water Heat Program
- HVAC Program
- Shell Program
- Fuel Efficiency Program
- ENERGY STAR® Homes Program
- Small Home & MF Weatherization Program
- Appliances Program
- Midstream Program (res)
- Low-Income Program
- Prescriptive Lighting Program
- Small Business Lighting Program
- HVAC Program (non-res)
- Grocer
- Shell Program (non-res)
- Midstream Program (non-res)

This sample of documents was used to cross-verify tracking data inputs. In the case the Evaluators found any deviations between the tracking data and application values, the Evaluators reported and summarized those differences in the Database Review sections presented for each program in Section 3.2 and Section 4.1.

The Evaluators developed a sampling plan that achieves a sampling precision of ±10% at 90% statistical confidence – or "90/10 precision" – to estimate the percentage of projects for which the claimed savings are verified or require some adjustment.

The Evaluators developed the following samples for each program's document review using Equation 2-1 and Equation 2-2. The Evaluators ensured representation in each state and fuel type for each measure.

Table 2-1: Document-based Verification Samples and Precision by Program

Sector	Program	Electric Population	Sample (With Finite Population Adjustment) *	Precision at 90% CI
Residential	Water Heat	7	7	90% ± 0.00%
Residential	HVAC	266	54	90% ± 9.36%
Residential	Shell	158	48	90% ± 9.24%
Residential	Fuel Efficiency	28	0	90% ± 8.27%
Residential	ENERGY STAR® Homes	14	12	90% ± 6.33%
Residential	Small Home & MF Weatherization	63	33	90% ± 8.19%
Residential	Appliances	556	61	90% ± 9.60%
Residential	Midstream	263	55	90% ± 9.88%
Residential	Multifamily Direct Install	0	0	N/A
Low-Income	Low-Income	146	47	90% ± 8.79%
Nonresidential	Prescriptive Lighting	587	70	±3.65%
Nonresidential	Small Business Lighting	128	40	2.81%
Nonresidential	HVAC	3	3	±0%
	Grocer	2	2	±0%
Nonresidential	Shell	1	1	±0%
Nonresidential	Midstream	21	21	0.00%
Nonresidential	Site-Specific	23	9	±9.61%
Nonresidential	Prescriptive Lighting	587	70	±3.65%

*Assumes sample size of 68 for an infinite population, based on *CV* (coefficient of variation) = 0.5, *d* (precision) = 10%, *Z* (critical value for 90% confidence) = 1.645.

The table above represents the number of rebates in Idaho service territory only (does not include Washington rebate samples). The Evaluators ensured representation of state and fuel type in the sampled rebates for document verification.

2.2.2.4 Survey-Based Verification

The Evaluators conducted survey-based verification for the Water Heat, HVAC, Fuel Efficiency, Small Home & MF Weatherization, Appliances, and Midstream Programs. The primary purpose of conducting a verification survey is to confirm that the measure was installed and is still currently operational and whether the measure was early retirement or replace-on-burnout.

The Evaluators summarize the final sample sizes shown in Table 2-2 for the Idaho Electric Avista projects. The Evaluators developed a sampling plan that achieved a sampling precision of ± 5.77% at 90% statistical confidence for ISRs estimates at the measure-level during web-based survey verification.

Table 2-2: Survey-Based Verification Sample and Precision by Program

Sector	Program	Population	Respondents	Precision at 90% CI
Residential	Water Heat*	7	2	90% ± 53.09%
Residential	HVAC*	266	52	90% ± 10.25%
Residential	Fuel Efficiency*	28	5	90% ± 33.95%
Residential	Small Home & MF Weatherization*	63	0	90% ± 100%
Residential	Appliances	556	112	90% ± 6.95%
Non-Residential	Prescriptive Lighting	379	5	90% ± 36.59%
Total		**1,299**	**176**	**90% ±5.77%**

*These programs did not meet 90/10 precision for the survey-based verification.
For these programs, 100% in-service rates were assumed.

The Evaluators implemented a web-based survey to complete the verification surveys. The Evaluators contacted all customers in the programs listed in the table above with the goal of reaching 90/10 precision, however, all efforts were exhausted to reach these customers and therefore these programs do not display 90/10 precision at the program-level for in-service rate calculations. For programs in which this goal was not met, the Evaluators assumed in-service rates of 100%.

The findings from these activities served to estimate ISRs for each measure surveyed. These ISRs were applied to verification sample desk review rebates towards verified savings, which were then applied to the population of rebates. The measure-level ISRs resulting from the survey-based verification are summarized in Section 3.1.

2.2.2.5 On-Site Visits

For sampled projects in the Site-Specific program, the Evaluators conducted onsite visits to the facilities to verify installation, collected facility characteristic and collected any data needed to conducted savings calculations. In Idaho, a total of 7 visits were conducted to verify electric measures. Further details are available in the Site-Specific chapter.

2.2.3 Impact Evaluation Methodology

The Evaluators employed the following approach to complete impact evaluation activities for the programs. The Evaluators define two major approaches to determining net savings for Avista's programs:

- Deemed Savings
- Billing Analysis (IPMVP Option C)

The Site-Specific program also employed various IPMVP options, deepening upon the project and measure, and is discussed separately as it differs in approach from the approaches used in the remainder of the portfolio. In the following sections, the Evaluators summarize the general guidelines and activities followed to conduct each the deemed savings and billing analyses approaches above.

In the following sections, the Evaluators summarize the general guidelines and activities followed to conduct each of the above analyses.

2.2.3.1 Deemed Savings

This section summarizes the deemed savings analysis method the Evaluators employed for the evaluation of a subset of measures for each program. The Evaluators completed the validation for specific measures across each program using the RTF unit energy savings (UES) values, where available. The Evaluators ensured the proper measure unit savings were recorded and used in the calculation of Avista's ex-ante measure savings. The Evaluators requested and used the technical reference manual Avista employed during calculation of ex-ante measure savings (Avista TRM). The Evaluators documented any cases where recommend values differed from the specific unit energy savings workbooks used by Avista.

In cases where the RTF has existing unit energy savings (UES) applicable to Avista's measures, the Evaluators verified the quantity and quality of installations and apply the RTF's UES to determine verified savings.

2.2.3.2 Billing Analysis

This section describes the billing analysis methodology employed by the Evaluators as part of the impact evaluation and measurement of energy savings for measures with sufficient participation. The Evaluators performed billing analyses with a matched control group and utilized a quasi-experimental method of producing a post-hoc control group. In program designs where treatment and control customers are not randomly selected at the outset, such as for downstream rebate programs, quasi-experimental designs are required.

For the purposes of this analysis, a household is considered a treatment household if it has received a program incentive. Additionally, a household is considered a control household if the household has not received a program incentive. To isolate measure impacts, treatment households are eligible to be included in the billing analysis if they installed only one measure during the 2023 program year. Isolation of individual measures is necessary to provide valid measure-level savings. Households that installed more than one measure may display interactive energy savings effects across multiple measures that are not feasibly identifiable. Therefore, instances where households installed isolated measures are used in the billing analyses. In addition, the pre-period identifies the period prior to measure installation while the post-period refers to the period following measure installation.

The Evaluators utilized propensity score matching (PSM) to match nonparticipants to similar participants using pre-period billing data. PSM allows the evaluators to find the most similar household based on the customers' billed consumption trends in the pre-period and verified with statistical difference testing.

After matching based on these variables, the billing data for treatment and control groups are compared, as detailed in IPMVP Option C. The Evaluators fit regression models to estimate weather-dependent daily consumption differences between participating customer and nonparticipating customer households.

Cohort Creation

The PSM approach estimates a propensity score for treatment and control customers using a logistic regression model. A propensity score is a metric that summarizes several dimensions of household

characteristics into a single metric that can be used to group similar households. The Evaluators created a post-hoc control group by compiling billing data from a subset of nonparticipants in the Avista territory to compare against treatment households using quasi-experimental methods. This allowed the Evaluators to select from a large group of similar households that have not installed an incented measure. With this information, the Evaluators created statistically valid matched control groups for each measure via seasonal pre-period usage. The Evaluators matched customers in the control group to customers in the treatment group based on nearest seasonal pre-period usage (e.g., summer, spring, fall, and winter) and exact 3-digit zip code matching (the first three digits of the five-digit zip code). After matching, the Evaluators conducted a *t*-test for each month in the pre-period to help determine the success of PSM.

While it is not possible to guarantee the creation of a sufficiently matched control group, this method is preferred because it is likely to have more meaningful results than a treatment-only analysis. Some examples of outside variables that a control group can sufficiently control for are changes in economies and markets, large-scale social changes, or impacts from weather-related anomalies such as flooding or hurricanes.

After PSM, the Evaluators ran the following regression models for each measure:

- Fixed effect Difference-in-Difference (D-n-D) regression model (recommended in UMP protocols)[7]
- Random effects post-program regression model (PPR) (recommended in UMP protocols)
- Gross billing analysis (treatment only)

The second model listed above (PPR) was selected because it had the best fit for the data, identified using the adjusted R-squared. Further details on regression model specifications can be found below.

Data Collected

The following lists the data collected for the billing analysis:

1. Monthly billing data for program participants (treatment customers)
2. Monthly billing data for a group of non-program participants (control customers)
3. Program tracking data, including customer identifiers, address, and date of measure installation
4. National Oceanic and Atmospheric Administration (NOAA) weather data between January 1, 2022 and December 31, 2023)
5. Typical Meteorological Year (TMY3) data

Billing and weather data were obtained for program year 2023 and for one year prior to measure install dates (2022).

[7] National Renewable Energy Laboratory (NREL) Uniform Methods Project (UMP) Chapter 17 Section 4.4.7.

Weather data was obtained from the nearest weather station with complete data during the analysis years for each customer by mapping the weather station location with the customer zip code.

TMY weather stations were assigned to NOAA weather stations by geocoding the minimum distance between each set of latitude and longitude points. This data is used for extrapolating savings to long-run, 30-year average weather.

Data Preparation

The following steps were taken to prepare the billing data:

1. Gathered billing data for homes that participated in the program.
2. Excluded participant homes that also participated in the other programs, if either program disqualifies the combination of any other rebate or participation.
3. Gathered billing data for similar customers that did not participate in the program in evaluation.
4. Excluded bills missing address information.
5. Removed bills missing fuel type/Unit of Measure (UOM).
6. Removed bills missing usage, billing start date, or billing end date.
7. Remove bills with outlier durations (<9 days or >60 days).
8. Excluded bills with consumption indicated to be outliers.
9. Remove duplicate bills and any bills with overlapping billing periods. If two billing periods overlapped, the bill with a start date that matched the previous bill's end date was included and the other bill was excluded. For example, if overlapping bill 1 had a 02/19/2023 start date, overlapping bill 2 had a 02/25/2023 start date, and the previous bill had a 02/19/2023 end date, overlapping bill 2 would be removed. If there was no previous bill, the overlapping bill with the earlier start date was included and the other overlapping bill was removed.
10. Calendarized bills (recalculates billing dates, usage, and total billed days such that bills begin and end at the start and end of each month).
11. Obtained weather data from nearest NOAA weather station using 5-digit zip code per household.
12. Computed Heating Degree Days (HDD) and Cooling Degree Days (CDD) for a range of setpoints. The Evaluators assigned a setpoint of 65°F for both HDD and CDD. The Evaluators tested and selected the optimal temperature base for HDDs and CDDs based on model *R*-squared values.
13. Removed measure cohorts without at least 75 treatment customers.
14. Selected treatment customers with only one type of measure installation during the analysis years and combined customer min/max install dates with billing data (to define pre- and post-periods).
15. Restricted to treatment customers with install dates in specified range (typically January 1, 2023 through June 30, 2023) to allow for sufficient post-period billing data.

16. Restricted to control customers with usage less than or equal to two times the maximum observed treatment group usage. This has the effect of removing control customers with incomparable usage relative to the treatment group.
17. Removed customers with incomplete post-period bills (<6 months).
18. Removed customers with incomplete pre-period bills.
19. Restricted control customers to those with usage that was comparable with the treatment group usage.
20. Created a matched control group using PSM and matching on pre-period seasonal usage and zip code.

Regression Models

The Evaluators ran the following models for matched treatment and control customers for each measure with sufficient participation. For net savings, the Evaluators selected either Model 1 or Model 2. The model with the best fit (highest adjusted R-squared) was selected. The Evaluators utilized Model 3 to estimate gross energy savings.

Model 1: Fixed Effects Difference-in-Difference Regression Model

The following equation displays the first model specification to estimate the average daily savings due to the measure.

Equation 2-3: Fixed Effects Difference-in-Difference (D-n-D) Model Specification

$$sADC_{it} = \alpha_0 + \beta_1(Post)_{it} + \beta_2(Post \times Treatment)_{it} + \beta_3(HDD)_{it} + \beta_4(CDD)_{it} + \beta_5(Post \times HDD)_{it} + \beta_6(Post \times CDD)_{it} + \beta_7(Post \times HDD \times Treatment)_{it} + \beta_8(Post \times CDD \times Treatment)_{it} + \beta_9(Month)_t + \beta_{10}(Customer\ Dummy)_i + \varepsilon_{it}$$

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage reading *t* for household *i* during the post-treatment period
- $Post_{it}$ = A dummy variable indicating pre- or post-period designation during period *t* at home *i*
- $Treatment_i$ = A dummy variable indicating treatment status of home *i*
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*
- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home i *(if electric usage)*
- $Month_t$= A set of dummy variables indicating the month during period *t*
- $Customer\ Dummy_i$ = a customer-specific dummy variable isolating individual household effects
- ε_{it} = The error term
- α_0= The model intercept

- β_{1-10} = Coefficients determined via regression

The Average Daily Consumption (ADC) is calculated as the total monthly billed usage divided by the duration of the bill month. β_2 represents the average change in daily baseload in the post-period between the treatment and control group and β_7 and β_8 represent the change in weather-related daily consumption in the post-period between the groups. Typical monthly and annual savings were estimated by extrapolating the β_7 and β_8 coefficients with Typical Meteorological Year (TMY) HDD and CDD data. However, in the case of gas usage, only the coefficient for HDD is utilized because CDDs were not included in the regression model.

The equation below displays how savings were extrapolated for a full year utilizing the coefficients in the regression model and TMY data. TMY data is weighted by the number of households assigned to each weather station.

Equation 2-4: Savings Extrapolation

$$Annual\ Savings = \beta_2 * 365.25 + \beta_7 * TMY\ HDD + \beta_8 * TMY\ CDD$$

Model 2: Random Effects Post-Program Regression Model

The following equation displays the second model specification to estimate the average daily savings due to the measure. The post-program regression (PPR) model combines both cross-sectional and time series data in a panel dataset. This model uses only the post-program data, with lagged energy use for the same calendar month of the pre-program period acting as a control for any small systematic differences between the treatment and control customers; in particular, energy use in calendar month *t* of the post-program period is framed as a function of both the participant variable and energy use in the same calendar month of the pre-program period. The underlying logic is that systematic differences between treatment and control customers will be reflected in the differences in their past energy use, which is highly correlated with their current energy use. These interaction terms allow pre-program usage to have a different effect on post-program usage in each calendar month.

The model specification is as follows:

Equation 2-5: Post-Program Regression (PPR) Model Specification

$$\begin{aligned} ADC_{it} = {} & \alpha_0 + \beta_1(Treatment)_i + \beta_2\ (PreUsageSpring)_i + \beta_3(PreUsageSummer)_i \\ & + \beta_4(PreUsageFall)_i + \beta_5(PreUsageWinter)_i + \beta_6(Month)_t \\ & + \beta_7(Month \times PreUsageSpring)_{it} + \beta_8(Month \times PreUsageSummer_{)it} \\ & + \beta_9(Month \times PreUsageFall)_{it} + \beta_{10}(Month \times PreUsageWinter)_{it} + \beta_{11}(HDD)_{it} \\ & + \beta_{12}(CDD)_{it} + \beta_{13}(Treatment \times HDD)_{it} + \beta_{14}(Treatment \times CDD)_{it} + \varepsilon_{it} \end{aligned}$$

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage for reading *t* for household *i* during the post-treatment period
- $Treatment_i$ = A dummy variable indicating treatment status of home *i*
- $Month_t$ = Dummy variable indicating month of month *t*

- $PreUsageSpring_i$ = Average daily usage in the spring months across household *i*'s available pre-treatment billing reads
- $PreUsageSummer_i$ = Average daily usage in the summer months across household *i*'s available pretreatment billing reads
- $PreUsageFall_i$ = Average daily usage in the fall months across household *i*'s available pretreatment billing reads
- $PreUsageWinter_i$ = Average daily usage in the winter months across household *i*'s available pre-treatment billing reads
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*
- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home i *(if electric usage)*
- ε_{it} = Customer-level random error
- α_0= The model intercept for home *i*
- β_{1-14} = Coefficients determined via regression

The coefficient β_1 represents the average change in consumption between the pre-period and post-period for the treatment group and β_{13} and β_{14} represent the change in weather-related daily consumption in the post-period between the groups. Typical monthly and annual savings were estimated by extrapolating the β_{13} and β_{14} coefficients with Typical Meteorological Year (TMY) HDD and CDD data.

The equation below displays how savings were extrapolated for a full year utilizing the coefficients in the regression model and TMY data.

Equation 2-6: Savings Extrapolation

$$Annual\ Savings = \beta_1 * 365.25 + \beta_{11} * TMY\ HDD + \beta_{12} * TMY\ CDD$$

Model 3: Gross Billing Analysis, Treatment-Only Regression Model

The sections above detail the Evaluator's methodology for estimating net energy savings for each measure. The results from the above methodology report net savings due to the inclusion of the counterfactual comparison group. However, for planning purposes, it is useful to estimate gross savings for each measure. To estimate gross savings, the Evaluators employed a similar regression model; however, only including participant customer billing data. This analysis does not include control group billing data and therefore models energy reductions between the pre-period and post-period for the measure participants (treatment customers).

To calculate the impacts of each measure, the Evaluators applied linear fixed effects regression using participant billing data with weather controls in the form of Heating Degree Days (HDD) and Cooling Degree Days (CDD). The following equation displays the model specification to estimate the average daily savings due to the measure.

Equation 2-7: Treatment-Only Fixed Effects Weather Model Specification

$$ADC_{it} = \alpha_0 + \beta_1(Post)_{it} + \beta_2(HDD)_{it} + \beta_3(CDD)_{it} + \beta_4(Post \times HDD)_{it} + \beta_5(Post \times CDD)_{it} + \beta_6(Customer\ Dummy)_i + \beta_7(Month)_t + \varepsilon_{it}$$

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage for reading *t* for household *i* during the post-treatment period
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*
- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i (if electric usage)*
- $Post_{it}$ = A dummy variable indicating pre- or post-period designation during period *t* at home *i*
- $Customer\ Dummy_i$ = a customer-specific dummy variable isolating individual household effects
- ε_{it} = Customer-level random error
- α_0= The model intercept for home *i*
- β_{1-7} = Coefficients determined via regression

The results of the treatment-only regression models are gross savings estimates. The gross savings estimates are useful to compare against the net savings estimates. However, the treatment-only models are unable to separate the effects of national or regional events like a pandemic, recession, or weather event. For example, the pre-period and post-period for PY2023 may have been affected by changes in remote work in Washington due to the tail end of the COVID-19 pandemic. Therefore, the results from this additional gross savings analysis are unable to reflect actual typical year savings. However, for planning purposes, these estimates may be useful.

2.2.3.3 Billing Heating Load Estimation

In addition to the regression based IPMVP Option C billing analysis, the Evaluators also employed a heating load estimation billing analysis. Heating load estimation is a prime methodology for estimating savings associated with space heating measures such as furnaces. This methodology follows IPMVP Option A, in which the estimation of a key parameter is used to calculate savings. The heating load estimation methodology follows the same data collection and data preparation steps outlined in Section 0 and Section 0, respectively. However, instead of ending with a regression analysis, post-period billing data are used to estimate customer heating load, which is used as an input in a deemed savings formula to calculate energy savings.

The first step in heating load estimation is calculating TMY3 weather normalized average daily consumption. To do so, customer-specific regressions are run to determine the effect of daily HDD on average daily consumption. This is a straightforward regression of the form:

Equation 2-8: Heating Load Regression

$$ADC_i = \alpha_0 + \beta_1(HDD)_i$$

Where,

- *i* = the *i*th household
- ADC_i = Average daily usage for household *i* during the post-treatment period
- HDD_i = Average heating degree days (base with optimal Degrees Fahrenheit) at home *i*
- β_1 = Coefficient determined via regression

This regression is run separately for each customer to determine β_1, impact of HDD on average daily consumption (i.e., the change in Therms usage per HDD). From there, β_1 multiplied by HDD is subtracted from ADC and $\beta_1$multiplied by TMY3_HDD is added back to ADC to calculate TMY3 weather normalized average daily consumption. The actual HDD attributable Therms usage is subtracted from average daily consumption and the TMY_HDD attributable Therms are added back in, as outlined in the following equation.

Equation 2-9: Normalized Average Daily Consumption

$$NADC_i = ADC_i - \beta_1 * (HDD)_i + \beta_1 * (TMY\_HDD)_i$$

Where,

- *i* = the *i*th household
- $NADC_i$ = TMY normalized average daily usage for household *i* during the post-treatment period
- β_1 = Customer-specific Therms usage per HDD
- ADC_i = Average daily usage for household *i* during the post-treatment period
- HDD_i = Average heating degree days (base with optimal Degrees Fahrenheit) at home *i*
- TMY_HDD_i = Average TMY heating degree days at home *i*

Once TMY normalized average daily usage is calculated, the penultimate step to heat load estimation is calculating customer baseload usage. Customer baseload usage represents the energy customers use for non-heating needs, such as a gas stove or dryer. For gas heating measures, customer baseload usage can be calculated as the average NADC across June, July, and August. Customer-specific baseload usage is then subtracted from NADC and to determine customer daily heating load.

Customer heating loads are then used in the following deemed savings equation to calculate the annual savings associated with gas furnace installation.

Equation 2-10: Gas Furnace Savings

$$Savings_i = 365 * HL_i * (\frac{1}{Base_i} - \frac{1}{Eff_i})$$

Where,

- *i* = the *i*th household
- $Savings_i$ = Annual Therms savings for household *i* based on post-treatment period billing data

- 365 = Days in the year
- HL_i = Customer-specific daily heating load for household *i*
- $Base_i$ = Baseline furnace efficiency at home *i*, which is assumed to be 85.5% per the RTF Gas Furnace UES Measure[8]
- Eff_i = Installed furnace efficiency at home *i*, which is assumed to be 95%

2.2.3.4 Net-To-Gross

The Northwest RTF UES measures do not require NTG adjustments as they are built into the deemed savings estimates. In addition, billing analyses with counterfactual control groups, as proposed in our impact methodology, does not require a NTG adjustment, as the counterfactual represents the efficiency level at current market (i.e. the efficiency level the customer would have installed had they not participated in the program).

2.2.3.5 Non-Energy Benefits

The Evaluators used the Regional Technical Forum (RTF) to quantify non-energy benefits (NEBs) for residential measures with established RTF values where available. Measures with quantified NEBs include residential insulation, high efficiency windows, air source heat pumps, and ductless heat pumps.

In addition to the residential NEBs, the Evaluators applied the end-use non-energy benefit and health and human safety non-energy benefit to the Low-Income Program. The Evaluators understand that the two major non-energy benefits referenced above are uniquely applicable to the Low-Income Program. The Evaluators applied those benefits to the program impacts as well as additional non-energy benefits associated with individual measures included in the program. The Evaluators incorporated additional NEBs to the impact evaluation, as applicable. Additional details on the non-energy benefits applied can be found in Section 2.2.3.5.

[8] https://rtf.nwcouncil.org/measure/residential-gas-furnaces/

3. Residential Impact Evaluation Results

The Evaluators completed an impact evaluation on Avista's Residential portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each electric impact evaluation in the Residential Portfolio in the Idaho service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, RTF, and billing analysis of participants and nonparticipants to evaluate savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data. Table 3-1 summarizes the Residential verified impact savings by program.

Table 3-1: Residential Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Water Heat	5,272	4,066	77.12%
HVAC	544,847	307,573	56.45%
Shell	238,446	155,539	65.23%
Fuel Efficiency	223,587	193,123	86.37%
ENERGY STAR Homes	45,531	47,508	104.34%
Small Home & MF Weatherization	66,305	81,535	122.97%
Multifamily Direct Install	140,349	172,921	123.21%
Appliances	85,586	81,599	95.34%
Midstream	1,264,821	683,356	54.03%
Total Res	**2,614,744**	**1,727,219**	**66.06%**

In PY2023, Avista completed and provided incentives for residential electric measures in Idaho and reported total electric energy savings of 1,727,921 kWh. All programs except the ENERGY STAR Homes, Small Home & MF Weatherization, and Multifamily Direct Install Programs did not meet savings goals based on reported savings, leading to an overall achievement of 66.06% of the expected savings for the residential programs. Further details of the impact evaluation results by program are provided in the sections following.

3.1 Simple Verification Results

The Evaluators surveyed 2,229 unique customers that participated in Avista's residential energy efficiency program in October 2022 and March 2023 using an email survey approach.

Customers with a valid email were sent the survey via an email invitation. The Evaluators surveyed customers that received rebates for the Water Heat, HVAC, Fuel Efficiency, Small Home & MF Weatherization, and Appliances Programs.

Table 3-2: Summary of Survey Response Rate

Population	Respondents
Initial email contact list	8,262
Invalid or bounced	416
Invalid or bounced email (%)	5.0%
Invitations sent (unique valid)	7,846
Completions	2,229
Response rate (%)	28.4%

3.1.1 In-Service Rates

The Evaluators calculated in-service rates of installed measures from simple verification surveys deployed to program participants for the Water Heat, HVAC, Shell, ENERGY STAR Homes, Fuel Efficiency, Small Home & MF Weatherization, and Appliances Programs. The Evaluators asked participants if the rebated equipment is currently installed and working, in addition to questions about the new equipment fuel type. The Evaluators achieved ±5.68% precision across the programs surveyed for the electric measures in Avista's service territory, summarized in Table 3-3.

Table 3-3: State-Specific Simple Verification Precision by Program

Sector	Program	State-Specific Population	State-Specific Respondents	State-Specific Precision at 90% CI
Residential	Water Heat*	7	2	90% ± 53.09%
Residential	HVAC*	266	52	90% ± 10.25%
Residential	Fuel Efficiency*	28	5	90% ± 33.95%
Residential	Small Home & MF Weatherization*	63	0	90% ± 100%
Residential	Appliances	556	112	90% ± 6.95%
Total		**920**	**171**	**90% ±5.68%**

*These programs did not achieve 90/10 precision. However, responses indicated 100% ISRs

Table 3-4: Mixed State-Specific Simple Verification Precision by Program

Sector	Program	Mixed State-Specific Population	Mixed State-Specific Respondents	Mixed State-Specific Precision at 90% CI
Residential	Water Heat	51	12	90% ± 21.0%
Residential	HVAC	706	130	90% ± 6.5%
Residential	Fuel Efficiency	28	5	90% ± 33.95%
Residential	Small Home & MF Weatherization	294	1	90% ± 82.3%
Residential	Appliances	1,688	298	90% ± 4.3%
Total		**2,767**	**446**	90% ± **3.57%**

*These programs did not achieve 90/10 precision. However, responses indicated 100% ISRs

As previously stated, the Evaluators contacted all customers in the Water Heat Program, Fuel Efficiency Program, and Small Home & MF Weatherization Program with the goal of reaching 90/10 precision, however, all efforts were exhausted to reach these customers and therefore these programs do not display 90/10 precision at the program-level for in-service rate calculations. For programs in which this

goal was not met, the Evaluators either assigned mixed-state (Idaho and Washington) in-service rates is precision meets the 90/10 goals, or assumed in-service rates of 100% if the mixed-state responses did not meet the 90/10 goals. The state-level (Idaho) and mixed state-level (Idaho and Washington) measure-level ISRs determined from the verification survey for each program in which simple verification was conducted is presented in Table 3-5, Table 3-6, and Table 3-7.

Table 3-5: Water Heat Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
E Heat Pump Water Heater*	2	100%	12	100%	Assume 100% ISR

*Due to lack of 90/10 precision, this ISR is instead assumed to be 100%

Table 3-6: HVAC Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
E Electric To Air Source Heat Pump	14	100%	27	100%	State-specific ISR
E Electric to Ductless Heat Pump	16	100%	36	97%	State-specific ISR
E Smart Thermostat DIY with Electric Heat	3	67%	18	94%	State-specific ISR
E Smart Thermostat Paid Install with Electric Heat	19	100%	48	100%	State-specific ISR

Table 3-7: Fuel Efficiency Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
E Electric To Natural Gas Furnace*	2	100%	2	100%	Assume 100% ISR
E Electric To Natural Gas Furnace & Water Heat*	3	100%	3	100%	Assume 100% ISR

*Due to lack of 90/10 precision, this ISR is instead assumed to be 100%

Table 3-8: Small Home & MF Weatherization Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
E Multifamily Attic Insulation With Electric Heat	0	100%	0	100%	Assume 100% ISR
E Multifamily Electric To Air Source Heat Pump	No Participation	N/A	0	N/A	Assume 100% ISR
E Multifamily Electric to Ductless Heat Pump	0	100%	0	100%	Assume 100% ISR
E Multifamily Energy Star Certified Insulated Door	0	100%	0	100%	Assume 100% ISR
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	0	100%	1	100%	Assume 100% ISR
E Multifamily Energy Star Rated Clothes Dryer	0	100%	0	100%	Assume 100% ISR
E Multifamily Energy Star Rated Front Load Washer	0	100%	0	100%	Assume 100% ISR
E Multifamily Energy Star Rated Top Load Washer	No Participation	100%	0	N/A	Assume 100% ISR
E Multifamily Floor Insulation to R-30	No Participation	N/A	0	N/A	Assume 100% ISR
E Multifamily Heat Pump Water Heater	No Participation	N/A	0	N/A	Assume 100% ISR
E Multifamily Line Voltage Smart Thermostat Electric Baseboard	No Participation	N/A	0	N/A	Assume 100% ISR
E Multifamily Line Voltage Thermostat Electric Baseboard	No Participation	N/A	0	N/A	Assume 100% ISR
E Multifamily Smart Thermostat DIY with Electric Heat	0	100%	0	100%	Assume 100% ISR
E Multifamily Smart Thermostat Paid Install with Electric Heat	0	100%	0	100%	Assume 100% ISR
E Multifamily Wall Insulation With Electric Heat	No Participation	N/A	0	N/A	Assume 100% ISR
E Multifamily Window Replc from Single Pane W Electric Heat	0	100%	0	100%	Assume 100% ISR
E Multifamily Energy Star Certified Upright Freezer	0	100%	0	100%	Assume 100% ISR
E Multifamily Window DIY Replc With Electric Heating	No Participation	N/A	0	N/A	Assume 100% ISR

*Due to lack of 90/10 precision, this ISR is instead assumed to be 100%

Table 3-9: Appliance Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
E Energy Star Certified Refrigerator and Refrigerator-Freeze	41	100%	113	97%	State-specific ISR
E Energy Star Certified Upright Freezer	12	100%	22	100%	State-specific ISR
E Energy Star Rated Clothes Dryer	30	97%	81	99%	State-specific ISR
E Energy Star Rated Front Load Washer	17	100%	48	100%	State-specific ISR
E Energy Star Rated Top Load Washer	8	100%	25	100%	State-specific ISR

These ISR values were utilized in the desk reviews for each of the measures listed above in order to calculate verified savings. Additional insights from the survey responses are summarized in Appendix B.

3.2 Program-Level Impact Evaluation Results

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Residential sector in the section below.

3.2.1 Water Heat Program

The Water Heat Program encourages customers to replace their existing electric or natural gas water heater with high efficiency equipment. Customers receive incentives after installation and after submitting a completed rebate form. Table 3-10 summarizes the measures offered under this program.

Table 3-10: Water Heat Program Measures

Measure	Description	Impact Analysis Methodology
E Heat Pump Water Heater	Electric water heater (0.94 EF or higher)	RTF UES

The following table summarizes the verified electric energy savings for the Water Heat Program impact evaluation.

Table 3-11 Water Heat Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings	Adjusted Savings	Verified Savings	Realization Rate
E Heat Pump Water Heater	7	5,272	9,226	4,066	77.12%
Total	**7**	**5,272**	**9,226**	**4,066**	**77.12%**

The Water Heat Program displayed verified savings of 4,066 kWh with a realization rate of 77.12% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-12 Water Heat Program Incentive Costs by Measure

Measure	Incentive Costs
E Heat Pump Water Heater	$1,615.00
Total	**$1,615.00**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Water Heat Program in the section below.

3.2.1.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Water Heat Program.

3.2.1.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Water Heat Program. The Evaluators selected a subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.3.

The Evaluators sampled seven rebates to evaluate program-level savings. Three of the sampled rebates were found to have 0 claimed kWh savings and did not contain the proper information located in the rebate application forms. The Evaluators found all sampled rebate equipment met or exceeded the measure efficiency requirements for the Water Heat Program except for one project, which was erroneously categorized as a "E Heat Pump Water Heater" when in fact the verified measure happened to be a "Heat pump and Heat pump coil", which would therefore fall under the HVAC Program.

The Evaluators found the remaining Water Heat Program rebates to have completed rebate applications with the associated water heater model number and efficiency values filled in either the Customer Care & Billing (CC&B) web rebate data or mail-in rebate applications.

The Evaluators found some water heaters to have storage tanks larger than 50 gallons. This information is crucial to assigning correct savings values for the rebate. The Evaluators recommend that Avista incorporate the storage tank size into rebate application forms.

Most rebates were accompanied with AHRI certification. To acquire accurate equipment efficiencies and tank sizes, AHRI certifications are required to be submitted with the rebate application, with an invoice that matches the model number found in the AHRI certification.

The Evaluators categorized each water heater tier rating using NEEA's HPWH Tier database[9] to correctly identify measure-level savings for the project. The Evaluators recommend that Avista document tier rating of heat pump water heaters to ensure proper validation of savings.

3.2.1.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure. The Evaluators included questions such as:

- Was this water heater a new construction, or did it replace another water heater?
- Was the previous water heater functional?
- Is the newly installed water heater still properly functioning?

[9] https://neea.org/img/documents/HPWH-qualified-products-list.pdf

The responses to this verification survey were used to calculate ISRs for the measures offered in the Water Heat Program. The responses to these additional questions can be found in Appendix B. Table 3-13 displays the ISRs for each of the Water Heat measures for Idaho and Washington territory combined.

Table 3-13: Water Heat Verification Survey ISR Results

Measure	Number of Rebates	Number of Survey Completes	Program-Level Precision at 90% Confidence	In-Service Rate
E Heat Pump Water Heater	7	2	90% ± 53.09%	100%

Although the Evaluators contacted all participants for this program, response rates did not meet the 90/10 precision goal for the program when considering participant responses in both Idaho and Washington combined. Therefore, the Evaluators assumed 100% in-service rate for this measure. However, of the participants who did respond, all survey respondents for each water heater measure described equipment to be currently functioning, supporting the 100% in-service rate assumption for this measure. The Evaluators applied these ISRs to each rebate to quantify verified savings for each measure.

3.2.1.4 Impact Analysis

This section summarizes the verified savings results for the Water Heat Program. The Evaluators calculated verified savings for the E Heat Pump Water Heater measure using the RTF workbook in place at the time the savings goal for the program was finalized. The UES value associated with this measure was applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.1.5 Billing Analysis

The Evaluators did not conduct a billing analysis for the electric measures in the Water Heat Program.

3.2.1.6 Verified Savings

The Evaluators reviewed and applied the current RTF UES values for the E Heat Pump Water Heater measure along with verified tracking data to estimate net program savings for this measure. The verified savings for the program is 4,066 kWh with a realization rate of 77.12%, as displayed in Table 3-11.

The realization rate for the electric savings in the Water Heat Program deviates from 100% due to the Avista TRM prescriptive savings value. The Avista TRM assigns a combination of the values the RTF assigns for Tier 2 and Tier 3 heat pump water heaters. However, among document verification, the Evaluators found most water heaters to be Tier 3 or higher, which the RTF UES assigns a higher savings value.

The Evaluators found that the kWh savings outlined by Avista for electric HPWHs did not match those outlined in the RTF measure table. Avista outlined its HPWH savings as 1,318 kWh while RTF savings are 1,371 and 1,324 for “0-55 gallons” and “AnySize” HPWHs, respectively.

In addition, the Avista TRM assigns the savings values for water heaters of any size. During document review, the Evaluators found most of the water heaters to have a storage tank under 55 gallons, which

has a higher savings value in the RTF than water heaters with unknown tank sizes. The Evaluators applied the RTF UES value for the associated tank size and tier found for each model number in the sampled rebates.

The ISRs for each of the measures in the Water Heat Program was 100% and therefore did not affect the verified savings realization rates.

3.2.2 HVAC Program

The HVAC program encourages installation of high efficiency HVAC equipment and smart thermostats through customer incentives. The program is available to residential electric or natural gas customers with a winter heating season usage of 4,000 or more kWh, or at least 160 Therms of space heating in the prior year. Existing or new construction homes are eligible to participate in the program. Table 3-10 summarizes the measures offered under this program.

Table 3-14: HVAC Program Measures

Measure	Description	Impact Analysis Methodology
E Ductless Heat Pump with Existing Forced Air Furnace*	Electric forced air furnace replacement with ductless heat pump	RTF UES
E Electric To Air Source Heat Pump	Electric forced air furnace replacement with air source heat pump	RTF UES
E Electric to Ductless Heat Pump	Electric forced air furnace replacement with ductless heat pump	RTF UES
E Smart Thermostat DIY with Electric Heat	Self-installed connected thermostats in electrically heated home	RTF UES
E Smart Thermostat Paid Install with Electric Heat	Professionally installed connected thermostats in electrically heated home	RTF UES
E Variable Speed Motor*	Variable speed motor in electrically heated home	RTF UES

*No E Variable Speed Motor or E Ductless Heat Pump with Existing Forced Air Furnace projects were completed in PY2023

The following table summarizes the verified electric energy savings for the HVAC Program impact evaluation.

Table 3-15: HVAC Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
E Electric To Air Source Heat Pump	67	178,188	190,414	185,813	104.28%
E Electric to Ductless Heat Pump	72	268,540	289,816	62,308	23.20%
E Smart Thermostat DIY with Electric Heat	35	28,462	28,462	5,419	19.04%
E Smart Thermostat Paid Install with Electric Heat	92	69,657	71,904	54,033	77.57%
Total	**266**	**544,847**	**580,596**	**307,573**	**56.45%**

The HVAC Program displayed verified savings of 307,573 kWh with a realization rate of 56.45% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-16: HVAC Program Incentive Costs by Measure

Measure	Incentive Costs
E Electric To Air Source Heat Pump	$62,000.00
E Electric to Ductless Heat Pump	$48,693.75
E Smart Thermostat DIY with Electric Heat	$4,036.12
E Smart Thermostat Paid Install with Electric Heat	$13,449.00
Total	**$128,178.87**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the HVAC Program in the section below.

3.2.2.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the HVAC Program.

3.2.2.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the HVAC Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in in Section 2.2.2.3.

The Evaluators found all HVAC Program rebates to have project documentation with the associated HVAC model number and efficiency values in either the CC&B web rebate data or mail-in rebate applications. Most project files contained associated AHRI certifications for the installed equipment. This allowed the Evaluators to easily verify equipment specifications to assign savings values to each sampled project.

The Evaluators note that not all rebate applications contained existing/new construction field and single-family home/manufactured home fields. This field is an input to apply correct RTF UES values. The Evaluators recommend requiring this field be completed in rebate applications, both mail-in and web-based.

The Evaluators verified E Electric to Ductless Heat Pump savings through the RTF. The measure displays a realization rate of 22% because the Avista TRM assigns Idaho-based ductless heat pumps a savings value of 4,000 kWh whereas the RTF assigns between 856 kWh to 908 kWh, depending on heating and cooling zones. However, this issue is not displayed in Washington-based projects because the Avista TRM assigns Washington-based ductless heat pumps a savings value of 908 kWh. The Evaluators recommend updating the Idaho-based unit energy savings Avista TRM value to match the Washington-based savings values.

The Evaluators verified smart thermostat model specifications through the ENERGY STAR database and to verify if thermostat met all conditions required from the RTF measure specifications. The Evaluators verified that 6 of the 8 sampled E Smart Thermostat DIY with Electric Heat rebates did not meet the RTF measure specifications due to lack of occupancy detection and/or geofencing capabilities, a specification required by the RTF. The remaining smart thermostats were verified to qualify for RTF measure savings. In addition, the Avista TRM assigns savings for smart thermostats at 749 kWh per device, whereas the RTF assigns savings of 558 or 664 kWh per device, depending on the heating zone of the household. For these reasons, the realization rate for E Smart Thermostat DIY with Electric Heat is 19% and the

realization rate for the E Smart Thermostat Paid Install with Electric Heat is 78%. The Evaluators found all other sampled rebate equipment met or exceeded the measure efficiency requirements for the HVAC Program.

3.2.2.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.4. The Evaluators included questions such as:

- What type of thermostat did this thermostat replace?
- Is your home heating with electricity, natural gas, or another fuel?
- Was the previous equipment functional?
  Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the HVAC Program. The responses to these additional questions can be found in Appendix B.

Table 3-17 displays the ISRs for each of the HVAC measures for Idaho electric territory only. The ISRs resulted in 10.25% precision at the 90% confidence interval for the program.

Table 3-17: HVAC Verification Survey ISR Results

Measure	Number of Rebates	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
E Electric To Air Source Heat Pump	67	14	90% ±10.25%	100%
E Electric to Ductless Heat Pump	72	16		100%
E Smart Thermostat DIY with Electric Heat	35	3		100%
E Smart Thermostat Paid Install with Electric Heat	92	19		100%

Although the Evaluators contacted all participants for this program, response rates did not meet the 90/10 precision goal for the program when considering participant responses in both Idaho and Washington combined. Therefore, the Evaluators assumed 100% in-service rate for this measure. However, of the participants who did respond, all survey respondents for each water heater measure described equipment to be currently functioning, supporting the 100% in-service rate assumption for this measure. The Evaluators applied these ISRs to each rebate to quantify verified savings for each measure.

3.2.2.4 Impact Analysis

This section summarizes the verified savings results for the HVAC Program. The Evaluators attempted to conduct a billing analysis for the HVAC measures, but participation was insufficient to complete verified savings using this methodology. Therefore, the Evaluators calculated verified savings for the HVAC measures using the RTF workbook in place at the time the savings goal for the program was finalized. These UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.2.5 Billing Analysis

The Evaluators did not conduct a billing analysis for the electric measures in the HVAC Program.

3.2.2.6 Verified Savings

The HVAC Program in total displays a realization rate of 56.45% with 307,573 kWh verified electric energy savings in the Idaho service territory, as displayed in Table 3-15. The realization rate for the electric savings in the HVAC Program deviates from 100% due to the differences between the applied Avista TRM prescriptive savings value and the true Avista TRM or appropriate RTF UES value.

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net program adjusted savings. In addition, the Evaluators reviewed and applied the current RTF UES values for the electric measures along with verified tracking data to estimate net program verified savings for this measure. For the HVAC measures such as ductless heat pumps and air source heat pumps, RTF savings are dependent on housing type (single family/multifamily/manufactured housing). The Evaluators verified home type when applying RTF values to each sampled project, which led to higher or lower savings than expected, depending on housing type.

The E Electric to Ductless Heat Pump displays 22% realization rate because the Avista TRM assigns Idaho-based ductless heat pumps a savings value of 4,000 kWh whereas the RTF assigns between 856 kWh to 908 kWh, depending on heating and cooling zones. The Evaluators recommend updating the Idaho-based unit energy savings Avista TRM value to match the Washington-based savings values.

The Smart Thermostat measures realization rates are low because the Avista TRM uses an average of retail and direct install savings values as well as an average across heating types, while the Evaluators assigned the appropriate RTF UES value for each installation type and heating zone. For example, the RTF assigns smart thermostats with electric FAF in heating zones annual savings between 558 and 604 kWh, while the Avista TRM assigns smart thermostats 778 kWh savings per year.

In addition, 6 of the 8 DIY smart thermostat measures were verified to lack requirements in the RTF, and therefore the realization rate for this measure is 19%. The Measure-level ISRs were also applied to these savings values, which did not affect the realization rate, as ISRs displayed were 100% for all measures in the HVAC program.

3.2.3 Shell Program

The Shell Program provides incentives to customers for improving the integrity of the home's envelope with upgrades to windows and storm windows. Rebates are issued after the measure has been installed for insulation and window measures. Participating homes must have electric or natural gas heating and itemized invoices including measure details such as insulation levels, window values, and square footage. In order to be eligible for incentive, the single-family households, including fourplex or less, must demonstrate an annual electricity usage of at least 8,000 kWh or an annual gas usage of at least 340 Therms. Multifamily homes have no usage requirement. This program includes free manufactured home duct sealing implemented by UCONS. Table 3-10 summarizes the measures offered under this program.

Table 3-18: Shell Program Measures

Measure	Description	Impact Analysis Methodology
E Attic Insulation with Electric Heat	Attic insulation for homes heated with electricity	RTF UES
E Floor Insulation with Electric Heat	Floor insulation for homes heated with electricity	RTF UES
E Energy Star Certified Insulated Door	ENERGY STAR-certified door replacement in homes heated with electricity	RTF UES
E Wall Insulation with Electric Heat	Wall insulation for homes heated with electricity	RTF UES
E Window DIY Replc With Electric Heating	High-efficiency window replacement for homes heated with electricity, installed by the home owner	RTF UES
E Window Replc from Single Pane W Electric Heat	High-efficiency single pane window replacement for homes heated with electricity, installed by a contractor	RTF UES

The following table summarizes the adjusted and verified electric energy savings for the Shell Program impact evaluation.

Table 3-19: Shell Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
E Attic Insulation With Electric Heat	19	36,223	38,828	27,065	74.72%
E Energy Star Certified Insulated Door	22	31,612	17,600	35,363	111.87%
E Floor Insulation With Electric Heat	5	2,694	3,384	0	0.00%
E Wall Insulation With Electric Heat	8	10,994	10,530	14,235	129.48%
E Window DIY Replc With Electric Heating	6	4,496	4,496	2,473	55.00%
E Window Replc from Single Pane W Electric Heat	98	152,428	152,002	76,402	50.12%
Total	**158**	**238,446**	**226,839**	**155,539**	**65.23%**

The Shell Program displayed verified savings of 155,539 kWh with a realization rate of 65.23% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-20: Shell Program Incentive Costs by Measure

Measure	Incentive Costs
E Attic Insulation With Electric Heat	$14,552.25
E Energy Star Certified Insulated Door	$4,000.00
E Floor Insulation With Electric Heat	$2,928.00
E Wall Insulation With Electric Heat	$5,561.63
E Window DIY Replc With Electric Heating	$817.46
E Window Replc from Single Pane W Electric Heat	$54,061.68
Total	**$81,921.02**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Shell Program in the section below.

3.2.3.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Shell Program.

3.2.3.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Shell Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.3.

The Evaluators used the Avista TRM to determine adjusted savings and RTF UES values for verified savings. The Evaluators reviewed each measure number of units, square footage, and insulation where available. The Evaluators found two instances of the 33 window replacement measures in which square footage quantity in the rebate application did not align with the values presented in the tracking data. The Evaluators also had insufficient documentation to verify one of the 33 window replacement measures. This led to additional deviations from a 100% realization rate.

The Evaluators found seven attic insulation projects displayed square footage or R-values values in the tracking database that did not align with the rebate application information or invoice. These factors lead to a realization rate below 100% for the attic insulation measures as highlighted in Table 3-19.

The RTF assigns savings for floor insulation savings at 0, resulting in a 0% realization rate for this measure. The Evaluators used the Avista TRM to determine adjusted savings and RTF UES values for verified savings. The Evaluators found that verified attic insulation, wall insulation, and window measure savings were less than expected savings primarily due to the differences between the categories applied in the Avista TRM prescriptive savings values and the more detailed categories present with unique RTF UES values associated with unique heating type, R-values and climate zone. The lack of granularity in the Avista TRM data lead to a low realization rate for attic insulation and window measures.

The Evaluators found no duplicate rebates in the project data and therefore did not remove any rebates from verified savings.

3.2.3.3 Verification Surveys

The Evaluators conducted a verification survey for the Energy Star door measure and found that the in-service rate was 100%. The Evaluators did not conduct verification surveys for the other measures in the Shell Program since weatherization measures historically have high verification rates.

3.2.3.4 Impact Analysis

This section summarizes the verified savings results for the Shell Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook in place at the time the savings goals for the program was finalized. The Evaluators calculated adjusted savings for each measure using the active Avista TRM values and verified tracking data. These UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.3.5 Billing Analysis

The results of the billing analysis for the Shell program are provided in this section. The methodology for the billing analysis is provided in Section 1.4.3.2.

Table 325 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis.

The customers considered for attic insulation and window replacement billing analysis include customers in both Washington and Idaho service territories to gather the maximum number of customers possible for precise savings estimates. Although the table shows that the windows have enough according to our criteria, the regression analysis p-values do not show significant results. To correct for variability in the data, the Evaluators combined all data for gas measures into a single analysis.

Table 325: Measures Considered for Billing Analysis, Shell Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
E Attic Insulation With Electric Heat	✓	22*	
E Window Replc With Electric Heat	✓	78*	✓

*This count includes rebates from Washington and Idaho

The final number of customers in each the treatment and control group are listed in Table 326.

The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 326 provides annual savings per customer for both measures combined. Model 2 (PPR) was selected as the final model for the Shell Program as it provided the highest adjusted R-squared among the regression models. Savings are statistically significant at the 90% level for all measures and the adjusted R-squared shows the model provided an excellent fit for the data (adjusted R-squared > 0.90).

Table 326: Measure Savings, Shell Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (kWh)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
E Attic Insulation and E Window Replc With Electric Heat	100	99	1,284.69	135.61	2,433.76	0.65	Model 2: PPR

The Evaluators found the E Attic Insulation and E Window Replacement measures with Electric Heat together display a statistically significant verified savings value of 1,284.69 kWh per year. Although the Evaluators estimated savings for these measures through billing analysis, the verified savings for the measures were calculated via Avista TRM due to a low adjusted R-squared value indicating poor fit. Further details of the billing analysis for the Shell measures can be found in Appendix A: Billing Analysis Results.

3.2.3.6 Verified Savings

The Shell Program in total displays a realization rate of 65% with 155,539 kWh verified electric energy savings in the Idaho service territory, as displayed in Table 3-19. The realization rate for the electric savings in the Shell Program deviate from 100% primarily due to the differences between the categories applied in the Avista TRM prescriptive savings values and the more detailed categories present with unique RTF UES values associated with heating type and climate zone. In addition, small changes in verified R-value and square footage led to variation in realization rate for each measure type.

The attic insulation measure displays a realization rate of 74% because the RTF rounds the UES values to the nearest whole kWh. The RTF assigns attic insulation annual savings of 1.00 kWh per square foot for homes with zonal heating and 2.00 kWh per square foot for homes in with heat pump heating, while the Avista TRM assigns a value of 1.86 kWh per square foot, regardless of heating type. The realization rate arises because the majority of homes that participated in attic insulation retrofits displayed zonal heating type. Therefore, the average verified kWh saved per square foot among participants is closer to 1.00 than 2.00. The Evaluators recommend Avista update the Avista TRM value to reflect participation home characteristics. The Evaluators found minimal discrepancy in square footage values between the tracking data and project-level documents provided. The Evaluators also recommend Avista update the floor insulation measure to align with the lack of savings displayed in the RTF documentation.

3.2.4 Fuel Efficiency Program

The Residential Fuel Efficiency Program encourages customers to consider converting their resistive electric space and water heating equipment to natural gas. This program is offered to residential customers in the Idaho service territory. Customers must use Avista electricity for electric straight-resistance heating or water heating in order to qualify for the rebate, which is verified by evaluating their energy use. The home's electric baseboard or furnace heat consumption must indicate at least 8,000 kWh during the previous heating season. Customers receive incentives after installation and after submitting a completed rebate form. Table 3-10 summarizes the measures offered under this program.

Table 3-21: Fuel Efficiency Program Measures

Measure	Description	Impact Analysis Methodology
E Electric to Air Source Heat Pump	Electric central ducted forced air furnace to air source heat pump (9.0 HFSP or greater)	RTF UES
E Electric To Natural Gas Furnace	Electric baseboard or forced air furnace heat to natural gas forced air furnace	Avista TRM
E Electric To Natural Gas Furnace & Water Heat	Electric to natural gas furnace and water heat combo	Avista TRM

*The E Electric to Air Source Heat Pump measure had 0 rebates completed in PY2023

The following table summarizes the verified electric energy savings for the Fuel Efficiency Program impact evaluation.

Table 3-22: Fuel Efficiency Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings	Adjusted Savings	Verified Savings	Verified Realization Rate
E Electric To Natural Gas Furnace	21	155,064	155,064	134,389	86.67%
E Electric To Natural Gas Furnace & Water Heat	7	68,523	66,118	58,734	85.71%
Total	**28**	**223,587**	**221,182**	**193,123**	**86.37%**

The Fuel Efficiency Program displayed verified savings of 193,123 kWh with a realization rate of 86.37% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-23: Fuel Efficiency Program Incentive Costs by Measure

Measure	Incentive Costs
E Electric To Natural Gas Furnace	$44,100
E Electric To Natural Gas Furnace & Water Heat	$19,950
Total	**$64,050**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Fuel Efficiency Program in the section below.

3.2.4.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Fuel Efficiency Program.

3.2.4.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Fuel Efficiency Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.3.

The Evaluators found all Fuel Efficiency Program rebates to have project documentation with the associated HVAC model number and efficiency values in either the CC&B web rebate data or mail-in rebate applications. All of the project files contained associated AHRI certifications for the installed equipment. This allowed the Evaluators to easily verify equipment specifications to assign savings values to each sampled project.

The Evaluators found the CC&B data does not contain manufacturer information. The Evaluators recommend this as an input in the CC&B data. The E Electric to Natural Gas Furnace & Water Heat measure CC&B data does not detail both the furnace and the water heater model number and manufacturer details. Instead, it contains only the furnace or only the water heater equipment, but not both. The Evaluators recommend collecting both equipment manufacturer, model number, and efficiency for the combination measures.

Three of the AHRI AFUE values reported were at 80% which does not meet the criteria to qualify for calculated savings. In addition, two of the rebate documents indicate that boilers were installed and there were not any fuel conversions that took place. Therefore, savings were removed for these projects

and led to a reduction of savings for the overall measures. The individual measures and program overall displayed 86% realization rate.

3.2.4.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure, as described in Section 2.2.2.4. The Evaluators included questions such as:

- Is your home heating with electricity, natural gas, or another fuel?
- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate in-service rates (ISRs) for the measures offered in the Fuel Efficiency Program. The responses to these additional questions can be found in Appendix B. Table 3-13 displays the ISRs for each of the Fuel Efficiency measures for Idaho territory. The ISRs did not meet 10% precision at the 90% confidence interval for the program.

Table 3-24: Fuel Efficiency Verification Survey ISR Results

Measure	Number of Rebates	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
E Electric To Natural Gas Furnace	21	2	90 ±33.95%	100%
E Electric To Natural Gas Furnace & Water Heat	7	3		100%

Although the Evaluators contacted all participants for this program, response rates did not meet the 90/10 precision goal for the program. Therefore, the Evaluators assumed 100% in-service rate for this measure. However, of the participants who did respond, all survey respondents for each furnace water heater combination measure described equipment to be currently functioning, supporting the 100% in-service rate assumption for this measure.

3.2.4.4 Impact Analysis

This section summarizes the verified savings results for the Fuel Efficiency Program. The Evaluators attempted to conduct a billing analysis for the Fuel Efficiency Program measures, but participation was insufficient to complete verified savings using this methodology. The Evaluators calculated verified savings for the gas measures using the active Avista TRM values. These UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

The following sections summarize the results of the billing analysis and the desk review, with a summary of the verified savings for the Fuel Efficiency Program.

3.2.4.5 Billing Analysis

The Evaluators did not conduct a billing analysis for the measures in the Fuel Efficiency Program, as there were insufficient participants. Table 3-25 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis.

Table 3-25: Measures Considered for Billing Analysis, Fuel Efficiency Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations	Sufficient Participation for Billing Analysis
E Electric To Natural Gas Furnace	✓	21	
E Electric To Natural Gas Furnace & Water Heat	✓	7	

3.2.4.6 Verified Savings

The Fuel Efficiency Program in total displays a realization rate of 86.37% with 193,123 kWh verified electric energy savings in the Idaho service territory, as displayed in Table 3-15. The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net program adjusted savings for measures not evaluated through billing analysis. In addition, the Evaluators reviewed and applied the current Avista TRM values for the electric measures along with verified tracking data to estimate net program verified savings for this measure.

The realization rate for the electric savings in the Fuel Efficiency Program deviates from 100% due to three of the AHRI AFUE values reported being at 80% which does not meet the criteria to qualify for calculated savings. The applied Avista TRM prescriptive savings value and the verified savings aligned in the tracking data, however, the removal of savings from these three projects caused the realization rate to drop down to 86.37%.

The Evaluators noted that the required information was validated by Avista employees prior to confirming the rebate and that the ex-ante claimed kWh and Therms savings values aligned with those outlined in the Avista TRM. The Evaluators recommend updating the Avista tracking database to capture previous heating types for conversion measures, requiring home previous heating type, existing cooling type, and home type as inputs on the rebate application forms, and lastly to enforce required documents for all rebates, such as the AHRI documentation and/or full model number in order to verify measure efficiency.

3.2.5 ENERGY STAR® Homes Program

The ENERGY STAR® Homes Program provides rebates for homes within Avista's service territory that attain an ENERGY STAR® certification. This program incentivizes ENERGY STAR® Eco-rated homes. Table 3-26 summarizes the measures offered under this program.

Table 3-26: ENERGY STAR® Homes Program Measures

Measure	Description	Impact Analysis Methodology
E ENERGY STAR Home - Manufactured, Electric Only	ENERGY STAR-rated manufactured home with electric furnace	RTF UES
G ENERGY STAR Home - Manufactured, Gas Only	ENERGY STAR-rated manufactured home with natural gas heating	RTF UES
E ENERGY STAR Home - Manufactured, Gas & Electric	ENERGY STAR-rated manufactured home with gas and electric	RTF UES

The following table summarizes the verified electric energy savings for the ENERGY STAR® Homes Program impact evaluation.

Table 3-27: ENERGY STAR® Homes Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
E Energy Star Home - Manufactured, Electric Only	11	36,465	36,465	37,639	103.22%
E Energy Star Home - Manufactured, Gas & Electric	3	9,066	9,066	9,869	108.86%
Total	**14**	**45,531**	**45,531**	**47,508**	**104.34%**

The ENERGY STAR® Homes Program displayed verified savings of 47,508 kWh with a realization rate of 104.34% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-28: ENERGY STAR® Homes Program Incentive Costs by Measure

Measure	Incentive Costs
E Energy Star Home - Manufactured, Electric Only	$11,000.00
E Energy Star Home - Manufactured, Gas & Electric	$3,000.00
Total	**$14,000.00**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the ENERGY STAR® Homes Program in the section below.

3.2.5.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the ENERGY STAR® Homes Program.

3.2.5.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the ENERGY STAR® Homes Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.3.

The Evaluators found no significant or notable discrepancies in the project data and rebate documentation for the rebates in the Idaho electric service territory.

3.2.5.3 Verification Surveys

The Evaluators did not conduct verification surveys for the ENERGY STAR® Homes Program.

3.2.5.4 Impact Analysis

This section summarizes the verified savings results for the ENERGY STAR® Homes Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook in place at the time the savings goal for the program was finalized. These RTF UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.5.5 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate adjusted program savings for each of the ENERGY STAR® Homes measures. In addition, the Evaluators reviewed and applied the current RTF UES values for each measure along with verified tracking data to estimate net program savings.

The ENERGY STAR® Homes Program in total displays a realization rate of 104.34% with 47,508 kWh verified electric energy savings in the Idaho service territory, as displayed in Table 3-27. The realization rate for the electric savings in the ENERGY STAR® Homes Program deviates from 100% due to the categorical differences between the applied Avista TRM prescriptive savings value and the more detailed RTF UES categories.

The Avista TRM applies RTF savings values from heating zone 2 to all rebates. In addition, the Avista TRM does not consider cooling zone, which also affects savings assigned in the RTF. The Evaluators assigned electric savings from the RTF associated with the appropriate heating and cooling zones rather than defaulting to a uniform value. This change led to low realization rates for some rebates and high realization rates for others within the same measure category. The overall effect this change had on the measure is an upward adjustment on savings. The Evaluators recommend updating Avista measure savings to reflect heating zone-specific RTF measure savings rather than averaging savings from heating zones together.

The Evaluators also found two all-electric rebates to be dual fuel projects and all dual fuel rebates to be primarily heated through natural gas. Savings were adjusted accordingly for both cases. The Evaluators recommend updating the Avista measure savings database to match the primary heating type for dual fuel households. The Evaluators did not conduct a verification survey for the ENERGY STAR® Homes Program and therefore did not adjust verified savings with an ISR.

3.2.6 Small Home & MF Weatherization Program

The Small Home & MF Weatherization Program is a residential prescriptive program that waives the energy usage requirement that is typically employed for residential prescriptive programs. This benefits small homes (less than 1,000 square feet in size) and multifamily dwellings (specifically customers in condominiums larger than five units in size). While this program is designed for all customers, it could also benefit members of Named Communities who reside in smaller homes.

This program encourages consumer to complete energy efficient home upgrades such as attic, floor, or wall insulation, replacing windows with high efficiency windows, or upgrading thermostats, clothes washers, clothes dryers, refrigerators, and refrigerator freezers to increase energy efficiency in these homes.

This section summarizes the impact results of the evaluation results for the Small Home & MF Weatherization Program. Table 3-29 summarizes the measures offered under this program.

Table 3-29: Small Home & MF Weatherization Program Measures

Measure	Description	Impact Analysis Methodology
E Multifamily Ductless Heat Pump Replac Existing Baseboard	Conversion from electric baseboard with high efficiency ductless heat pump in multifamily home	RTF UES
E Multifamily Heat Pump Water Heater	Install high efficiency heat pump water heater in multifamily home	RTF UES
E Multifamily Smart Thermostat DIY	Connected thermostat for multifamily homes with electric heat, self-installed	RTF UES
E Multifamily WIFI Thermostat with Baseboard Electric Heat	Connected thermostat for multifamily homes with electric heat	RTF UES
E Multifamily Energy Star Rated Insulated Door With El Heat	Install ENERGY STAR-certified door in multifamily home	RTF UES
E Multifamily Wall Insulation With Electric Heat	Wall insulation for multifamily homes with electric heat	RTF UES
E Multifamily Attic Insulation With Electric Heat	Attic insulation for multifamily homes with electric heat	RTF UES
E Multifamily Smart Thermostat Paid install	Connected thermostat for multifamily homes with electric heat, contractor-installed	RTF UES
E Multifamily Air Source Heat Pump replac existing baseboard	Conversion to air source heat pump from electric baseboard for multifamily home	RTF UES
E Multifamily Floor Insulation With Electric Heat	Floor insulation for multifamily homes with electric heat	RTF UES
E Multifamily Window Replc With Electric Heat	Window replacement for multifamily homes with electric heat	RTF UES

The following table summarizes the verified electric energy savings for the Small Home & MF Weatherization impact evaluation.

Table 3-30: Small Home & MF Weatherization Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Multifamily Window Replc from Single Pane W Electric Heat	11	38,012	30	63,548	167.18%
E Multifamily Electric to Ductless Heat Pump	5	12,908	15,000	4,694	36.37%
E Multifamily Energy Star Certified Insulated Door	1	800	800	186	23.28%
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	6	868	402	49	5.65%
E Multifamily Energy Star Rated Clothes Dryer	11	3,190	3,190	3,454	108.28%
E Multifamily Energy Star Rated Front Load Washer	14	1,680	1,680	1,680	100.00%
E Multifamily Smart Thermostat DIY with Electric Heat	9	5,299	5,850	6,157	116.19%
E Multifamily Smart Thermostat Paid Install with Electric Heat	4	2,600	2,600	1,524	58.62%
E Multifamily Energy Star Certified Upright Freezer	1	67	67	18	26.87%
E Multifamily Attic Insulation With Electric Heat	1	881	1	225	25.49%
Total	**63**	**66,305**	**29,620**	**81,535**	**122.97%**

The Small Home & MF Weatherization Program displayed verified savings of 81,535 kWh with a realization rate of 122.97% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-31: Small Home & MF Weatherization Incentive Costs by Measure

Measure	Incentive Costs
E Multifamily Window Replc from Single Pane W Electric Heat	$6,221.24
E Multifamily Electric to Ductless Heat Pump	$2,560.00
E Multifamily Energy Star Certified Insulated Door	$100.00
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	$700.00
E Multifamily Energy Star Rated Clothes Dryer	$550.00
E Multifamily Energy Star Rated Front Load Washer	$700.00
E Multifamily Smart Thermostat DIY with Electric Heat	$949.19
E Multifamily Smart Thermostat Paid Install with Electric Heat	$600.00
E Multifamily Energy Star Certified Upright Freezer	$50.00
E Multifamily Attic Insulation With Electric Heat	$648.00
Total	**$13,078.43**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for Small Home & MF Weatherization Program in the section below.

3.2.6.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Small Home & MF Weatherization Program.

3.2.6.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Small Home & MF Weatherization Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in in Section 2.2.2.3.

The rebate application form sufficiently collects all required RTF measure specification details. All rebate applications and tracking data contain smart thermostat manufacturer and model number. The Evaluators were able to verify the models for RTF specifications for connected thermostats.

The Evaluators found that many projects exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). The Evaluators recommend claiming projects on single family homes that are larger than 1,000 SQFT into the Shell Program.

In addition, the Evaluators note that the current program rebate applications do not provide an option to indicate “Multifamily” home type. Rather, the current rebate application includes an option for “Single family”, “Manufactured”, “New construction”, and “Other”. The Evaluators recommend including an option for “Multifamily” in order to consistently apply RTF savings for each of the measures.

The Evaluators reviewed each measure number of units, square footage, and insulation where available. The Evaluators found that five of the sampled projects with insulation or window replacement did not track square footage of installed units in the tracking database. The Evaluators also note that Avista consistently verified square footage and R-values with customers when information was unclear.

Although quantity in the CC&B database were consistent, the Avista TRM savings values differed from verified RTF UES values for each of the projects. The majority of projects displayed realization rates larger than 100% due to differences in home type. The Evaluators verified home type via Zillow to apply correct RTF workbook savings from the single family, multifamily, and manufactured home RTF workbooks. These adjustments led to high realization rates for the overall program.

The Evaluators imputed home type (single family home vs. manufactured home vs. multifamily home) and space heating type for a number of sampled rebates, as the tracking database did not contain values for these accounts, and rebate applications were not available to draw values from. This allows the Evaluators to accurately assign RTF values. The mail-in rebates collect this information; however, it does not seem to be required to complete the rebate and therefore many rebates are missing this information. The Evaluators recommend verifying home type and space heating type during rebate application approval in order to apply correct savings values to each project.

The Evaluators found no duplicate rebates in the project data and therefore did not remove any rebates from verified savings.

3.2.6.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.4. The Evaluators included questions such as:

- What type of thermostat did this thermostat replace?
- Is your home heating with electricity, natural gas, or another fuel?

- Was the previous equipment functional?
  Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Small Home & MF Weatherization Program. The responses to these additional questions can be found in Appendix B.

Table 3-17 displays the ISRs for each of the Small Home & MF Weatherization measures for Idaho and Washington electric territory combined. The ISRs resulted in 45.17% precision at the 90% confidence interval for the program.

Table 3-32: Small Home & MF Weatherization Program Verification Survey ISR Results

Measure	Number of Rebates	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
E Multifamily Attic Insulation With Electric Heat	1	0	90% ±100%	Assume 100% ISR
E Multifamily Electric To Air Source Heat Pump	N/A	N/A		Assume 100% ISR
E Multifamily Electric to Ductless Heat Pump	5	0		Assume 100% ISR
E Multifamily Energy Star Certified Insulated Door	1	0		Assume 100% ISR
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	6	0		Assume 100% ISR
E Multifamily Energy Star Rated Clothes Dryer	11	0		Assume 100% ISR
E Multifamily Energy Star Rated Front Load Washer	14	0		Assume 100% ISR
E Multifamily Energy Star Rated Top Load Washer	N/A	N/A		Assume 100% ISR
E Multifamily Floor Insulation to R-30	N/A	N/A		Assume 100% ISR
E Multifamily Heat Pump Water Heater	N/A	N/A		Assume 100% ISR
E Multifamily Line Voltage Smart Thermostat Electric Baseboard	N/A	N/A		Assume 100% ISR
E Multifamily Line Voltage Thermostat Electric Baseboard	N/A	N/A		Assume 100% ISR
E Multifamily Smart Thermostat DIY with Electric Heat	9	0		Assume 100% ISR
E Multifamily Smart Thermostat Paid Install with Electric Heat	4	0		Assume 100% ISR
E Multifamily Wall Insulation With Electric Heat	N/A	N/A		Assume 100% ISR
E Multifamily Window Replc from Single Pane W Electric Heat	11	0		Assume 100% ISR
E Multifamily Energy Star Certified Upright Freezer	1	0		Assume 100% ISR
E Multifamily Window DIY Replc With Electric Heating	N/A	N/A		Assume 100% ISR

Although the Evaluators contacted all participants for this program, response rates did not meet the 90/10 precision goal for the program. Therefore, the Evaluators assumed 100% in-service rate for this measure. The Evaluators applied these ISRs to each rebate to quantify verified savings for each measure.

3.2.6.4 Impact Analysis

This section summarizes the verified savings results for the Small Home & MF Weatherization Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook in place at the time the savings goal for the program was finalized.

3.2.6.5 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net adjusted program savings for those measures. Final verified savings were estimated using the RTF UES values associated with each measure. The Small Home & MF Weatherization Program displayed 122.97% realization with 81,535 kWh saved, as displayed in Table 3-30.

The E Multifamily Electric to Ductless Heat Pump displays a 36% realization rate because two of the four sampled rebates were rebated for homes in heating zone 3, in which the RTF does not define savings for ductless heat pump with existing FAF equipment. Therefore, the Evaluators assigned ductless heat pump with zonal RTF savings, which is 29.4% the magnitude of savings of the Avista TRM value of 3,000 kWh. The remaining two sampled E Multifamily Electric to Ductless Heat Pump rebates were installed in homes which were verified to be multifamily homes, in which the RTF assigns savings at 43.33% the magnitude of savings of the Avista TRM value. This led to a low realization rate for the measure overall. The Evaluators recommend Avista incorporate additional measure specifications to assign expected savings for this measure which account for home type, heating zone, and cooling zone.

The Attic Insulation and Door Insulation measures also returned low realization rates due to heating zone discrepancies in the claimed expected savings. The Evaluators assigned electric savings from the RTF associated with the appropriate heating and cooling zones which caused a difference in the verified realization rates. The Evaluators recommend updating Avista measure savings to reflect heating zone-specific RTF measure savings rather than averaging savings from heating zones together.

The Evaluators found the realization rate for Energy Star Certified Refrigerators and Freezers to be low due to the configuration of the measure itself. The expected savings values line up with a side-mounted freezer however, after further investigation via document verification the Evaluators found these measures to be bottom-mounted which caused the RTF savings to reflect a lower value hence the low realization rate.

The program verified savings resulted in a realization rate of 0% for the E Energy Star Rated Top Load Washer largely due to the fact that the Evaluators attributed 0 kWh/unit savings because the RTF clothes washer workbook estimates that savings for this measure are negative and therefore there are no proven RTF savings for this measure.

The Evaluators found that the tracking database does not currently track square footage data consistently for insulation measures. The Evaluators recommend these values are tracked consistently for this program to ensure savings are calculated accurately for each measure.

The realization rate for the E Multifamily Smart Thermostat DIY is low because one of the two thermostats were verified to lack RTF qualification due to lack of occupancy sensor or geolocation capabilities. The realization rate for the E Multifamily Energy Star Rated Insulated Door With El Heat is low because the RTF UES is 75% the magnitude of the Avista TRM value.

Although quantity in the CC&B database were consistent, the Avista TRM savings values differed from verified RTF UES values for each of the projects. The majority of projects displayed realization rates that differ from 100% due to differences in home type for all measures because the RTF weatherization workbook for single family homes has significantly lower savings than the updated weatherization workbook for multifamily homes. The Evaluators verified home type via Zillow to apply correct RTF workbook savings from the single family, multifamily, and manufactured home RTF workbooks. These adjustments led to high and low realization rates across each measure.

The Evaluators recommend Avista verify home type prior to applying Avista TRM values, and to create a separate single family and a separate multifamily windows measure and savings value to apply in the Avista database, mimicking the RTF values, in order to ensure proper categorization of measure savings.

3.2.7 Multifamily Direct Install Program

The Multifamily Direct Install Program (MFDI) Program is administered by SBW Consulting, Inc (SBW). This program provides direct installation and audits for customers to install direct install measures and identify additional energy efficiency opportunities. This program is available to customers who receive electric service from Avista and have a five-unit or more multifamily property. The program also serves hard-to-reach customer segment as well as Avista's low- and limited-income population. Table 3-29 summarizes the measures offered under this program.

Table 3-33: Multifamily Direct Install Program Measures

Measure	Impact Analysis Methodology
Screw-in LED lamp (3.8)	SBW TRM
Screw-in LED lamp (4.8)	SBW TRM
Screw-in LED lamp (A-line 100W)	SBW TRM
Screw-in LED lamp (A-line 40W)	SBW TRM
Screw-in LED lamp (A-line 60W)	SBW TRM
Screw-in LED lamp (BR30)	SBW TRM
Screw-in LED lamp (BR40)	SBW TRM
Screw-in LED lamp (G25)	SBW TRM
Screw-in LED lamp (PAR30)	SBW TRM
Screw-in LED lamp (PAR38)	SBW TRM
Screw-in LED lamp (R20)	Avista TRM/SBW TRM
Faucet aerator (1 GPM)	RTF UES, Aerators_v1_1/SBW TRM
Kitchen Aerator	RTF UES, Aerators_v1_1/SBW TRM
VendingMiser	SBW TRM

The following table summarizes the verified electric energy savings for the Multifamily Direct Install Program impact evaluation.

Table 3-34: Multifamily Direct Install Verified Electric Savings

Measure	Participation	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Screw-in LED lamp (A-line 60W)	1,828	50,279	67,427	134.11%
Screw-in LED lamp (BR30)	41	3,154	3,441	109.11%
Screw-in LED lamp (BR40)	12	397	563	141.88%
Screw-in LED lamp (G25)	401	36,464	51,552	141.38%
Screw-in LED lamp (PAR38)	3	2,394	2,276	95.06%
Faucet aerator (1 GPM)	456	47,544	47,544	100.00%
Kitchen Aerator	3	117	117	100.00%
Total	**2,744**	**140,349**	**172,921**	**123.21%**

The Multifamily Direct Install Program displayed verified savings of 172,921 kWh with a realization rate of 124.20% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-35: Multifamily Direct Install Program Incentive Costs by Measure

Measure	Incentive Costs
Screw-in LED lamp (A-line 60W)	$62,135.00
Screw-in LED lamp (BR30)	$1,210.00

Screw-in LED lamp (BR40)	$336.00
Screw-in LED lamp (G25)	$28,118.00
Screw-in LED lamp (PAR38)	$384.00
Faucet aerator (1 GPM)	$9,056.00
Kitchen Aerator	$24.00
Total	**$101,263.00**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for Multifamily Direct Install Program in the section below.

3.2.7.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Multifamily Direct Install Program.

3.2.7.2 Database Review & Document Verification

To verify savings, the Evaluators reviewed the tracking data and verified savings using Avista TRM values, RTF UES values, and SBW saving methodology.

The Evaluators found that in many cases, the per unit savings value for the lighting measures did not align with the per unit value in SBW's methodology or the RTF UES values. The tracking data contained multiple savings baselines for savings including one value for savings above code (EISA) and another value for savings above existing installed lighting. This kWh energy saved per unit item did not always align with the SBW TRM pre-defined values. The precise reason for these discrepancies was unclear. These discrepancies led to deviations from 100% realization rate for the lighting measures.

The Evaluators evaluated the faucet and kitchen aerator values using RTF UES values. The Evaluators found no discrepancy between the savings values in the tracking database and the RTF UES values leading to a realization rate of 100% for these measures. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data in order to apply more specific savings values to each project.

The Evaluators did not conduct survey verification for the Multifamily Direct Install Program since customers are typically unaware of the measures installed and since the MFDI measure savings values have in-service rates embedded in the savings values.

3.2.7.3 Impact Analysis

This section summarizes the verified savings results for the Multifamily Direct Install Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook, Avista TRM, and SBW methodology in place at the time the savings goals for the program were finalized.

3.2.7.4 Verified Savings

The Evaluators reviewed the SBW savings values along with verified tracking data to estimate net adjusted program savings for those measures. Final verified savings were estimated using the SBW UES values associated with each measure. The Multifamily Direct Install Program displayed 124.20% realization with 172,921 kWh saved, as displayed in Table 3-30.

The difference between calculated expected savings and verified savings are due to the application of the SBW TRM to the consistently validated quantity of measures. The program verified savings resulted in a realization rate of above 100% largely due to low expected savings for the A-line 60W and G25 LEDs. The SBW document measure-level UES did not align with tracking data values. The Evaluators were unable to identify the cause of this discrepancy. The Evaluators recommend Avista apply the SBW UES to the tracking database accurately and consistently across all lighting measures.

The Evaluators evaluated the faucet and kitchen aerator values using RTF UES values and found there was discrepancy between the savings values in the tracking database and the RTF UES values leading to a realization rate of 100% for these measures. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data to apply more specific savings values to each project.

3.2.8 Appliances Program

The Appliances Program is residential prescriptive program that offers incentives for customers to upgrade their existing clothes washers and dryers to ENERGY STAR-rated clothes dryers and washers.

This section summarizes the impact results of the evaluation results for the Appliances Program. Table 3-29 summarizes the measures offered under this program.

Table 3-36: Appliances Program Measures

Measure	Description	Impact Analysis Methodology
E Energy Star Certified Refrigerator and Refrigerator-Freeze	ENERGY STAR-certified refrigerator or refrigerator-freezer for residential homes	RTF UES
E Energy Star Certified Upright Freezer	ENERGY STAR-certified standard or compact freezer for residential homes	RTF UES
E Energy Star Rated Clothes Dryer	ENERGY STAR-certified clothes dryer for residential homes	RTF UES
E Energy Star Rated Front Load Washer	ENERGY STAR-certified clothes washer for residential homes	RTF UES
E Energy Star Rated Top Load Washer	ENERGY STAR-certified clothes washer for residential homes	RTF UES

The following table summarizes the verified electric energy savings for the Appliances Program impact evaluation.

Table 3-37: Appliances Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Energy Star Certified Refrigerator and Refrigerator-Freeze	230	27,776	28,250	27,776	100.00%
E Energy Star Certified Upright Freezer	35	2,144	2,345	2,144	100.00%
E Energy Star Rated Clothes Dryer	149	42,464	43,657	39,439	92.88%
E Energy Star Rated Front Load Washer	101	12,240	12,120	12,240	100.00%
E Energy Star Rated Top Load Washer	40	962	1,040	0	0.00%
Total	**555**	**85,586**	**87,682**	**81,599**	**95.34%**

The Appliances Program displayed verified savings of 81,599 kWh with a realization rate of 95.34% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-38: Appliances Program Incentive Costs by Measure

Measure	Incentive Costs
E Energy Star Certified Refrigerator and Refrigerator-Freeze	$22,050.00
E Energy Star Certified Upright Freezer	$1,700.00
E Energy Star Rated Clothes Dryer	$7,150.00
E Energy Star Rated Front Load Washer	$5,250.00
E Energy Star Rated Top Load Washer	$1,950.00
Total	**$38,100.00**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for Appliances Program in the section below.

3.2.8.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Appliances Program.

3.2.8.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Appliances Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in in Section 2.2.2.3.

Avista sufficiently collects all required RTF measure specification details on the rebate application forms. All rebate applications and tracking data contain AHRI documentation or model numbers to verify model specifications. The Evaluators were able to verify the models for RTF specifications for most projects.

The Evaluators verified each model specification with values provided by ENERGY STAR qualified product lists. The Evaluators found that all the sampled projects qualified for RTF savings.

The Evaluators found no duplicate rebates in the project data and therefore did not remove any rebates from verified savings.

3.2.8.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.4. The Evaluators included questions such as:

- What type of clothes washer/dryer did this equipment replace?
- Is your home heating's water heated with electricity or natural gas?
- Was the previous equipment functional?

  Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Appliances Program. The responses to these additional questions can be found in Appendix B.

Table 3-17 displays the ISRs for each of the Appliances measures for Idaho electric territory only. The ISRs resulted in ±6.95% precision at the 90% confidence interval for the program.

Table 3-39: Appliances Program Verification Survey ISR Results

Measure	Number of Rebates	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
E Energy Star Certified Refrigerator and Refrigerator-Freeze	230	41	90% ±6.95%	97%
E Energy Star Certified Upright Freezer	35	12		100%
E Energy Star Rated Clothes Dryer	149	30		99%
E Energy Star Rated Front Load Washer	101	17		100%
E Energy Star Rated Top Load Washer	40	8		100%

Almost survey respondents described equipment to be currently functioning, leading to near- 100% ISR for each measure. The Evaluators applied the ISRs listed in Table 3-17 to each rebate to quantify verified savings for each measure.

3.2.8.4 Impact Analysis

This section summarizes the verified savings results for the Appliances Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook in place at the time the savings goal for the program was finalized.

3.2.8.5 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net adjusted program savings for those measures. Final verified savings were estimated using the RTF UES values associated with each measure. The Appliances Program displayed 95.34% realization with 81,599 kWh saved, as displayed in Table 3-30.

The program verified savings resulted in a realization rate of less than 100% largely due to low savings attributed to E Energy Star Rated Clothes Dryer and E Energy Star Rated Top Load Washer projects. The Evaluators attributed 0 kWh/unit savings to the E Energy Star Rated Top Load Washer because the referenced RTF clothes washer workbook estimates that savings for this measure is negative and therefore there is no proven RTF savings for this measure which caused a drop in realization.

Furthermore, the E Energy Star Rated Clothes Dryer measure expected savings differed from the RTF workbook unit savings. The claimed savings came in at 290 kWh for some projects and 293 kWh for others while the RTF UES values associated with the measure were 281 kWh. This value was further reduced when incorporating the ISR rate of 97% from the verification surveys.

3.2.9 Midstream Program (Residential)

Avista converted several residential and nonresidential measures from a downstream delivery channel to a midstream delivery channel via local distributors. As Avista notes, midstream approaches have proven successful in other parts of the Pacific Northwest, as well as nationally.

The Midstream Program currently offers midstream incentives to residential customers for measures such as:

- Residential heat pump water heaters
- Residential split unitary equipment
- Residential high efficiency natural gas furnaces
- Residential tankless water heaters

The nonresidential midstream measures and impact evaluation results are presented in Section 5.3.8. This change in delivery channel is seen to expand the benefits gained from the consumer with respect to the midstream incentive design rather than the downstream incentive design, as well as how customers use this offering.

This section summarizes the estimated savings Avista has calculated for the Midstream Program. The Evaluators conducted the first impact evaluation for the measures in this program for PY2023. Table 3-40 summarizes the measures offered under this program.

Table 3-40: Midstream Program Measures

Measure	Description	Impact Analysis Methodology
E Heat Pump Water Heater	High efficiency heat pump water heater installation	RTF with adjustments
E Split Unitary Equipment	Conversion to Air Source Heat Pump installation	RTF with adjustments

The following table summarizes the estimated electric energy savings for the Midstream Program impact evaluation.

Table 3-41: Midstream Program Verified Electric Savings

Measure	PY2023 Units	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Heat Pump Water Heater	1	2,181	2,787	1,575	72.22%
E Split Unitary Equipment	262	1,262,639	1,258,343	681,780	54.00%
Total	**263**	**1,264,821**	**1,261,130**	**683,356**	**54.03%**

The Midstream Program displayed estimated savings of 683,356 kWh with a realization rate of 54%. The following table summarizes the incentive costs associated with the program.

Table 3-42: Midstream Program Costs by Measure

Measure	Incentive Costs
E Heat Pump Water Heater	$200.00
E Split Unitary Equipment	$115,090.00
Total	**$115,290.00**

The Evaluators describe the impact evaluation tasks completed for this program in the subsections below.

3.2.9.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Midstream Program.

3.2.9.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Midstream Pilot. The Evaluators selected a subset of rebates to cross-verify tracking data inputs, summarized in in Section 2.2.2.3.

The Evaluators found all 10 selected rebates documented the information necessary to accurately characterize savings for the program within the Idaho electric service territory. The Evaluators verified the model number, efficiency, quantity, and RTF UES values necessary to calculate verified savings. The Midstream tracking data is tracked and delivered separately from the remaining residential portfolio, often demonstrating extensive detail on product characteristics.

During review, the Evaluators found that the implementer's engineering algorithms, in which expected savings are calculated, differed greatly from the UES previously defined for each measure in the Avista TRM and RTF UES values. That is, the implementer's engineering equations resulted in savings double or triple the amount for the average air source heat pump and heat pump water heater. In addition, the Evaluators found that the engineering algorithms applied to the tracking database equipment were not applied properly to the tracking data inputs. The reasoning for this discrepancy is unclear. The tracking database displays measure-level savings about 40% inflated compared to measure-level savings had the designated baseline and annual operating hours aligned with those values defined in the implementer TRM. This discrepancy is separate from the adjustment for market practice baseline defined by the RTF.

3.2.9.3 Verification Surveys

The Evaluators did not conduct verification surveys for the Midstream Program in PY2023 due to the nature of the midstream delivery channel; customers are not aware that they are participating in the program because they are not required to fill out a downstream rebate application.

3.2.9.4 Impact Analysis

This section summarizes the verified savings results for the Midstream Program. The Evaluators attempted to conduct a billing analysis for each measure with sufficient participation. For measures in which billing analysis was not feasible or displayed inconclusive results, the Evaluators evaluated verified savings for the measure through the Regional Technical Forum workbooks in place at the time of the biennium plan for the Midstream Program.

The Evaluators reviewed the expected savings workbook from the program implementer, Energy Solutions. The implementer defined expected kWh savings for each measure prior to the rollout of the program. The Evaluators note that the expected savings workbook values from the implementer vary from the Avista TRM for the previous prescriptive measure savings expectations as well as the RTF UES

for each of the measures. For this reason, it is expected that the realization rate will portray discrepancies between the expected and verified savings.

The Evaluators estimated verified savings using RTF UES workbooks in the RTF's residential sector.

3.2.9.5 Billing Analysis

The Evaluators did not conduct a billing analysis for the electric measures in the Midstream Program because of limited participation for each measure due to mid-year implementation of the program.

3.2.9.6 Verified Savings

The Evaluators reviewed the Energy Solutions implementer expected savings values along with verified tracking data to estimate net adjusted program savings for those measures. In order to calculate verified savings, the Evaluators utilized industry-standard engineering algorithms using purchased equipment efficiency values and RTF-defined market practice baseline values, where appropriate. The Midstream Program displayed 54.03% realization with 683,356 kWh saved, as displayed in Table 3-41.

The program verified savings resulted in low realization rate largely due to the fact that the expected savings were inflated due to incorporation of baselines that did not represent market baseline, as the Regional Technical Forum does. Additionally, the implementer-given expected savings differ from the Avista TRM values. The Evaluators compared the implementer-provided expected savings to the previously defined measure-level expected savings defined in the TRM and concluded that, had the Avista TRM been used to define program expected savings, the realization rate would have been 100% realization rather than 54% realization. This difference is seen in the discrepancy between the expected savings value and the adjusted savings value presented in Table 3-41.

The Evaluators did not make any additional adjustments to the purchased equipment efficiency level of the equipment nor the quantity, as the verification efforts confirmed the details were properly tracked. Therefore, the difference between the established values in the implementer minimum code baseline and the RTF market practice baseline, as well as incorrectly applied engineering algorithms were the driving factors for the low realization rate. The Evaluators recommend that Avista and the implementers update the expected savings calculation methodology to incorporate market practice baseline rather than minimum code baseline values in order to remain consistent with the baseline methods utilized in the downstream measure programs and more accurately estimate expected savings in future iterations of this program.

4. Low-Income Impact Evaluation Results

The Low-Income Program delivers energy efficiency measures to low-income residential customers in its Idaho service territory with a partnership with five network Community Action Agencies ("Agencies") and one tribal weatherization organization. The Agencies qualify income to prioritize and treat households based on several characteristics. In-house or contract crews install approved program measures. In addition, the Agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures.

The Evaluators completed an impact evaluation on Avista's Low-Income portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each electric impact evaluation in the Low-Income Portfolio in the Idaho service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, and RTF values to evaluate verified savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data.

Table 4-1: Low-Income Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Low-Income	223,111	171,311	76.78%
Total Low-Income	**223,111**	**171,311**	**76.78%**

In PY2023, Avista completed and provided incentives for low-income electric measures in Idaho and achieved total electric energy savings of 171,311 kWh. The Low-Income sector achieved 76.78% of the savings expectations. Further details of the impact evaluation results by program are provided in the sections following.

4.1 Program-Level Impact Evaluation Results

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Low-Income sector in the section below.

4.1.1 Low-Income Program

The Low-Income Program delivers energy efficiency measures to low-income residential customers in its Idaho service territory with a partnership with five network Community Action Agencies ("Agencies") and one tribal weatherization organization. The Agencies qualify income to prioritize and treat households based on several characteristics. In-house or contract crews install approved program measures. In addition, the Agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures.

Avista provides CAP agencies with the following approved measure list, which are reimbursed in full by Avista. Avista also provides a rebate list of additional energy saving measures the CAP agencies are able to utilize which are partially reimbursed. The following table summarizes the measures offered under this program.

Table 4-2 summarizes the measures offered under this program.

Table 4-2: Low-Income Program Measures

Measure	Impact Analysis Methodology
Air Infiltration - E – ID	Avista TRM
Air Source Heat Pump - E – ID	
Attic Insulation - E – ID	
Conversion to Air Source Heat Pump - E - ID	
Conversion to Ductless Heat Pump - E - ID	
Conversion to Natural Gas Furnace – E - ID	
Duct Insulation - E - ID	
Duct Sealing - E - ID	
E Energy Star Certified Refrigerator and Refrigerator-Freeze – E - ID	
Exterior Doors - E - ID	
Floor Insulation - E - ID	
Health Safety Repair - E - ID	
LED - E - ID	
Windows - E – ID	

Table 4-3 summarizes the verified electric energy savings for the Low-Income Program impact evaluation.

Table 4-3: Low-Income Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Air Infiltration	17	10,727	10,727	10,727	100.00%
E Air Source Heat Pump	2	1,757	1,757	1,757	100.00%
E Attic Insulation With Electric Heat	2	848	848	848	100.00%
E Conversion to Air Source Heat Pump	24	134,903	134,903	97,316	72.14%
E Conversion to Ductless Heat Pump	10	30,162	30,162	25,753	85.38%
E Conversion to Natural Gas Furnace	5	21,636	21,636	12,264	56.68%
E Duct Insulation	2	271	536	536	198.02%
E Duct Sealing	3	2,130	2,130	2,130	100.00%
E Energy Star Certified Refrigerator and Refrigerator-Freeze	1	39	39	39	100.00%
E Exterior Doors	15	3,077	3,077	3,077	100.00%
E Floor Insulation With Electric Heat	5	5,706	5,706	5,706	100.00%
E Health Safety and Repair	22	-	-	-	N/A
E Lighting	17	102	102	102	100.00%
E Window Replc from Single Pane W Electric Heat	17	11,754	11,056	11,056	94.06%
Total	**142**	**223,111**	**222,679**	**171,311**	**76.78%**

The Low-Income Program displayed verified savings of 171,311 kWh with a realization rate of 76.78% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 4-4: Low-Income Program Incentive Costs by Measure

Measure	Incentive Costs
E Air Infiltration	$17,956.58
E Air Source Heat Pump	$1,463.84
E Attic Insulation With Electric Heat	$2,254.61
E Conversion to Air Source Heat Pump	$345,882.90
E Conversion to Ductless Heat Pump	$126,604.81
E Conversion to Natural Gas Furnace	$57,930.35
E Duct Insulation	$649.98
E Duct Sealing	$316.87
E Energy Star Certified Refrigerator and Refrigerator-Freeze	$918.85
E Exterior Doors	$15,358.61
E Floor Insulation With Electric Heat	$9,551.54
E Health Safety and Repair	$92,089.39
E Lighting	$395.99
E Window Replc from Single Pane W Electric Heat	$74,525.05
Total	**$745,899.37**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for Low-Income Program in the section below.

4.1.1.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Low-Income Program.

4.1.1.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Low-Income Program. The Evaluators selected a subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.3.

During the review, the Evaluators found there were several projects with missing data. In total, thirteen projects were unable to be verified due to missing or incomplete data. In addition, the Evaluators found one measure that was repeated and removed from the review.

The required information necessary to complete verification activities and proper expected savings calculations are: measure installed square footage for insulation measures, measure quantity for appliance measures, and total building annual energy usage in order to calculate proper building savings cap at 20% annual energy usage.

4.1.1.3 Verification Surveys

The Evaluators did not conduct verification surveys for the Low-Income Program.

4.1.1.4 Impact Analysis

This section summarizes the verified savings results for the Low-Income Program. The Evaluators calculated verified savings for Low-Income Program measures using the Avista TRM. However, a whole building billing analysis was completed to supplement the findings from the desk review.

4.1.1.5 Billing Analysis

The results of the billing analysis for the Low-Income Program are provided below.

The Evaluators attempted to estimate measure-level Low-Income Program energy savings through billing analysis regression with a counterfactual group selected via propensity score matching. The Evaluators attempted to isolate each unique measure. In doing so, the Evaluators also isolate the measure effects using the customer's consumption billing data. However, participation for the Low-Income program resulted in a small number of customers with isolated measures and therefore the Evaluators were unable to estimate measure-level savings through billing analysis.

The Evaluators instead conducted a whole-home billing analysis for all the electric measures combined in order to estimate savings for the average household participating in the program, across all measures. The Evaluators successfully created a matched cohort for the electric measure households. Customers were matched based on average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household.

Table 4-5 provides annual savings per customer for each measure. Model 2 (PPR) was selected as the final model for the Low-Income Program as it provided the highest adjusted R-squared among the regression models. However, savings for this model are not statistically significant at the 90% level, indicated by the lower 90% confidence bound at 0 Therms saved per year. The customers considered for billing analysis include customers in both Washington and Idaho service territories to gather the maximum number of customers possible for precise savings estimates.

Table 4-5: Measure Savings, Low-Income Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (kWh)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
All Electric Measures	215	283	442.26*	94.09	791.90	0.80	Model 2: PPR

*Not statistically significant

Due to lack of statistical significance from the billing analysis results, The Evaluators did not apply these regression savings estimates to the program. Instead, the Evaluators estimated savings through the program by applying Avista TRM values to verified quantities. Further details of the billing analysis can be found in Appendix A.

4.1.1.6 Verified Savings

Due to lack of statistically significant estimates from the billing analyses, the Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net program savings for those measures. Adjusted savings were estimated using the Avista TRM. Verified savings were estimated using the Avista TRM savings values to each measure along with adjustments found during document verification of the sampled projects.

The largest contributor to discrepancy of savings is the application of the 20% annual kWh and Therm usage cap on project-level savings. When implemented, this led to a reduction of savings for a number of projects. The Evaluators recommend that Avista and CAP Agencies ensure that all required documentation is properly documented and the 20% annual kWh and Therm usage caps are incorporated to total project-level savings.

5. Non-Residential Impact Evaluation Results

The Evaluators completed an impact evaluation on Avista's Non-Residential portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each electric impact evaluation in the Non-Residential Portfolio in the Idaho service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, RTF, IPMVP, supplemental sources and billing analysis of participants to evaluate savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data. Table 5-1 summarizes the Non-Residential verified impact savings by program.

Table 5-1: Non-Residential Verified Impact Savings by Program

Program	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Prescriptive Lighting	8,374,096	8,374,096	7,978,849	95.3%
Small Business Lighting	3,135,108	2,956,164	2,956,164	94.3%
HVAC	42,924	42,924	42,924	100.0%
Food Service Equipment	No PY2023 Participation			
Grocer	1,928	1,928	1,928	100.0%
Shell	3,458	37,320	37,320	1079.2%
Green Motors	No PY2023 Participation			
Midstream	142,927	58,355	58,355	40.8%
Site-Specific	2,576,031	2,576,031	2,556,219	99.2%
Total Non-Residential:	**14,276,472**	**14,046,818**	**13,631,759**	**95.5%**

In PY2023, Avista completed and provided incentives for non-residential electric measures in Idaho and achieved a total electric energy savings of 13,631,759 kWh, leading to an overall achievement of 95.5% of the expected savings for the non-residential programs. Verification Results

5.1.1 Database & Document Verification

Before conducting the impact analyses, the Evaluators conducted a database review for all prescriptive programs. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Document-Based Verification in Section 2.2.2.3.

The Evaluators requested rebate documentation for a subset of participating customers. These documents included invoices, rebate applications, pictures, AHRI certificates and DLC screenshots and similar types of documents for the following programs:

- Lighting
- HVAC (VFD) Program
- Food Service Equipment Program
- Grocer Program
- Shell Program
- Green Motors Program

This sample of documents was used to cross-verify tracking data inputs. In the case the Evaluators found any deviations between the tracking data and application values, the Evaluators reported and summarized those differences in the appropriate report chapters.

The Evaluators developed a sampling plan that achieves a sampling precision of ±10% at 90% statistical confidence – or "90/10 precision" – for document verification.

Table 5-2 displays program populations, sample sizes for document verification and resulting precision.

Table 5-2: Prescriptive Program Verification Precision

Program	Population (Projects)	Sampled (Projects)	Precision
Prescriptive Lighting	587	70	±3.65%
Small Business Lighting	128	40	2.81%
HVAC	3	3	±0%
Grocer	2	2	±0%
Shell	1	1	±0%
Midstream	21	21	0.00%
Site-Specific	23	9	±9.61%

5.2 Survey and On-Site Verification

Unlike Residential measures, non-residential measures typically have a 100% installation rate or a deemed in-service rate (ISR) included in RTF and Avista TRM UES. The two exceptions to this are Prescriptive Lighting measures and customs projects, such as those in the Site-Specific programs. Verification for these programs was addressed in two ways:

5.2.1 Prescriptive Lighting Verification

To access Prescriptive Lighting ISRs the Evaluators conducted a survey of program participants. A total of 472 projects included a contact email, of which 74 were unique. Customers with a valid email were sent the survey via an email invitation, followed a week later by a follow-up reminder to those who had not responded.

The Evaluators asked participants if the rebated equipment is currently installed and working, in addition to questions about HVAC configurations. The Evaluators achieved ±58.10% precision across the Prescriptive Lighting Program in Avista's WA service territory, summarized in Table 5-3.

Table 5-3: Survey Verification

Population	Respondents	ISR	Precision at 90% CI
472	2	100%	±58.10%

All respondents reported that their rebated equipment was currently installed and operating.

5.2.2 Site-Specific Verification

For the Site-Specific program, the Evaluators conducted 9 on-site visits to verify full installation and equipment operation as described in the project scope. This is discussed further in the Site-Specific chapter.

Table 5-4: On-Site Verification

Program	Population	On-Site Visits	Precision at 90% CI (by claimed savings)
Site-Specific	31	9	±9.35%[10]

5.3 Program-Level Impact Evaluation Results

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Non-Residential sector in the section below.

[10] Sampling precision based on sample stratified by kWh. Multiple projects occurred at several sites, necessitating only a single visit for multiple sampled projects.

5.3.1 Prescriptive Lighting Program

This program is intended to prompt commercial electric customers to increase the energy efficiency of their lighting equipment through direct financial incentives. It indirectly supports the infrastructure and inventory necessary to ensure that the installation of high-efficiency equipment is a viable option for customers.

In an effort to streamline the process and make it easier for customers and vendors to participate in the program, Avista developed a prescriptive approach for commercial/industrial customers in 2004. This program provides for many common retrofits to receive a pre-determined incentive amount. The Prescriptive Lighting program makes it easier for customers – especially smaller customers and vendors – to participate in the program.

The measures included in the Prescriptive Lighting program include retrofits from fluorescent lamps and fixtures, HID, directional, and incandescent can fixtures to more energy-efficient LED light sources and controls.

In PY2023, the Prescriptive Lighting Program accounted for the largest share of non-residential expected savings, or roughly 58.7% of the expected non-residential portfolio from this program alone.

Table 5-5 summarizes the measures offered under this program.

Table 5-5: Prescriptive Lighting Program Measures

Location	Measure	Savings Source
Interior	LED tubes	Prescriptive Calculations with RTF Inputs
	LED U-Bend	
	LED W reduction	
	LED Downlamps/Directional	
	Linear LED Fixtures	
	HID LED fixtures/lamps	
	Occupancy Sensors	
	LLLC Fixtures	
Exterior	HID LED fixtures/lamps	
	Sign Lighting	
New Construction	HID LED fixtures	

Prescriptive Lighting Program impact evaluation by measure, and then are summarized in Table 5-6.

Table 5-6: Interior Prescriptive Lighting Program Verified Electric Savings

Measure	PY2023 Participation (Measures)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
1000 watt HID Fixture to 400 watt or less LED Fixture or Retrofit (Ext)	64	214,408	214,408	215,144	100.3%
150 watt HID Fixture to 50 watt or less LED Fixture or Retrofit (Ext)	367	269,224	269,224	270,148	100.3%
175 watt HID Fixture to 100 watt or less LED Fixture (Ext, NC)	74	46,648	46,648	46,808	100.3%

175 watt HID Fixture to 100 watt or less LED Fixture or Retrofit (Ext)	167	121,098	121,098	121,513	100.3%
250 watt HID Fixture to 140 watt or less LED Fixture or Retrofit (Ext)	435	416,643	416,643	418,074	100.3%
320 and 400 watt HID Fixture to 160 or less watt LED Fixture (Ext, NC)	19	17,763	17,763	17,824	100.3%
320 watt HID Fixture to 160 watt or less LED Fixture or Retrofit (Ext)	12	12,695	12,695	12,739	100.3%
400 watt HID Fixture to 175 watt or less LED Fixture or Retrofit (Ext)	773	1,121,125	1,121,125	1,124,976	100.3%
70-89 watt HID Fixture to 25 watt or less LED Fixture or Retrofit (Ext)	107	35,798	35,798	35,921	100.3%
750 watt HID Fixture to 300 watt or less LED Fixture or Retrofit (Ext)	1	2,359	2,359	2,367	100.3%
90-100 watt HID Fixture to 30 watt or less LED Fixture or Retrofit (Ext)	86	40,328	40,328	40,466	100.3%
DLC Qualified LLLC Exterior Fixture	4	480	480	482	100.3%
>= 150W Incandescent to <= 30W LED Fixture	2	917	917	920	100.3%
1000 watt HID Fixture to 400 watt or less LED Fixture	85	290,742	290,742	291,740	100.3%
2, 3, 4-Lamp T12/T8 Fixture to LED Qualified 2x4 Fixture	1,518	398,296	398,296	359,697	90.3%
250-watt HID Fixture to 140-watt or less LED Fixture	189	284,864	284,864	257,258	90.3%
2-Lamp T12/T8 Fixture to LED Qualified 1x4 Fixture	192	19,993	19,993	18,055	90.3%
2-Lamp T12/T8 Fixture to LED Qualified 2x2 Fixture	76	10,030	10,030	9,058	90.3%
400 watt HID Fixture to 175 watt or less LED Fixture	651	1,126,397	1,126,397	1,130,265	100.3%
75-100 watt Incandescent Can to less than 20 watt LED Fixture Retrofit	90	27,219	27,219	27,313	100.3%
Four Pin Base CFL to 17 watt or less Plug in LED	978	69,928	69,928	70,168	100.3%
DLC Qualified LLLC Fixture	1,347	86,301	86,301	86,596	100.3%
T12/T8 (2') Lamp to 1-Lamp less than 13 watt T8 TLED	130	3,527	3,527	3,185	90.3%
T12/T8 (3') Lamp to 1-Lamp less than 17 watt T8 TLED	178	18,223	18,223	16,457	90.3%
T12/T8 (4') Lamp to 1-Lamp less than 23 watt T8 TLED	42,105	2,499,632	2,499,632	2,257,394	90.3%
T12/T8 8' Fixture to 90 watt or less 8' LED fixture	236	75,923	75,923	68,565	90.3%
T12/T8 Eight-Foot to LED	532	52,713	52,713	47,605	90.3%
T12/T8 U-Bend to less than 23 watt T8 LED	132	10,291	10,291	9,293	90.3%
T5 Lamp to 1-Lamp less than 18 watt T5 TLED	78	3,083	3,083	2,784	90.3%
T5HO (4') 4-Lamp to 135 watt of less LED Fixture	42	20,174	20,174	18,219	90.3%

T5HO (4') 6-Lamp to 165 watt of less LED Fixture	149	77,746	77,746	70,211	90.3%
T5HO Lamp to 1-Lamp less than 29 watt T5HO TLED	5,273	787,670	787,670	711,338	90.3%
TLED (4') Lamp to TLED (4') Lamp with 5 watt or more reduction	225	4,739	4,739	4,279	90.3%
Ceiling or Fixture Occupancy sensor with built-in relays	167	26,649	26,649	26,143	98.1%
Sign Lighting	3,665	180,472	180,472	185,843	103.0%
Total	**60,149**	**8,374,096**	**8,374,096**	**7,978,849**	**95.3%**

The following table summarizes the incentive costs associated with the program.

Table 5-7: Prescriptive Lighting Program Incentives

Measure	Measure Count	Total Electric Incentives
Lighting	60,149	$1,969,025

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Prescriptive Lighting Program in the section below.

5.3.1.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Lighting Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 5.1.1. Data points checked between project applications and program tacking counts, wattages/DLCs sheets, hours of operation and measure cost values. Below, Table 5-8 shows the project population, the number of projects checked and the overall precision.

Table 5-8: Prescriptive Lighting Program Verification Precision

Population (Projects)	Sampled	Precision
379	20	±7.64%

Below, Table 5-9 shows the count of discrepancies found between program tracking and project-level data.

Table 5-9: Prescriptive Lighting Program Verification Findings

Count Correction	Location Correction	Hours Correction	Wattage Correction
0	0	0	3

No corrections to discrepancies resulted in appreciable changes to verified savings.

5.3.1.2 Impact Analysis

The Evaluators calculated verified savings by using a standard engineering algorithm:

$$kWh_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times AOH \times ISR$$

Where:

Nfixt(i), pre = Pre-retrofit number of fixtures of type i

Nfixt(i), post = Post-retrofit number of fixtures of type i
Wfixt(i), pre = Rated wattage of pre-retrofit fixtures of type i (Standard Wattage Table developed from RTF materials)
Wfixt(i), post = Rated wattage of post-retrofit fixtures of type i (Varies). Self-reported.
AOH = Annual operating hours for specified space type (Varies). Self-reported.
ISR = The In-Service Rate, based on type. RTF estimates. See Table 5-10 below.

Table 5-10: Lighting In-Service Rates

Type	ISR
Screw-in	96.4%
Linear	98.3%
Pin-based	90.0%
Fixture	100.0%

The Evaluators completed surveys with 5 program participants and asked participants if the rebated equipment was installed and operating. The RTF does not provide storage rate estimates for integral fixtures however survey responses for this measure are statistically significant and show a 100% ISR.

5.3.1.3 Verified Savings

The verified savings for the program is 7,978,849 kWh with a realization rate of 95.3%, as displayed in Table 5-6. Two factors affected the overall realization rate: The first is that annual hours in expected savings calculations were calculated using 365 days/year, which does not account for leap years. Verified savings calculations developed hours using 365.25 days/year, slightly raising realization. However, claimed savings calculations did not include in-service rates. The Evaluators used the RTF Midstream Lighting work books and assigned ISRs according to the rates shown above in Table 5-10, resulting in slightly lower verified savings than expected.

5.3.2 Small Business Lighting

New in 2024, the Small Business Lighting Program is a non-residential direct install lighting program implemented by Resource Innovations. The program offers lighting and controls assessments, equipment and installation for commercial customers on rate schedules 11 or 12.

To participate, businesses fill out a request in the Avista website and then are contacted by a program partner. An on-site assessment is scheduled to identify potential lighting and sensor upgrades needed and eligibility is verified. Measures are then installed at low/no cost to the participant and incentivized at $0.40 - $0.65/kWh.

In PY2023, the Small Business Lighting Program accounted for the second largest share of non-residential expected savings, or roughly 22.0% of the expected non-residential portfolio from this program alone.

Table 5-11 summarizes the measures offered under this program.

Table 5-11: Small Business Lighting Program Measures

Measure	Savings Source
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W	Prescriptive Calculations with Custom Inputs
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	
LED Fixture - replacing FLT12, 400W - 1000W with OCC	
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	
LED Retrofit Kit - replacing FLT12, 400W - 1000W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W with OCC	
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W with OCC	
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W with OCC	
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W with OCC	
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W with OCC	
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W with OCC	
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W	
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W	
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W	

Small Business Lighting Program impact evaluation by measure, and then are summarized in Table 5-12.

Table 5-12: Small Business Lighting Program Verified Electric Savings

Measure	PY2023 Participation (Measures)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
LED Fixture - replacing CFL Screw-in/Pin-based, 8W - 40W	41	4,516	4,516	4,516	100.0%
LED Fixture - replacing FLT12, 400W - 1000W	739	351,632	351,632	351,632	100.0%
LED Fixture - replacing FLT12, 400W - 1000W with OCC	947	480,188	409,480	409,480	85.3%
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W	42	14,114	14,114	14,114	100.0%
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W with OCC	180	83,259	74,543	74,543	89.5%
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W	361	140,304	140,304	140,304	100.0%
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	241	53,022	47,224	47,224	89.1%
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W	10	14,889	14,889	14,889	100.0%
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W with OCC	14	29,682	23,444	23,444	79.0%
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W	844	271,299	271,299	271,299	100.0%
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W with OCC	54	16,214	13,823	13,823	85.3%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W	45	10,532	10,532	10,532	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W with OCC	38	37,396	34,066	34,066	91.1%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	139	102,240	102,240	102,240	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W with OCC	60	60,195	48,086	48,086	79.9%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	65	82,533	82,533	82,533	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W with OCC	40	58,690	48,936	48,936	83.4%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	77	166,984	166,984	166,984	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	38	37,059	33,431	33,431	90.2%
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W	1140	123,398	123,398	123,398	100.0%

LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W with OCC	258	23,091	20,634	20,634	89.4%
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W	74	6,461	6,461	6,461	100.0%
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W with OCC	64	7,538	7,286	7,286	96.7%
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W	3747	240,049	240,049	240,049	100.0%
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	466	22,543	23,530	23,530	104.4%
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W	864	349,118	349,118	349,118	100.0%
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W with OCC	36	11,940	9,297	9,297	77.9%
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	4	1,962	1,962	1,962	100.0%
LED Retrofit Kit - replacing FLT12, 400W - 1000W with OCC	388	247,071	203,466	203,466	82.4%
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W	58	18,717	18,717	18,717	100.0%
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	104	49,600	41,298	41,298	83.3%
LED Retrofit Kit - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	2	2,184	2,184	2,184	100.0%
LED Retrofit Kit - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	15	16,688	16,688	16,688	100.0%
Total	**11,195**	**3,135,107**	**2,956,164**	**2,956,164**	**94.3%**

The following table summarizes the incentive costs associated with the program.

Table 5-13: Prescriptive Lighting Program Incentives

Measure	Measure Count	Total Electric Incentives
Lighting	11,195	$1,823,804

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Small Business Lighting Program in the section below.

5.3.2.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Small Business Lighting Program. The Evaluators reviewed a representative sample (80) of projects, verifying that wattages listed in program tracking data were those specified by product literature. For measures listed as having integrated occupancy sensors, this configuration was also checked. No discrepancies were found. Below, Table 5-14 shows the project population, the number of projects checked and the overall precision.

Table 5-14: Small Business Lighting Program Verification Precision

Population	Sampled	Precision
128	40	± 2.81%

5.3.2.2 Impact Analysis

The Evaluators calculated verified savings by using a standard engineering algorithms:

5.3.2.3 Lighting Fixtures

$$kWh_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times AOH \times ISR$$

Where:

Nfixt(i), pre = Pre-retrofit number of fixtures of type i
Nfixt(i), post = Post-retrofit number of fixtures of type i
Wfixt(i), pre = Rated wattage of pre-retrofit fixtures of type i (Standard Wattage Table developed from RTF materials)
Wfixt(i), post = Rated wattage of post-retrofit fixtures of type i (Varies). Self-reported, verified.
AOH = Annual operating hours for specified space type (Varies). Self-reported. Reported weekly hours were divided by seven, then multiplied by 365.25.
ISR = The In-Service Rate. Due to the DI delivery channel, this is assumed to be 100%.

5.3.2.4 Occupancy Sensors

$$kWh_{savings} = \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \times AOH \times reduction$$

Where:

Nfixt(i), post = Post-retrofit number of fixtures of type i
Wfixt(i), post = Rated wattage of post-retrofit fixtures of type i (Varies). Self-reported, verified.
AOH = Annual operating hours for specified space type (Varies). Self-reported.
reduction = The reduction in operating hours as a result of the installation of occupancy sensors, 32%for fixture/ceiling mounted sensors.

5.3.2.5 Verified Savings

The verified savings for the program is 2,956,164 kWh with a realization rate of 94.3%, as displayed in Table 5-12. For measures without occupancy sensors, realization is ±1% of expectations, with any differences likely due to rounding. For measures with occupancy sensor, the Evaluators found that expected savings were calculated by applying the occupancy sensor reduction factor both the operating hours and the connected load of the lighting retrofit , slightly 'double counting' savings. To account for occupancy sensor savings in verified calculations, the Evaluators applied the 32% reduction to the operation of the post-install equipment, then added this value to the retrofit savings, resulting in slightly lower verified savings.

5.3.2.6 Recommendations for Future Program Cycles

- Report savings from lighting retrofits and sensor installation separately.

- Specify the type of control method employed.
- In tracking data, denote the wattage controlled by each installed occupancy sensor.
- If possible, record building type, vintage and HVAC configuration to calculate and include additional savings resulting from HVAC interactive effects.

5.3.3 Prescriptive HVAC VFD Program

The Prescriptive HVAC Variable Frequency Drive Program is intended to prompt customers to increase the energy efficiency of their HVAC fan or pump applications with a Variable Frequency Drive (VFD) retrofit. Adding a VFD to HVAC systems is an effective tool for cutting operating costs, improving overall system performance, and reducing wear and tear on motors. The prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista electricity and apply the VFD to the eligible fan or pump measures are eligible for this program.

The Prescriptive HVAC Variable Frequency Drive Retrofit Program is offered for retrofitting VFDs on existing HVAC equipment. Customers must submit a completed rebate form, invoices, and documentation to verify the horsepower of the motor on which the VFD was installed within 90 days of installation. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. The website is also used to communicate program requirements, incentives, and forms.

Table 5-15 summarizes the measures offered under this program.

Table 5-15: Prescriptive HVAC VFD Program Measures

Measure	Impact Analysis Methodology
HVAC Cooling Pump	Avista TRM UES
HVAC Fan	Avista TRM UES
HVAC Heating Pump or Combo	Avista TRM UES

The following table summarizes the verified electric energy savings for the Prescriptive HVAC VFD Program impact evaluation.

Table 5-16: Prescriptive HVAC VFD Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings	Adjusted Savings	Verified Savings	Realization Rate
VFD on Supply Fan or Supply Air Handler	2	42,924	42,924	42,924	100.0%
Total	**2**	**42,924**	**42,924**	**42,924**	**100.0%**

The following table summarizes the incentive costs associated with the program.

Table 5-17: Prescriptive HVAC VFD Program Incentives

Measure	Measure Count	Total Electric Incentives
VFDs on HVAC Systems	3	$8,400

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Prescriptive HVAC VFD Program in the section below.

5.3.3.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive HVAC VFD Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 5.1.1. Verification of project documents included data points such as quantity, motor horsepower, installation location and costs of the equipment. Table 5-18 shows the project population, the number of projects checked and the overall precision.

Table 5-18: Prescriptive HVAC VFD Program Verification Precision

Population	Sampled	Precision
3	3	±0%

The Evaluators did not find any deviations between project applications and program tracking data.

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Prescriptive HVAC VFD Program.

5.3.3.2 Impact Analysis

This section summarizes the verified savings results for the Prescriptive HVAC VFD Program. The Evaluators calculated verified savings for VFD measures using the Avista TRM. The Evaluators attempted to use the RTF to calculate verified savings, however found project documentation to be insufficient to determine key characteristics necessary to assign RTF UES. A recommendation is made below to address this. Final verified savings were calculated by applying the appropriate TRM UES to a census of measures.

5.3.3.3 Verified Savings

The Evaluators reviewed and applied the current TRM UES values to verified tracking data to estimate net program savings for this measure. The verified savings for the program is 42,924 kWh with a realization rate of 100.00%, as displayed in Table 5-16.

5.3.4 Food Service Equipment Program

The Food Service Equipment Program offers incentives for commercial customers who purchase or replace food service equipment with ENERGY STAR-qualified equipment. This prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista electricity to operate the equipment submitted for a rebate are eligible for this program. Customers must submit a completed rebate form and invoices within 90 days after the installation has been completed. Avista will send incentive checks to the customers or their designees after each project is approved. The website is also used to communicate program requirements, incentives, and forms.

Table 5-19 summarizes the measures offered under this program.

Table 5-19: Prescriptive Food Service Equipment Program Measures

Measure	Impact Analysis Methodology
Convection oven	RTF, Convection Oven v4.2
Combination oven	RTF, Commercial Cooking RTF Combination Ovens v4.2
Griddle	RTF, Griddles v1.2
Rack oven	RTF, Rack Ovens v1.2
Dishwasher	Avista TRM, Non-Res Dishwashers (multiple)
Energy Star ice machine	RTF, Commercial ENERGY STAR™ Ice Makers v1.3
Fryer	RTF, Commercial Cooking Fryer v4.2
Hot food holding cart	RTF, Commercial Cooking Hot Food Cabinet v4.2
Steam cookers	RTF, Commercial Cooking Steamer v4.2
Pre-rinse sprayer	Avista TRM, Non-Res Pre-Rinse Sprayer (multiple)
Overwrapper	RTF, On-Demand Overwrappers v1.1

In PY2023 there were no claimed kWh savings from the Food Service Equipment Program.

Table 5-20: Prescriptive Food Service Equipment Program Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings	Adjusted Savings	Verified Savings	Realization Rate
Total	**0**	**0**	**0**	**0**	**N/A**

5.3.5 Grocer Program

This program offers incentives to customers who increase the energy efficiency of their refrigerated cases and related grocery equipment. Refrigeration often represents the primary electricity expense in a grocery store or supermarket. The prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista fuel for the measure applied for are eligible.

Customers must submit a completed rebate form and invoice within 90 days after the installation has been completed. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. The website is also used to communicate program requirements, incentives, and forms.

Table 5-21 summarizes the measures offered under this program.

Table 5-21: Grocer Program Measures

Measure	Impact Analysis Methodology
Refrigerator Case Lighting	RTF EUS
ASH Controls	RTF EUS
Door Gaskets	Avista TRM UES
Floating Head Pressure Controls	RTF EUS
Strip Curtains	RTF EUS
Walk-In ECM Controllers	RTF EUS
ECMs on Evaporator Fans	Avista TRM UES
ECM Replacing Evaporator PS and PSC	RTF EUS
Refrigerator Case Lighting	RTF Commercial Grocery Display Case Lighting v1.2
ASH Controls	RTF EUS
Door Gaskets	RTF EUS
Floating Head Pressure Controls	RTF EUS
Strip Curtains	RTF EUS

The following table summarizes the verified electric energy savings for the Grocer Program impact evaluation.

Table 5-22: Grocer Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Case Light	1	936	936	936	100.0%
Low Temp ECM	1	304	304	304	100.0%
Med Temp ECM	1	688	688	688	100.0%
Totals:	**3**	**1,928**	**1,928**	**1,928**	**100.0%**

The following table summarizes the incentive costs associated with the program.

Table 5-23: Grocer Program Incentives

Measure	Measure Count	Total Electric Incentives
Case Light	18	$180
Low Temp ECM	1	$50
Med Temp ECM	1	$50
Totals:	**20**	**$280**

The Evaluators summarize the program-specific and measure-specific impact analysis activities and results for the Grocer Program in the section below.

5.3.5.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Grocer Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 5.1.1. Data points checked between project applications and program tacking including measure specification, quantity and measure cost values.

Table 5-24 shows the project population, the number of projects checked and the overall precision.

Table 5-24: Verification Precision

Population	Sampled	Precision
2	2	±0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Grocer Program.

5.3.5.2 Impact Analysis

This section summarizes the verified savings results for the Prescriptive Food Service Equipment Program. The Evaluators calculated verified savings for the food service measures using RTF UES in place at the time the savings goals for the program was finalized. Final verified savings were calculated by applying the appropriate UES to a census of measures.

5.3.5.3 Verified Savings

The Evaluators reviewed and applied the appropriate UES values to verified tracking data to estimate program savings for these measures. The verified savings for the program is 1,928 kWh with a realization rate of 100.00%, as displayed in Table 5-22.

5.3.6 Prescriptive Shell Program

The Commercial Prescriptive Shell Program offers incentives to commercial customers who improve the envelopes of their existing buildings by adding insulation, which may make a business more energy-efficient and comfortable. This prescriptive rebate approach issues payment to the customer after the measure has been installed by a licensed contractor. Commercial customers must have an annual heating footprint for a fuel provided by Avista.

Customers must submit a completed rebate form, invoices, and an insulation certificate within 90 days after the installation has been completed. Avista will send incentive checks to customers or their designees after each project is approved. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. The website is also used to communicate program requirements, incentives, and forms.

Table 5-25 summarizes the measures offered under this program.

Table 5-25: Prescriptive Shell Program Measures

Measure	Impact Analysis Methodology
Attic Insulation	Avista TRM UES
Roof Insulation	Avista TRM UES
Wall Insulation	Avista TRM UES

The following table summarizes the verified electric energy savings for the Prescriptive Shell Program impact evaluation.

Table 5-26: Prescriptive Shell Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Attic =< R11 to R45+	3	2,847	30,441	30,441	1,069.2%
Attic =< R11 to R30-R44	3	565	6,399	6,399	1,133.3%
Wall =< R4 to R11-R18	1	46	479	479	1,044.4%
Totals	**7**	**3,458**	**37,320**	**37,320**	**1,079.4%**

The following table summarizes the incentive costs associated with the program.

Table 5-27: Shell Program Incentives

Measure	Measure Count (Square Feet Installed)	Total Electric Incentives
Attic =< R11 to R45+	21,900	$875
Attic =< R11 to R30-R44	6,274	$207
Wall =< R4 to R11-R18	170	$6
Total	**28,344**	**$1,089**

The Evaluators summarize the program-specific and measure-specific impact analysis activities and results for the Prescriptive Shell Program in the section below.

5.3.6.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Shell Program. The Evaluators review all rebate applications to cross-verify tracking data inputs,

summarized in Section 5.1.1. Data points checked between project applications and program tacking include R-levels, square footage of installation, HVAC configuration and measure cost values. Below, Table 5-28 shows the project population, the number of projects checked and the overall precision.

Table 5-28: Prescriptive Shell Program Verification Precision

Population	Sampled	Precision
1	1	±0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Prescriptive Shell Program.

5.3.6.2 Impact Analysis

This section summarizes the verified savings results for the Prescriptive Shell Program. The Evaluators calculated verified savings for the insulation measures using the Avista TRM, in place at the time the savings goals for the program was finalized. Final verified savings were calculated by applying the appropriate UES to a census of measures.

5.3.6.3 Verified Savings

The Evaluators reviewed and applied the current TRM UES values for the Attic and Wall Insulation measures along with verified tracking data to estimate net program savings for this measure. The verified savings for the program is 37,320 kWh with a realization rate of 1,079%, as displayed Table 5-26.

5.3.7 Green Motors Program

The Green Motors Program ensures quality rewinding that results in the motor maintaining its original efficiency, which is commonly called a "green rewind." The Green Motors Practices Group (GMPG) is a non-profit organization that identifies, promotes, and verifies only excellent member motor service centers. These companies are committed to consistently producing repair/rewinds that retain or improve reliability and efficiency and provide on-site motor driven systems assistance.

The incentive for this program is $1 per HP of the motor being rewound, up to $10,000 for 5,000 HP, and is taken directly off the customer bill at the service center. There is also a $1 per HP fee paid to the service center for participating.

Table 5-29 summarizes the measures offered under this program.

Table 5-29: Green Motors Program Measures

Measure	Impact Analysis Methodology
Motor Rewind (Industrial)	Avista TRM 2023 UES

In PY2023 there were no claimed kWh savings from the Food Service Equipment Program.

Table 5-30: Green Motors Program Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Total	**0**	**0**	**0**	**0**	**N/A**

5.3.8 Midstream Program (Non-Residential)

Avista designed the Midstream Program to shift the onus of applying for rebates from end-use customers to distributors. Not only does this reduce customers'/contractors' administrative burden (i.e., no need to submit paperwork tracking energy efficient installations), but it is also anticipated to increase high-efficiency equipment options at competitive prices. Midstream rebates provide an immediate discount on eligible products, which appear as a line item on customer invoices. Starting on July 1, 2023, the Midstream Program replaced Avista's residential and commercial downstream space-heating and water-heating programs as well as the commercial food service equipment rebate program.

Through the Midstream Program, Avista seeks to achieve three overall objectives:

- Provide greater long-term, cost-effective savings for residential and commercial customers alike
- Reduce Avista's administrative burden in processing space-heating, water-heating, and commercial kitchen equipment applications
- Accelerate the market transformation of energy-efficient equipment

The Midstream Program provides bought-down equipment to both Residential and Commercial entities. This chapter discusses and presents results only for the non-residential measures. See Section 3.2.9 for the residential portion.

Table 5-31 summarizes the measures rebated in PY2023 under this program.

Table 5-31: Non-Residential Midstream Program Measures

Measure	Measure	Impact Analysis Methodology
Food Service	Combination Oven	RTF Combination Ovens
	Convection Oven	RTF Convection Ovens
	Dishwasher	Avista TRM
	Hot Food Holding Cabinet	RTF HFHC
	Ice Machine	RTF Ice Makers
	Steamers	RTF Steamers
HVAC	Mini/Multi Split	Engineering algorithm

The following table summarizes the verified electric energy savings for the Midstream Program impact evaluation.

Table 5-32: Non-Residential Midstream Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Hot Food Holding Cabinet	1	1,016	2,603	2,603	256.1%
Dishwasher	2	22,668	8,220	8,220	36.3%
Steamer	1	36,468	9,274	9,274	25.4%
Ice Machine	2	1,411	702	702	49.7%
Combination Oven	2	49,993	24,490	24,490	49.0%
Convection Oven	1	2,595	1,496	1,496	57.6%
Mini/Multi Split	3	28,776	11,572	11,572	40.2%
Total	**12**	**142,927**	**58,355**	**58,355**	**40.8%**

The following table summarizes the incentive and non-incentive costs associated with the program.

Table 5-33: Non-Residential Midstream Incentives

Measure	Measure Count	Incentive Costs
Hot Food Holding Cabinet	1	$550
Dishwasher	2	$5,400
Steamer	1	$2,600
Ice Machine	2	$550
Combination Oven	2	$3,800
Convection Oven	1	$1,050
Mini/Multi Split	3	$7,400
Totals	**12**	**$21,350**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Midstream Program in the section below.

5.3.8.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Midstream Program. Due to the program delivery pathway, the Program does not include project applications. For this program, the Evaluators examined a representative sample of projects to ensure that program tracking data accurately reflected measure characteristics used in assessing savings. Data points checked include: equipment configurations, capacities and efficiency levels.

Table 5-34 shows the project population, the number of projects checked and the overall precision.

Table 5-34: Non-Residential Midstream Program Verification Precision

Population	Sampled	Precision
12	12	0.0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Midstream Program and no substantive equipment specifications differed from those in the tracking data.

5.3.8.2 Impact Analysis

Once verification was completed, to estimate program savings for these measures the Evaluators reviewed and applied the appropriate UES values from the RTF. If a measure was not covered by an RTF entry then a UEF from the Avista TRM was used as the source for verified savings. For measures not included in either the RTF or Avista TRM, verified savings was calculated using standard engineering algorithms with project-specific specs and RTF inputs.

5.3.8.3 Verified Savings

The verified savings for the program is 58,355 kWh with a realization rate of 40.9%, as displayed in Table 5-33.

Adjusted savings comes from the program planning workbooks used by program implementors.

With the exception of Mini/Multi Splits, which were analyzed using standard engineering algorithms and equipment-specific inputs, verified savings was sourced from the respective RTF workbooks associated with each measure. In most cases, expected savings estimates far exceeded RTF estimates. No background information relating to how planning estimates were developed was included in program materials, precluding a thorough explanation of differences, though a weighted average of expected savings show these values to be approximately 186% of RTF estimates.

Further, it is unclear how ex ante estimates for Mini/Multi Splits was developed. Using program planning materials and methods, the Evaluators found that approximately 17% of ex ante estimates should have been claimed.

5.3.9 Site-Specific Program

The Site-Specific Program provides calculated incentives to support the installation of qualifying energy efficiency equipment at commercial/industrial sites. These projects typically have a higher degree of complexity than the traditional prescriptive offerings and rely on custom calculations of savings and incentive levels. Examples of these projects include process improvements, upgrades to specialized equipment used in manufacturing, lighting installations that rely on specialized controls, and other measures designed around the customer's specific needs.

Avista's Site-Specific Program is a major component in its non-residential electric offerings. The program approach strives for a flexible response to energy efficiency projects that have demonstrable kWh savings within program criteria. The majority of site-specific kWh savings are composed of custom lighting projects and custom HVAC, envelope, and industrial process load projects that do not fit the prescriptive path. The Site-Specific Program is available to all commercial/industrial retail electric customers, and typically brings in the largest portion of savings to the overall energy efficiency portfolio.

In PY2023, the Site-Specific Program accounted for the second largest share of non-residential expected savings, or roughly 18.1% of the expected non-residential portfolio from this program alone.

The following table summarizes the verified electric energy savings for the Site-Specific Program impact evaluation.

Table 5-35: Site-Specific Program Verified Electric Savings

PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
23	2,576,031	2,576,031	2,556,219	99.2%

The Site-Specific Program displayed verified savings of 2,556,219 kWh with a realization rate of 99.4% against the expected savings for the program. Below, Table 5-37 breaks savings into Lighting and Non-Lighting:

Table 5-36: Site-Specific Program Lighting and Non-Lighting Savings

Savings Source	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Lighting	102,399	102,399	96,738	94.5%
Non-Lighting	2,473,632	2,473,632	2,459,481	99.4%

Table 5-37: Site-Specific Program Incentives

Type	Count of Projects	Incentives
Lighting	6	$16,062
Non-Lighting	17	$386,012
Total	**23**	**$402,074**

The Evaluators summarize the program-specific and measure-specific impact analysis activities and results for the Site-Specific Program in the section below.

5.3.9.1 Sample Design

Unlike other non-residential programs, completing a census review of all Site-Specific projects is not feasible. To ensure accurate verified savings estimates, the Evaluators developed a sample of

representative sites to inspect using the Stratified Random Sampling procedure detailed in 2.2.2.2. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than random sampling would require, by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results.

The participant population for the Site-Specific Program was divided into five strata. Table 5-38 summarizes the strata boundaries and sample frames for the Site-Specific Program.

Table 5-38: Site-Specific Program Sample Design

Descriptor	Stratum 1	Stratum 2	Stratum3	Stratum 4	Stratum 5	Totals
Strata boundaries (kWh)	< 10,000	10,001 - 62,000	62,001 - 190,000	190,001 - 400,000	> 400,001	
Number of projects	6	6	5	5	1	**23**
Total kWh savings	26,187	122,403	480,804	1,327,378	619,259	**2,576,031**
Average kWh Savings	4,365	20,401	96,161	265,476	619,259	**112,001**
Standard deviation of kWh	3,121	11,658	60,778	28,512	N/A	**153,625**
Coefficient of variation	0.715	0.571	0.632	0.163	0.000	**0.000**
Final design sample	2	2	1	3	1	**9**

The highest-savings was specifically selected for verification and analysis. Verified sampling precision is ±9.61% at 90%.

Table 5-39: Site-Specific Program Sample Summary

# Sites in Population	Review Sample Size	Precision
23	9	9.61% at 90%

5.3.9.2 Project Document Review and On-Site Visits

Once representative projects were selected, the Evaluators obtained all project-related documentation for review. These documents typically included spec sheets, building characteristics, calculators, invoices, project photos and trending data. This information allowed the Evaluators to replicate claimed savings estimates and develop M&V plans to be used in assessing verified savings and collecting on-site data.

Using project-specific M&V plans, the Evaluators visited sampled to verify measure installation and operating parameters, as well as building parameters such as square footage and HVAC configurations. The Evaluators were able to conduct visits at 7 of the 9 sampled sites, with two projects occurring at the same site.

5.3.9.3 Impact Approaches

The majority (8/14) projects were lighting projects and could be analyze using standard savings algorithms. Below, the two equations show the algorithms used in calculating savings from lighting projects.

$$kWh_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times AOH \times IEF$$

$$kW_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times CF \times IEF$$

Where:

Nfixt(i), pre = Pre-retrofit number of fixtures of type i
Nfixt(i), post = Post-retrofit number of fixtures of type i
Wfixt(i), pre = Rated wattage of pre-retrofit fixtures of type i (Standard Wattage Table developed from RTF materials)
Wfixt(i), post = Rated wattage of post-retrofit fixtures of type i (Taken from project spec sheets)
CF = Peak demand coincidence factor (80%, for most measures)
AOH = Annual operating hours for specified space type (Varies. Collected during M&V site visits)
IEF = Site-Specific Interactive effects factor specific to building and Site-Specific configuration (developed from RTF materials)

For non-lighting projects, specific methodology varies between IPMVP Options A-C, and is described as needed in individual site reports, located in Appendix C: Site-Specific Program Project Reports.

5.3.9.4 Site-Level Realization

Adjusted and verified savings were developed for each sampled site. The realization rates for sites within each stratum were then applied to the non-sampled sites within their respective stratum. Table 5-40 presents realization at the site level, with Table 5-41 presenting results at the stratum level.

Table 5-40: Site-Specific Expected, Adjusted and Verified kWh Savings by Sampled Project

Project ID	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
SSOP_113679	1,259	1,259	1,259	100.0%
SSLP_117017	8,034	8,034	8,034	100.0%
SSLP_82210	10,008	10,008	9,994	99.9%
SSLP_82041	31,361	31,361	28,846	92.0%
SSOP_113344	100,360	100,360	100,291	99.9%
SSOP_81734	198,868	198,868	196,000	98.6%
SSOP_81611	286,724	286,724	286,724	100.0%
SSOP_117547	288,762	288,762	288,762	100.0%
SSOP_82111	619,259	619,259	614,089	99.2%
Totals:	**1,544,635**	**1,544,635**	**1,533,999**	**99.3%**

Table 5-41: Site-Specific Summary of kWh Savings by Sample Stratum and Overall

Stratum	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
1	26,187	26,187	26,186	100.00%
2	229,645	229,645	215,607	93.89%
3	174,694	174,694	174,574	99.93%
4	1,526,246	1,526,246	1,520,593	99.63%
5	619,259	619,259	619,259	100.00%

Total	**2,576,031**	**2,576,031**	**2,556,219**	**99.23%**

5.3.9.5 Discussion of Non-100% Realization

For project SSLP_82041 Expected savings calculations assumed 3,120 annual hours of operation, hours extrapolated for the operating schedule collected during the on-site visit yielded approximately 2,870 annual hours and slightly reduced realized kWh.

Additionally, ex ante calculations for all lighting projects assumed an 80% chance that lighting would operate during times of peak demand. The Evaluators found that for multiple projects the lighting fixtures runs continuously, so there is a 100% chance of them operating during the peak period. The coincidence factor was adjusted from 80% to 100% for these measures.

Individual reports for each sampled site are included in Appendix C: Site-Specific Program Project Reports.

5.3.9.6 Verified Savings

The Site-Specific Program in total displays a realization rate of 99.2% with 2,556,219 kWh verified electric energy savings in the Idaho service territory, as displayed in Table 5-41.

6. Appendix A: Billing Analysis Results

This appendix provides additional details on the billing analyses conducted for each program.

6.1 Shell Program

The results of the billing analysis for the Shell program are provided below. Table 6-1 shows customer counts for customers considered for billing analysis (i.e. customers with single-measure installations) and identifies measures that met the requirements for a billing analysis. A billing analysis was completed for measures that had at least 75 customers with single-measure installations. This ensured that measures would have a sufficient sample size after applying PSM data restrictions (e.g. sufficient pre- and post-period data). The billing analysis included participants in Washington and Idaho service territories (439 total) to acquire the maximum number of customers possible. The billing analysis on individual measures did not find significant savings due to variability observed in the data. The results reported combine measures across Idaho and Washington to produce a statistically significant estimate. See Table 6-5 for the non-significant results for individual measures. The rest of the section reports the combined analysis.

Table 6-1: Measures Considered for Billing Analysis, Shell Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
E Attic Insulation With Electric Heat	✓	22*	
E Window Replc With Electric Heat	✓	78*	✓

*This count includes rebates from Washington and Idaho

The Evaluators were successful in creating a matched cohort for each of the measures with sufficient participation. Customers were matched on zip code (exact match) and their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household. The Evaluators were provided a considerable pool of control customers to draw upon, as shown in Table 6-2. Also shown in Table 6-2, are the impact of various restrictions on the number of treatment and control customers that were included in the final regression model. The “Starting Count” displays the beginning number of customers available prior to applying the data restrictions, while the “Ending Count” displays the number of customers after applying data restrictions and final matching.

Table 6-2: Cohort Restrictions, Shell Program

Measure	Data Restriction	# of Treatment Customers	# of Control Customers
G Attic Insulation With Natural Gas Heat	Starting Count	357	7,286
	Install Date Range: January 1, 2023 to June 30, 2023	357	7,286
	Control Group Usage Outlier (>2X max treatment usage)	355	7,280
	Incomplete Post-Period Bills (<6 months)	107	6,945

	Incomplete Pre-Period Bills (<10 months)	103	6,012
	Ending Count (Matched by PSM)	97	97
G Window Replc With Natural Gas Heat	Starting Count	1,057	7,286
	Install Date Range: January 1, 2023 to June 30, 2023	1,057	7,286
	Control Group Usage Outlier (>2X max treatment usage)	1,040	7,281
	Incomplete Post-Period Bills (<6 months)	356	6,946
	Incomplete Pre-Period Bills (<10 months)	351	6,013
	Ending Count (Matched by PSM)	342	342

Figure 6-1 and Figure 6-2 display the density of each variable employed in propensity score matching for the combined measures, before and after conducting matching.

For the combined measures, the covariate balance shows small differences between the treatment and control groups before and after matching.

Figure 6-1: Covariate Balance Before Matching, Shell Attic Insulation and Shell Window Replacement, Washington and Idaho

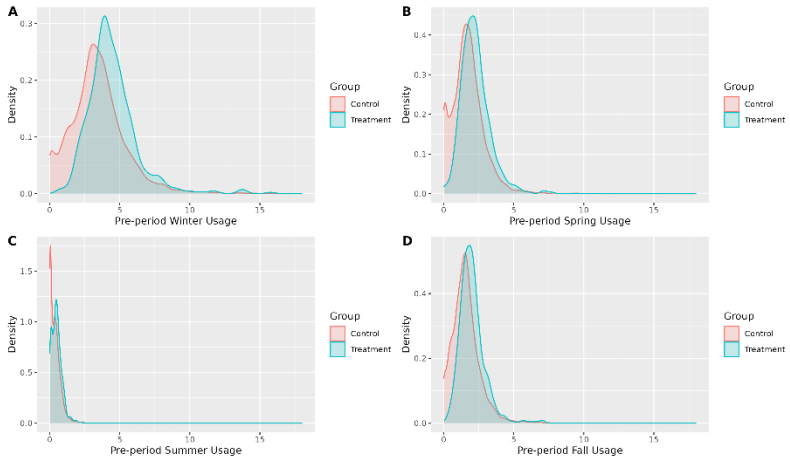
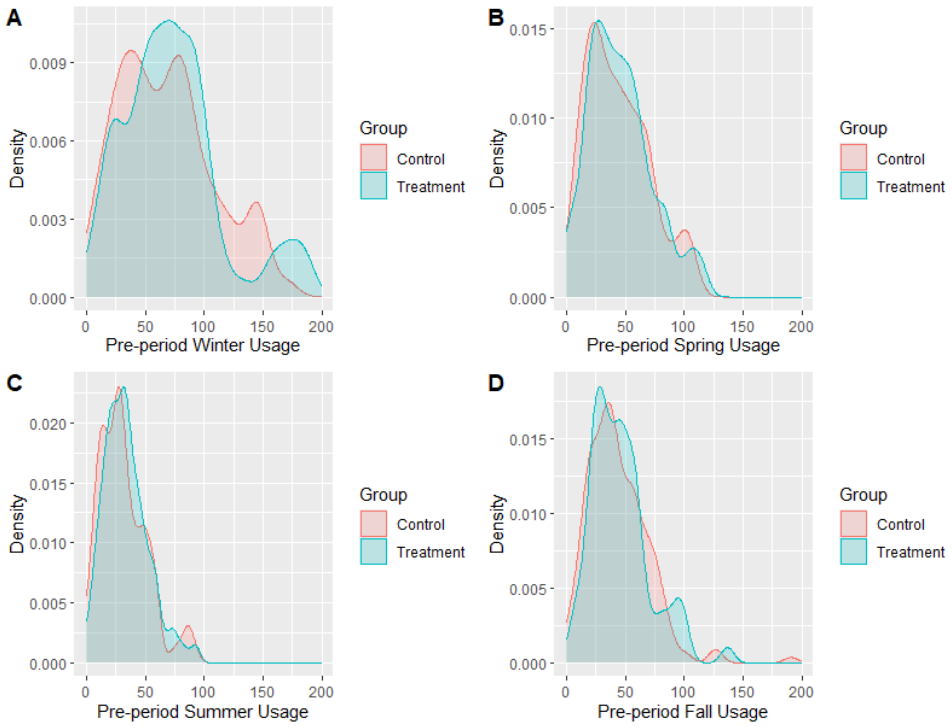


Figure 6-2: Covariate Balance After Matching, Shell Attic Insulation and Shell Window Replacement, Washington and Idaho



The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure. The t-test displayed no statistically significant differences at the 95% level in average daily consumption between the treatment and control groups for any month in the pre-period.

Table 6-3 -provides results for the *t*-test on pre-period usage between the treatment and control groups after matching for the Shell program. The P-Value is over 0.05 for each month, meaning pre-period usage between treatment and control groups is similar at the 95% confidence level.

Table 6-3: Pre-period Usage T-test for Attic Insulation and Window Replacement Washington and Idaho, Shell Program

Month	Average Daily Usage (kWh), Control	Average Daily Usage (kWh), Treatment	T Statistic	Std Error	P-Value	Reject Null?
Jan	45.645	50.641	-1.194	2.957	0.234	No
Feb	45.780	50.576	-1.149	2.950	0.252	No
Mar	45.615	50.063	-1.071	2.935	0.286	No
Apr	47.283	50.641	-0.748	3.166	0.456	No

May	47.190	50.641	-0.774	3.145	0.440	No
Jun	47.046	50.417	-0.774	3.072	0.440	No
Jul	46.849	51.095	-0.956	3.132	0.340	No
Aug	46.574	50.893	-0.986	3.091	0.325	No
Sep	47.772	50.250	-0.554	3.149	0.580	No
Oct	46.686	50.185	-0.798	3.092	0.426	No
Nov	47.043	50.641	-0.807	3.145	0.421	No
Dec	46.419	50.290	-0.890	3.068	0.375	No

Table 6-4 provides customer counts for customers in the final regression model by assigned weather station ID for each measure. In addition, TMY HDD and CDD from the nearest available TMY weather station is provided as well as the weighted HDD/CDD for each measure. The HDD and CDD was weighted by the number of treatment customers assigned to a weather station.

Table 6-4: TMY Weather, Shell Program

Measure	USAF Station ID	# of Treatment Customers	TMY USAF ID	TMY HDD	TMY CDD	Weighted TMY HDD	Weighted TMY CDD
E Attic Insulation With Electric Heat and E Window Replc With Electric Heat	720322	4	726985	4207	245	6053	413
	726817	3	726985	4207	245	6053	413
	726873	7	727830	5347	861	6053	413
	727830	4	727830	5347	861	6053	413
	727834	12	727834	6773	343	6053	413
	727850	5	727850	6436	224	6053	413
	727855	3	727855	7224	437	6053	413
	727856	69	727856	6052	437	6053	413
	727857	12	727857	6322	265	6053	413
	727870	13	727857	6322	265	6053	413

Table 6-5 provides annual savings per customer for the Shell program for each measure and regression model. The PPR model was selected for ex post savings because it provided the best fit for the data (highest adjusted R-squared).

Table 6-5: Measure Savings for All Regression Models, Shell Program

Measure	Model	# of Treatment Customers	# of Control Customers	Annual Savings/Customer (kWh)	90% Lower CI	90% Upper CI	Adjusted R-Squared
	Diff-in-diff	132	165	1901.59*	0.00	50998.13	0.149
	PPR	100	99	1284.69	135.61	2433.76	0.65

E Attic Insulation and E Window Replc With Electric Heat	Treatment Only (Gross)	132	165	300.60*	0.00	5563.03	0.23

*Not statistically significant

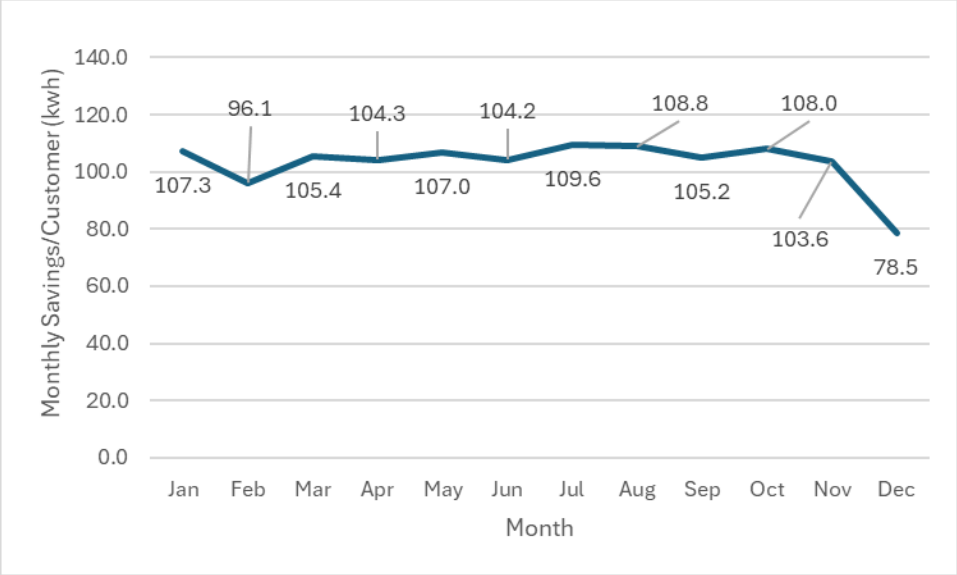
Savings are statistically significant at the 90% level for the combined measures and the adjusted R-squared shows the model provided an excellent fit for the data. The results of the billing analysis indicate no statistically significant savings were found for the window replacement measures.

Table 6-6: Measure Savings, Shell Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (kWh)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
E Attic Insulation and E Window Replc With Electric Heat	100	99	1284.69	135.61	2433.76	0.65	Model 2: PPR

Figure 6-3 provides monthly TMY savings per customer for the Shell program. As expected for gas weatherization measures, the greatest savings occur during the winter months.

Figure 6-3: Monthly Savings, Shell Program



6.2 Low-Income Program

The Evaluators conducted a whole-home billing analysis for all the natural gas measures combined in order to estimate savings for the average household participating in the program, across all measures. The Evaluators successfully created a matched cohort for the natural gas measure households. Customers were matched on their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household.

The Evaluators were provided a considerable pool of control customers to draw upon, as shown in Table 6-7: Cohort Restrictions, Low-Income Program

. The Evaluators used propensity score matching. Also shown in Table 6-7: Cohort Restrictions, Low-Income Program

, are the impact of various restrictions on the number of treatment and control customers that were included in the final regression model. The "Starting Count" displays the beginning number of customers available prior to applying the data restrictions, while the "Ending Count" displays the number of customers after applying data restrictions and final matching.

Table 6-7: Cohort Restrictions, Low-Income Program

Measure	Data Restriction	# of Control Customers	# of Treatment Customers
Whole home electric	Starting Count	815	412
	Install Date Range: January 1, 2023 to June 30, 2023	815	412
	Control Group Usage Outlier (>2X max treatment usage)	642	401
	Incomplete Post-Period Bills (<4 months)	350	226
	Incomplete Pre-Period Bills (<10 months)	320	218
	Ending Count (Matched by PSM)	283	215

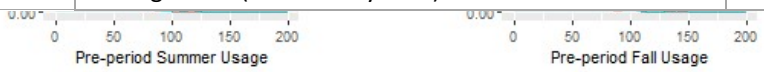


Figure 6-4 and

Figure *6-5* display the density of each variable employed in propensity score matching for the combined natural gas measures before and after conducting matching.

The distributions prior to matching appear to be less similar in summer, with control customers averaging higher usage. However, after matching, the pre-period usage distribution in summer is more similar between the groups. The remaining pre-period seasons (winter, summer, fall), closely overlap before and after matching, indicating little differences exist on average between the groups prior to matching and validating the initial selection of control customers.

Figure 6-4: Covariate Balance Before Matching, Low Income Electric Measures

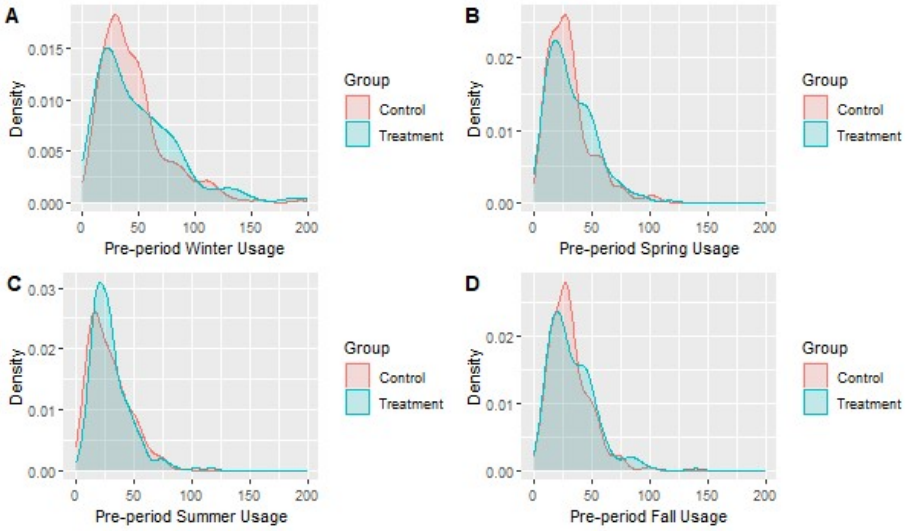
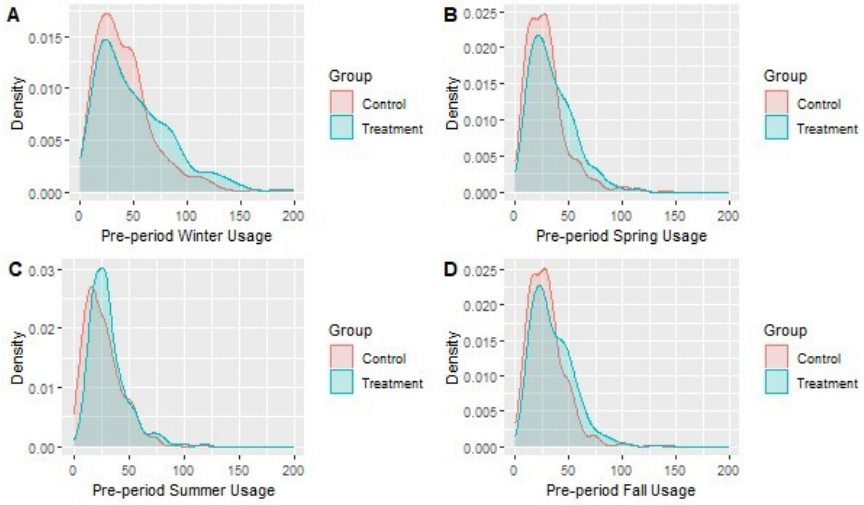


Figure 6-5: Covariate Balance After Matching, Low Income Electric Measures



The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure. The t-test displayed no statistically significant differences at the 95% level in average daily consumption between the treatment and control groups for any month in the pre-period. In addition, the chi-squared test returned a p-value well over 0.05 for all measures, indicating that pre-period usage was balanced between the groups. Lastly, the standardized difference test returned values well under the recommended cutoff of 25, and always falling under 10, further indicating the groups were well matched on all included covariates.

Table 6-8 provides results for the *t*-test on pre-period usage between the treatment and control groups after matching for the Low-Income program. The P-Value is over 0.05 for each month, meaning pre-period usage between treatment and control groups is similar at the 95% confidence level.

Table 6-8: Pre-period Usage T-test for Electric Measures, Low-Income Program

Month	Average Daily Usage (kWh), Control	Average Daily Usage (kWh), Treatment	T Statistic	Std Error	P-Value	Reject Null?
Jan	44.40	48.94	-1.59	2.84	0.11	No
Feb	41.86	45.39	-1.35	2.61	0.18	No
Mar	36.17	38.41	-1.09	2.05	0.27	No
Apr	30.23	31.89	-1.09	1.52	0.28	No
May	25.50	25.68	-0.16	1.14	0.87	No
Jun	25.40	24.66	0.72	1.02	0.47	No
Jul	30.01	31.15	-0.91	1.26	0.36	No
Aug	30.03	31.54	-1.22	1.24	0.22	No
Sep	24.47	24.37	0.10	0.99	0.92	No
Oct	26.94	27.72	-0.70	1.13	0.49	No
Nov	38.81	41.49	-1.44	1.86	0.15	No
Dec	42.98	45.64	-1.27	2.09	0.20	No

Table 6-9 provides customer counts for customers in the final regression model by assigned weather station ID for each measure. In addition, TMY HDD and CDD from the nearest available TMY weather station is provided as well as the weighted HDD/CDD for each measure. The HDD and CDD was weighted by the number of treatment customers assigned to a weather station.

Table 6-9: TMY Weather, Low-Income Program

Measure	USAF Station ID	# of Treatment Customers	TMY USAF ID	TMY HDD	TMY CDD	Weighted TMY HDD	Weighted TMY CDD
All Electric Measures	727827	3	726985	4207	245	5829	376
	727830	3	727830	5347	861	5829	376
	727834	3	727834	6773	343	5829	376
	727850	1	727850	6436	224	5829	376
	727855	17	727856	6052	437	5829	376
	727856	7	727857	6322	265	5829	376
	727857	2	727857	6322	265	5829	376

In addition to the net savings value represented above, the Evaluators also conducted a treatment-only regression model for each of the measures described above. Table 6-10 provides annual savings/customer for the Low-Income program the program. Model 2 (PPR) was selected as the final model for the Low Income Program as it provided the highest adjusted R-squared among the regression models. Savings are statistically significant at the 90% level for all measures and the adjusted R-squared

shows the model provided an excellent fit for the data (adjusted R-squared > 0.90). The Evaluators estimate gross savings for each Low-Income participant is 1,005 kWh per year.

Table 6-10: Measure Savings for All Regression Models, Low-Income Program

Measure	Model	# of Treatment Customers	# of Control Customers	Annual Savings per Customer	90% Lower CI	90% Upper CI	Adjusted R-Squared
All Electric Measures	Diff-in-diff	215	283	1005.41*	0.00	4340.16	0.29
	PPR	215	283	363.26*	0.00	1235.33	0.74
	Treatment Only (Gross)	215	283	5,082.85*	3,186.76	6,978.93	0.27

*Not statistically significant

The results of the billing analysis indicate no statistically significant savings were found for the electric measures.

6.3 HVAC Program

Four gas measures met the inclusion criteria necessary for billing analyses. Key components of these inclusion criteria included having at least 75 customers who only installed a single measure, full details can be found in Section 0. These four measures were Smart Thermostat Contractor Install, Smart Thermostat Self Install, High Efficiency Natural Gas Furnaces, and Natural Gas Multi-Stage or Modulating Furnaces. The Evaluators employed a regression-based pre vs. post billing analysis methodology, as outlined in Section 0, to calculate the savings associated with thermostat installation. Of note, the PSM process to create matching control cohorts for these two thermostat measures involved a caliper of 0.2, a ratio of 1, and a "nearest" matching methodology. In contrast, the Evaluators used a heating load estimation methodology, as outlined in Section 2.2.3.3, to assess furnace savings. Heating load estimation only requires post-period billing data from treatment customers, so PSM was not necessary for this analysis.

As detailed in Section 0, the regression model with the highest adjusted R-squared was selected for reporting. For smart thermostats, as outlined in the table below, the PPR regression yielded the best fit.

Table 6-11: Thermostat Regression Adjusted R-squared

Measure	DnD Adj R-squared	PPR Adj R-squared	Treatment Only Adj R-squared
Smart Thermostat Contractor Install	0.58	0.91	0.83
Smart Thermostat Self Install	0.59	0.93	0.83

Both smart thermostat regressions yielded statistically significant results, which suggests that both contractor and self-installed smart thermostats are associated with a decrease in customer gas usage. Full regression results for contractor and self-installed thermostats are outlined below in Table 6-12 and Table 6-13, respectively.

Table 6-12: Contractor Installed Thermostat PPR Results

Metric	Value
Treatment sample population (*n*)	200
Control sample population (*n*)	200
Annual savings (Therms)	16.95
Pooled Standard Error	10.55
90% Confidence Interval	17.35
90% Relative Precision	1.02
P value	0.02

Table 6-13: Self Installed Thermostat PPR Results

Metric	Value
Treatment sample population (*n*)	356
Control sample population (*n*)	356
Annual savings (Therms)	29.46
Pooled Standard Error	6.80
90% Confidence Interval	11.19
90% Relative Precision	0.38
P value	< 0.01

Meanwhile, the heating load estimation methodology was used to calculate annual savings for High Efficiency Natural Gas Furnaces and Natural Gas Multi-Stage or Modulating Furnaces. Since this calculation methodology is based on a deemed savings algorithm (not a regression) it does not produce measures of goodness of fit or statistical significance. However, the Evaluators did calculate standard error, 90% confidence and precision metrics for this analysis. A full outline of the key billing analysis results associated with each HVAC furnace measure can be found below.

Table 6-14: Natural Gas Furnace Heating Load Estimation Results

Metric	Value
Treatment sample population (*n*)	109
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%[11]
Installed Furnace Efficiency	95%
Annual savings (Therms)	48.22
Pooled Standard Error	0.80
90% Confidence Interval	1.32
90% Relative Precision	0.03

Table 6-15: Natural Gas Multi-Stage or Modulating Furnace Heating Load Estimation Results

Metric	Value
Treatment sample population (*n*)	46.5[12]
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%
Installed Furnace Efficiency	95%
Annual savings (Therms)	48.25
Pooled Standard Error	1.88
90% Confidence Interval	3.10
90% Relative Precision	0.06

Of note, heating load estimation savings are highly dependent on the baseline used in calculations. The 88.5% baseline outlined in the Regional Technical Forum's gas furnace UES measure workbook represents a precise regional estimate. However, if the federal minimum standard of 80% was used in heating load calculations instead, estimated annual savings would reach 123 Therms for both Natural Gas Furnaces and Natural Gas Multi-Stage or Modulating Furnaces.

6.4 Water Heat Program

The only gas measure that met inclusion criteria for the Water Heat program was Natural Gas Tankless Water Heaters. The Tankless Water Heater cohort began with 187 treatment customers; however, after preprocessing, billing data from 129 customers was used in the regression analyses. As with smart thermostats, a caliper of 0.2, a ratio of 1, and a "nearest" matching methodology was used to develop a matched control cohort of non-participant customers. The Difference-in-Difference regression yielded an adjusted R-squared of 0.55, the PPR yielded an adjusted R-squared of 0.98, and the Treatment Only regression yielded an adjusted R-squared of 0.80. As such PPR was selected for reporting. The following table outlines the PPR results for Natural Gas Tankless Water Heater program.

[11] The Regional Technical Forum outlines current practice furnace efficiency as 88.5% as of the July 2021 publication of the Gas Furnace UES workbook version 1.1.

[12] Heating load estimation is calculated monthly, so 46.5 is the average customers included in each month of valid billing data in 2023.

Table 6-16: Natural Gas Tankless Water Heater PPR Results

Metric	Value
Treatment sample population (*n*)	129
Control sample population (*n*)	129
Annual savings (Therms)	21.62
Pooled Standard Error	10.55
90% Confidence Interval	17.36
90% Relative Precision	0.80
P value	< 0.01

6.5 Midstream Program

The only billing analyses for the Midstream program that yielded valid results were for the Residential Furnace and Residential HVAC measures. While the Residential Heat Pump Water Heater and Residential Water Heater programs passed the PSM, they only had 7 and 4 treatment customers each, making the results of the regression analysis invalid due to such small sample sizes. As with the HVAC program, the heating load savings estimate methodology was employed for both of these space heating measures. Key savings results for the midstream residential furnace and HVAC measures are outlined below.

Table 6-17: Midstream Residential Furnace Heating Load Estimation Results

Metric	Value
Treatment sample population (*n*)	26.5[13]
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%
Installed Furnace Efficiency	95%
Annual savings (Therms)	47.43
Pooled Standard Error	1.14
90% Confidence Interval	1.88
90% Relative Precision	0.04

Table 6-18: Midstream Residential HVAC Heating Load Estimation Results

Metric	Value
Treatment sample population (*n*)	13.4
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%
Installed Furnace Efficiency	95%
Annual savings (Therms)	51.73
Pooled Standard Error	4.81
90% Confidence Interval	7.91
90% Relative Precision	0.15

[13] As above, heating load estimation is calculated monthly, so 26.5 represents the average customers included in each month of valid billing data in 2023.

7. Appendix B: Summary of Survey Respondents

This section summarizes additional insights gathered from the simple verification surveys deployed by the Evaluators for the impact evaluation of Avista's Residential and Low-Income Programs.

Survey respondents confirmed installing between one and three measures that were rebated by Avista, displayed in Table 7-1. This table is missing information from 29 low-income, CEEP, and MFDI survey respondents who did not indicate the number nor type of measures they received.

Table 7-1: Type and Number of Measures Received by Respondents

Measure Category	Total	Percent
No Measures	304	13.8%
One Measure	1218	55.4%
Two Measures	440	20.0%
Three Measures	171	7.8%
Four Measures	47	2.1%
Five or more measures	20	0.9%
HVAC	289	13.1%
Water Heater	136	6.2%
Smart Thermostat	515	23.4%
Clothes Washer	297	13.5%
Clothes Dryer	189	8.6%

The Evaluators asked respondents to provide information regarding their home, as displayed in Table 7-2. Similar to the previous impact evaluation findings, the majority of respondents noted owning a single-family home between 1,000 and 3,000 square feet with central air conditioning.

Table 7-2: Survey Respondent Home Characteristics[14]

Question	Response	Percent
Do you rent your home? (n=755)	Own	93.8%
	Rent	1.9%
	Own and rent to someone else	1.3%
	I don't know	0.1%
	Prefer not to answer	2.9%
Which of the following best describes your home? (n=755)	Single-family house detached	86.0%
	Single-family house attached to one or more other houses	2.3%
	Mobile or manufactured home	8.2%
	Apartment with 2 to 4 units	0.8%
	Apartment with 5+ units	0.3%
	Other	1.4%
	I don't know	0.2%
	Prefer not to answer	0.7%
Does your home have central air conditioning? (n=755)	Yes	72.6%
About how many square feet is your home? (n=629)	Less than 1,000ft^2	6.6%
	1,000-1,999ft^2	42.4%

[14] Four contractors or construction companies were not asked these questions.

	2,000-2,999ft^2	32.3%
	3,000-3,999ft^2	13.5%
	4,000ft^2 or more	5.2%
When was your home built? (n=719)	Before 1950	20.0%
	1950 to 1959	10.3%
	1960 to 1969	6.6%
	1970 to 1979	15.3%
	1980 to 1989	7.7%
	1990 to 1999	15.3%
	2000 to 2009	13.2%
	2010 to 2019	4.7%
	2020 to Present	5.6%
	I don't know	1.1%
	Prefer not to answer	0.2%

8. Appendix C: Site-Specific Program Project Reports

This section displays site reports for each sampled project in the Site-Specific Program.

Project Number SSOP_113679

Project Background

The participant is a fast-food restaurant that received incentives from Avista for installing electronic defrost controls on its cooler and freezer.

M&V Methodology

The Evaluators reviewed all project documentation including plans, photos, invoices, and simulation outputs to verify the installation of rebated equipment. On site, the Evaluators verified this information.

The Evaluators attempted to measure savings estimates through a whole facility billing analysis, however the results were not statistically significant.

To verify savings, the Evaluators instead examined materials used to develop expected savings estimates, scrutinizing each of the inputs and cross-checked the model results using engineering algorithms. The Evaluators found all assumptions and inputs to be reasonable, and prescriptive calculations carried out to verify estimates yielded similar kWh savings estimated, corroborating savings claims.

Results

For project # SSOP_113679, the kWh realization rate is 100%.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	Therm Realization Rate
BAS	1,259	N/A	100.0%	N/A
Totals:	**1,259**	**N/A**	**100.0%**	**N/A**

Project Number SSLP_117017

Project Background

The participant is fast food restaurant that received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (33) 3L F24T5HOs were replaced by (33) Sylvania 3L 2ft T5HE LED
- (6) 3L F24T5HOs were replaced by (6) Sylvania 3L 2ft T5HE LED

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Fast Food	AC, gas heat	3,640	3,640	80%
Fast Food	AC, gas heat	8,760	8,760	100%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
3L F24T5HO to Sylvania 3L 2ft T5HE LED	33	33	63	21	3,640	3,640	5,589	5,589	5,589	100.0%
3L F24T5HO to Sylvania 3L 2ft T5HE LED	6	6	63	21	8,760	8,760	2,445	2,445	2,445	100.0%
Totals:							**8,034**	**8,034**	**8,034**	**100.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
3L F24T5HO to Sylvania 3L 2ft T5HE LED	33	33	63	21	0.80	1.23	1.23	1.23	100.0%

3L F24T5HO to Sylvania 3L 2ft T5HE LED	6	6	63	21	1.00	0.22	0.22	0.28	127.3%
Totals:						**1.45**	**1.45**	**1.51**	**104.1%**

Results

For project # SSLP_117017 the kWh realization rate is 100.0% and the kW realization rate is 104.1%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
3L F24T5HO to Sylvania 3L 2ft T5HE LED	5,589	1.23	100.0%	100.0%	0	0.00	-90
3L F24T5HO to Sylvania 3L 2ft T5HE LED	2,445	0.28	100.0%	127.3%	0	0.00	-40
Totals:	**8,034**	**1.51**	**100.0%**	**104.1%**	**0**	**0.00**	**-130**

By default, expected savings are calculated using an 80% peak CF. One of the retrofitted areas' lights operate continuously, so the peak coincidence factor for this area was changed to 100%, resulting in a slightly higher verified peak kW reduction.

Project Number SSLP_82210

Project Background

The participant is a restaurant that received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (4) 1L HPS 100s were replaced by (4) 40W LED
- (63) 1L 60W Incs were replaced by (63) 9W A19 LED
- (19) 1L 15W CFs were replaced by (19) 9W BR30 LED

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation, assumed operating parameters and HVAC configuration(s). Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Exterior	none	4,288	4,288	0%
Full Service Restaurant	AC, gas heat	3,276	3,640	30%
Full Service Restaurant	AC, gas heat	8,766	3,640	100%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L HPS 100 to 40W LED	4	4	130	40	4,288	4,288	1,544	1,544	1,544	100.0%
1L 60W Inc to 9W A19 LED	63	63	43	9	3,276	3,276	7,859	7,578	7,578	100.0%
1L 15W CF to 9W BR30 LED	14	14	18	9	3,276	3,276	605	446	446	144.1%
1L 15W CF to 9W BR30 LED	5	5	18	9	8,766	8,766		426	426	

Totals:	**10,008**	**9,994**	**9,994**	**99.9%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L HPS 100 to 40W LED	4	4	130	40	0.00	0.29	0.29	0.00	0.0%
1L 60W Inc to 9W A19 LED	63	63	43	9	0.30	1.92	1.85	0.69	37.3%
1L 15W CF to 9W BR30 LED	14	14	18	9	0.30	0.15	0.04	0.04	61.3%
1L 15W CF to 9W BR30 LED	5	5	18	9	1.00		0.05	0.05	
Totals:						**2.35**	**2.29**	**0.78**	**33.2%**

Results

For project # SSLP_82210 the kWh realization rate is 99.9% and the kW realization rate is 31.9%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L HPS 100 to 40W LED	1,544	0.00	100.0%	0.0%	0	0.00	0.00
1L 60W Inc to 9W A19 LED	7,578	0.69	100.0%	37.3%	0	0.00	-72.61
1L 15W CF to 9W BR30 LED	446	0.04	144.1%	61.3%	446	0.04	-5.80
1L 15W CF to 9W BR30 LED	426	0.05			426	0.05	-4.08
Totals:	**9,994**	**0.78**	**99.9%**	**33.2%**	**0**	**0.00**	-82.49

Expected savings calculations assumed 3,276 annual hours of operation for all (19) BR-30 lamps however, during the on-site visit the Evaluators found that five of the lamps were left on continuously, so 8,766 hours and a 100% peak CF were used in verified savings calculations, resulting in higher-than-expected kWh savings and peak kW reduction. By default expected savings are calculated using an 80% peak CF, though using the verified operating schedule the Evaluators calculated a 30% chance the remaining interior lights would be operating during peak hours, and a 0% chance for exterior lamps, resulting in a lower verified peak W reduction. Lastly, expected savings calculations for (63) LED A-lamps assumed an erroneous HCIF interaction factor (1.12), whereas 1.08 should have been used for the entire interior of this facility (a full service restaurant with AC and gas heating built prior to 2006). This adjustment resulted in slightly lower verified kWh and kW estimates for these lamps.

Project Number SSLP_82041

Project Background

The participant is social club with a boat storage area that received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (34) 4L F54T5HOs were replaced by (26) 1L 148W LED
- (41) 4L F54T5HOs were replaced by (26) 1L 181W LED

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation, assumed operating parameters and HVAC configuration(s). Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Conditioned Storage	Gas heat, no AC	3,640	3,640	43%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
4L F54T5HO to 1L 148W LED	34	26	236	148	2,870	2,870	14,353	14,353	13,202	92.0%
4L F54T5HO to 1L 181W LED	41	26	236	182	2,870	2,870	17,008	17,008	15,645	92.0%
Totals:							**31,361**	**31,361**	**28,846**	**92.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					

4L F54T5HO to 1L 148W LED	34	26	236	148	0.43	3.67	3.68	1.97	53.5%
4L F54T5HO to 1L 181W LED	41	26	236	182	0.43	4.37	4.36	2.34	53.7%
Totals:						**8.04**	**8.04**	**4.31**	**53.6%**

Results

For project #SSLP_82041 the kWh realization rate is 92.0% and the kW realization rate is 53.6%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
4L F54T5HO to 1L 148W LED	13,202	1.97	92.0%	53.5%	0	0.00	-200
4L F54T5HO to 1L 181W LED	15,645	2.34	92.0%	53.7%	0	0.00	-237
Totals:	**28,846**	**4.31**	**92.0%**	**53.6%**	**0**	**0.00**	**-438**

Expected savings calculations assumed 3,120 annual hours of operation, hours extrapolated for the operating schedule collected during the on-site visit yielded approximately 2,870 annual hours and slightly reduced realized kWh. Similarly, by default expected savings are calculated using an 80% peak CF, though using the verified operating schedule the Evaluators calculated a 43% chance the lights would be operating during peak hours, resulting in a lower verified peak W reduction.

Project Number SSOP_113344

Project Background

The participant is a manufacturing facility that received incentives from Avista for replacing and existing 180hp DC motor and silicon-controlled rectifier with a 200hp AC induction motor controlled by a VFD.

M&V Methodology

The Evaluators reviewed all project documentation including plans, photos, and invoices to verify the installation of rebated equipment. Verified savings were calculated using the following standard algorithms, along with runtime data extrapolated from data logger.

$$kWh_{savings} = kWh_{pre} - kWh_{post}$$

$$kWh_{pre/post} = kW_{pre/post} \times AOH$$

$$kW_{pre/post} = \frac{V \times I_{avg,pre/post} \times Pf_{pre/post} \times \sqrt{3}}{1000}$$

Where:

AOH = Annual Operating Hours
V = Voltage (nominal)
I_{avg} = Average current draw
Pf = Power Factor
pre = Indicates pre-implementation
post = Indicates post-implementation

Savings Parameters

Specific input parameters assumed in the analysis and confirmed by the Evaluators are:

Measure Parameters/Characteristics

Baseline		Efficient		Motor Voltage	AOH
$Current_{avg}$	Power Factor	$Current_{avg}$	Power Factor		
71.8	0.8	44.0	0.98	480	8,424

Results

For project # SSOP_113344, the kWh realization rate is 100.0% and the kW realization rate is 100.0%.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
DC motor with silicon rectifier to AC induction motor with VFD	402,286	11.91	100.0%	100.0%
Totals:	**402,286**	**11.91**	**100.0%**	**100.0%**

Project Number SSOP_81734

Project Background

The participant is a communications office that received incentives from Avista for "grooming" their telecom switch system, in which unneeded switches are removed from the network.

M&V Methodology

The Evaluators reviewed all project documentation including plans, photos, invoices and simulation outputs, to verify the installation of rebated equipment. The Evaluators attempted to conduct a facility-level billing analysis (Option C) using two years' worth of facility billing data and local weather data, obtaining the following results:

Billing Regression Results

CDD Balance Point	HDD Balance Point	CVRMSE	Pre-Period kWh/day	Post-Period kWh/day	kWh Savings (per day)
55	50	4.2%	3,039	2,776	263

Savings Calculations

Calculations parameters used in the analysis and confirmed by the Evaluators are:

Model Fit

'Pre' model R^2	'Post 'Model R^2
0.77	0.81

Pre/Post Use and kWh Savings

Expected kWh Savings	Annual Pre Usage (kWh)	Annual Post Usage (kWh)	Verified kWh Savings	Realization Rate
198,868	40,280	21,983	196,000	99%

Results

For project # SSOP_81734, the kWh realization rate is 99%.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
Telecom "Grooming"	198,868	N/A	99%	N/A
Totals:	**198,868**	**N/A**	**99%**	**N/A**

Project Number SSOP_81611

Project Background

The participant is an assembly that received incentives from Avista for replacing existing hydraulic motors with VFD AC-induction motors in their facility. The Evaluators verified the participant had installed:

- (1) VFD AC Motor replaced an existing hydraulic motor on the planer feed line

M&V Methodology

The Evaluators reviewed all project documentation including plans, photos, invoices and prescriptive calculations used to arrive at ex ante savings estimates. On site, the Evaluators confirmed the installation of the equipment and recorded nameplate information for verification. Existing logging data was use to confirm the annual hours of operation. Savings were calculated using the following algorithms:

$$kWh_{savings} = kWh_{base} - kWh_{ee}$$

$$kWh = kW \times hours\ of\ operation$$

$$kW = \frac{V \times I_{avg} \times Pf \times \sqrt{3}}{1000}$$

Where:

Hours of operation	= Annual Operating Hours
V	= Voltage (nominal)
I_{avg}	= Average current draw
Pf	= Power Factor

Savings Parameters

Specific input parameters assumed in the analysis and confirmed by the Evaluators are:

Measure Parameters/Characteristics

Annual Building Hours	Input Voltage	Uptime %	Outfeed Amps	Infeed Amps	Cooling Amps	Outfeed PF	Infeed PF	Cooling PF
8,760	472	45%	63.0	51.0	50.0	0.60	0.50	0.80

Savings Calculations

Baseline kW	Baseline Annual Operating Hours	Baseline Energy	Efficient kW	Efficient Annual Operating Hours	Efficient Energy	Energy Savings
87.7	4,993	438,130	38.5	3,942	151,596	**286,534**

Results

For project # SSOP_121533, the kWh realization rate is 100%.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
VFD-controlled AC motors	286,724	49.00	100.%	100.0%
Totals:	**286,724**	**49.00**	**100.%**	**100.0%**

Project Number SSOP_117547

Project Background

The participant is a lodging facility that received incentives from Avista for replacing existing baseboard heaters with efficient PTHP units, install insulation to the buildings interior, and replace single-pane windows with triple-pane vinyl windows. The Evaluators verified the participant had installed:

- (25) inefficient baseboard PTAC units were replaced with (25) PTHP units
- (30,118) sqft of uninsulated wall of R4 to (30,118) sqft of insulated walls of R19, ceiling of R49 and floors of R25
- (568) sqft of U-0.58 and 0.75 SHGC value single-pane window units were replaced with (568) sqft of U-0.29 and 0.26 SHGC value triple-paned vinyl windows on all sides of the building.

M&V Methodology

The Evaluators reviewed all project documentation including plans, photos, invoices, and simulation outputs, to verify the installation of rebated equipment. The Evaluators attempted to conduct a facility-level billing analysis (Option C) using nine months of pre and post conditions worth of facility billing data and local weather data, however found that there was a statistically significant increase in use during the post period when compared with the pre period. This indicated additional conflating factors beyond weather (such as other changes to equipment, store operating hours or changes in behavioral patterns) are affecting the energy consumption of the facility.

To verify savings, the Evaluators instead examined materials used to develop expected savings estimates, and prescriptive engineering algorithms to verify ex ante estimates. The Evaluators found all ex ante assumptions and inputs to be reasonable and appropriate, and prescriptive calculations yielded similar kWh savings estimated, corroborating savings claims.

Savings Parameters

Specific input parameters assumed in the analysis and confirmed by the Evaluators are:

Measure Parameters/Characteristics – HVAC Units

Baseline				Efficient				Location	Air Conditio-ning	Heating
Heating Unit Size	AC Unit Size	COP	System Type	Heating Unit Size	AC Unit Size	COP	System Type			
2,000 W	9,000 BTU	1	ER	8,100 BTU	9,000 BTU	3.4	HP	Baseboard Units	Electric	HP

Measure Parameters/Characteristics – Insulation

Baseline				Efficient				HDD	CDD	Air Conditioning	Heating
Ft^2	Wall R	Ceiling R	Floors R	Ft^2	Wall R	Ceiling R	Floors R				
30,118	4	4	4	30,118	19	49	25	6,276	899	Electric	HP

Measure Parameters/Characteristics – Window Panes

Baseline				Efficient				Location	Air Conditioning	Heating
Ft^2	U-value	S.C.	SHGC	Ft^2	U-value	S.C.	SHGC			
568	0.58	0.75	0.653	568	0.29	0.26	0.226	Entire Facility	Electric	HP

Results

For project # SSOP_117547, the kWh realization rate is 100.0%.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	Therm Realization Rate
PTAC/PTHP, window pane, insulation replacement	288,762	N/A	100.0%	N/A
Totals:	**288,762**	**N/A**	**100.0%**	**N/A**

Project Number SSOP_82111

Project Background

The participant is an assembly that received incentives from Avista for removing six (6) existing wall-mounted electric resistance space heaters and three (3) mobile electric space heaters. On site, the Evaluators had confirmed that these heaters had been replaced with steam-powered heaters.

M&V Methodology

The Evaluators reviewed all project documentation including plans, photos, invoices and prescriptive calculations used to calculate expected savings. During the site visits, the Evaluators confirmed that the existing ER heaters had been replaced with steam-powered heaters, and that heaters operate only when the air temperature drops below 50 degrees Fahrenheit. Energy savings comes from the removal of electric equipment and is calculated as follows:

$$kW = \frac{V \times I_{avg} \times Pf \times \sqrt{3}}{1000}$$

$$kWh = kW \times hours\ of\ operation$$

$$kWh_{savings} = kWh_{wall} + kWh_{mobile}$$

Where:

Hours or operation	= Annual Operating Hours (5,464)
V	= Voltage (nominal) (472 volts)
I_{avg}	= Average current draw (22.4 amps)
Pf	= Power Factor (0.9)

Savings Calculations

Specific input parameters assumed in the analysis and confirmed by the Evaluators are shown in the table below. Annual operating hours are based on TMY data taken from station NSRDB 241029 in Grangeville, ID.

Measure Parameters/Characteristics

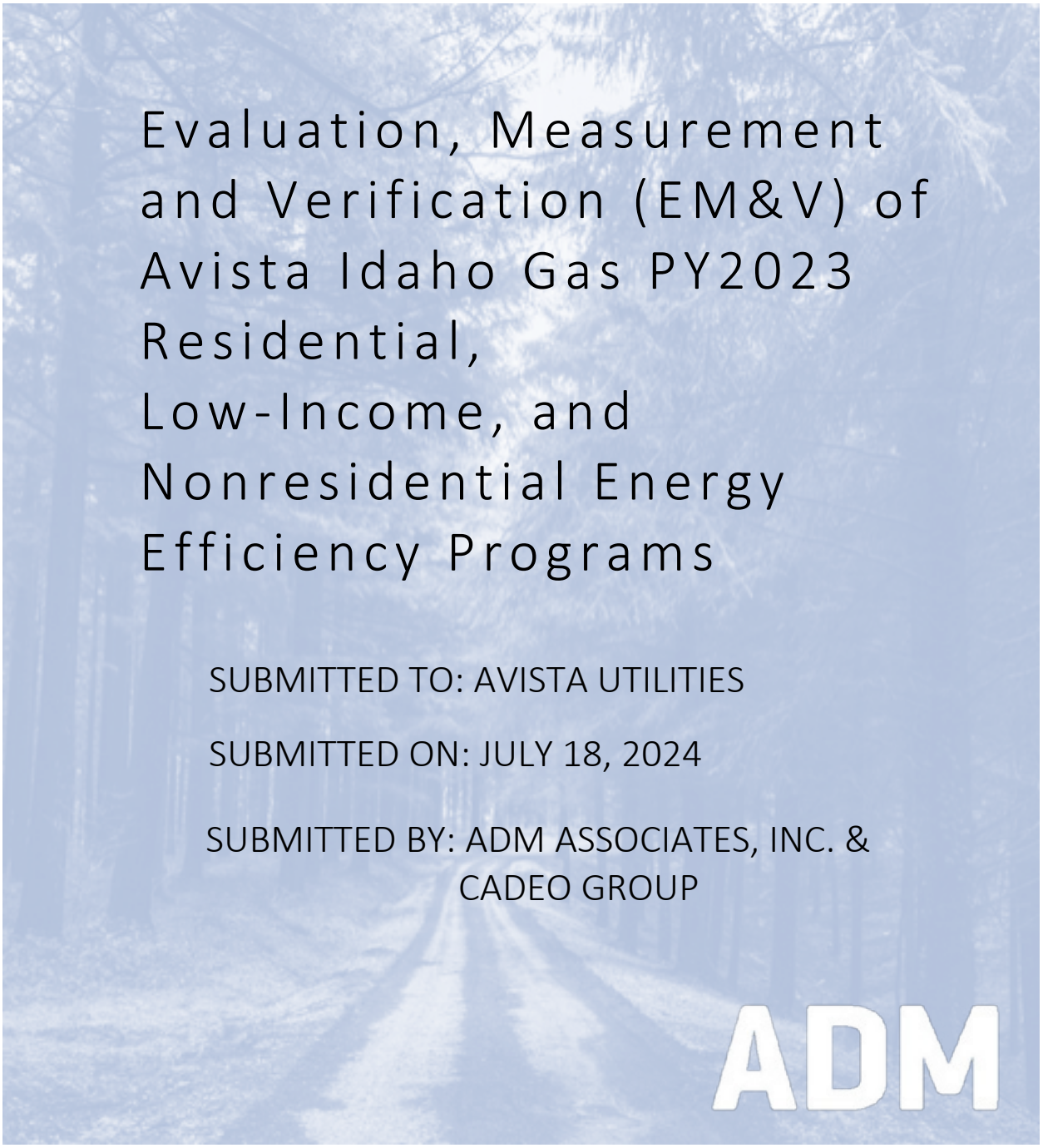
Unit Type	kW	ON Hours	Quantity (Space Heaters)	Annual Savings
Wall	16.5	5,510	6	544,874
Mobile	4.5	5,510	3	74,385
			Total:	**619,259**

Results

For project #SSOP_82111, the kWh realization rate is 100.0%.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
EEM Heaters	619,259	37.46	100.0%	100.0%
Totals:	**619,259**	**37.46**	**100.0%**	**100.0%**



Evaluation, Measurement and Verification (EM&V) of Avista Idaho Gas PY2023 Residential, Low-Income, and Nonresidential Energy Efficiency Programs

SUBMITTED TO: AVISTA UTILITIES

SUBMITTED ON: JULY 18, 2024

SUBMITTED BY: ADM ASSOCIATES, INC. & CADEO GROUP

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Table of Contents

List of Tables

1. Executive Summary

This report is a summary of the Residential, Low-Income, and Nonresidential Gas Evaluation, Measurement, and Verification (EM&V) effort of the 2023 program year (PY2023) portfolio of programs for Avista Corporation (Avista) in the Idaho service territory. The evaluation was administered by ADM Associates, Inc. and Cadeo Group, LLC (herein referred to as the "Evaluators").

1.1 Savings Results

The Evaluators conducted an impact evaluation for Avista's Residential, Low-Income, and Nonresidential programs for PY2023. The Residential portfolio savings amounted to 167,465 Therms with a 63.77% realization rate. The Low-Income portfolio savings amounted to 2,025 Therms with a 94.82% realization rate. The Nonresidential portfolio savings amounted to 62,007 Therms with a 92.5% realization rate. The Evaluators summarize the Residential, Low-Income, and Nonresidential portfolio verified savings in Table 1-1 through Table 1-3, respectively.

Table 1-1: Residential Verified Impact Savings by Program

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Water Heat	10,125	9,051	89.39%
HVAC	87,728	85,264	97.19%
Shell	19,541	18,117	92.71%
Fuel Efficiency[1]	0	0	-
ENERGY STAR Homes[2]	134	134	100.00%
Small Home & MF Weatherization	5,540	5,445	98.29%
Appliances	605	396	65.53%
Multifamily Direct Install	227	227	100.00%
Midstream	138,707	48,830	35.20%
Total Res	**262,607**	**167,465**	**63.77%**

Table 1-2: Low-Income Verified Impact Savings by Program

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Low-Income[3]	2,136	2,025	94.82%
Total Low-Income	**2,136**	**2,025**	**94.82%**

[1] The Fuel Efficiency Program displayed a verified Therms penalty of 11,562.80 Therms due to fuel conversion measures. For the purposes of this report, this penalty is not included in the overall metrics of natural gas-saving energy efficiency measures.
[2] The ENERGY STAR Homes Program displayed a verified Therms savings of 0.00 Therms for the electric measures; no dual fuel measures were rebated in PY2023.
[3] The Low-Income Program displayed a verified Therms penalty of 0.00 Therms; no fuel conversion measures were rebated in PY2023.

Table 1-3: Nonresidential Verified Impact Savings by Program

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
HVAC	12,969	12,969	100.0%
Food Service Equipment	3,930	3,930	100.0%
Shell	7,117	7,117	100.0%
Midstream	18,140	8,922	49.2%
Site-Specific	24,891	29,069	116.8%
Total	**67,047**	**62,007**	**92.5%**

Table 1-4 summarizes the gas programs offered to residential, low-income, and nonresidential customers in the Idaho Avista service territory in PY2023 as well as the Evaluators' evaluation tasks and impact methodology for each program.

Table 1-4: Impact Evaluation Activities by Program and Sector

Sector	Program	Database Review	Survey Verification	Impact Methodology
Residential	Water Heat	✓	✓	Avista TRM
Residential	HVAC	✓	✓	Avista TRM/IPMVP Option A
Residential	Shell	✓		Avista TRM
Residential	ENERGY STAR® Homes	✓		Avista TRM
Residential	Small Home & MF Weatherization	✓	✓	Avista TRM
Residential	Appliances	✓	✓	Avista TRM
Residential	Multifamily Direct Install	✓	✓	SBW TRM
Residential	Midstream	✓		Avista TRM
Low-Income	Low-Income	✓		Avista TRM
Nonresidential	HVAC	✓		RTF, Avista TRM
Nonresidential	Food Service Equipment	✓		RTF, Avista TRM
Nonresidential	Shell	✓		Avista TRM
Nonresidential	Midstream	✓		RTF, Avista TRM, IPMVP Option A
Nonresidential	Site-Specific	✓		IPMVP Options

1.2 Conclusions and Recommendations

The following section details the Evaluators' conclusions and recommendations for each the Residential Portfolio, Low-Income Portfolio, and Nonresidential Portfolio program evaluations.

1.2.1 Conclusions

The following section details the Evaluator's findings resulting from the program evaluations for each the Residential Portfolio, Low-Income Portfolio, and Nonresidential Portfolio.

1.2.1.1 Residential Programs

The Evaluators provide the following conclusions regarding Avista's Residential gas programs:

- The Evaluators found the **Residential** portfolio to demonstrate a total of 167,465 Therms with a realization rate of 63.77%.
- The Residential Portfolio impact evaluation resulted in a realization rate of 63.78% due to discrepancy in expected savings for the Midstream Program and due to differences between the implementer-assigned expected savings values using minimum code baseline and the RTF-implemented market practice baseline. The Evaluators utilized engineering algorithms to evaluate this program based on purchased equipment efficiency level. The Evaluators also applied RTF market practice baseline equivalents to the engineering algorithms in order to maintain consistency with evaluation methods between the downstream and midstream programs, while taking into account the often-higher efficiency values of the purchased equipment. Although the Evaluators note instances in which the implementer's engineering algorithm were applied incorrectly in the calculation of the expected savings values, the market practice baseline adjustment led to the largest downward adjustment, leading to a low realization rate for the program.
- The **Midstream Program**, which contributes 53% of the expected savings, resulted in a realization rate of 35% whereas each of the other programs resulted in a combined 107% realization rate. The Midstream Program contributed to a 43% decrease in the overall residential sector.
- The Evaluators conducted verification surveys via web survey to collect information from customers who participated in the Water Heat, HVAC, Small Home and MF Weatherization, and Appliance Programs. The Evaluators collected information including the functionality of the efficient equipment, and the functionality of the replaced equipment. The Evaluators calculated in-service rates for the measures within these programs in order to apply findings to the verified savings results for each program.
- The realization rate for the natural gas savings in the **Water Heat Program** was 89.39% with 9,051 verified Therms saved. The Evaluators explored a billing analysis for the natural gas water heater measures within the **Water Heat Program**. However, the G 50 Gallon Natural gas Water Heater and the G Tankless Gas Water Heater measures resulted in savings that were not statistically significant. Therefore, the Evaluators elected to use Avista TRM values to estimate verified savings.
- In the **Water Heat Program**, the realization rate for the natural gas savings in the tankless and storage tank water heater measures deviated from 100% realization due to differences in home type, heating zone, cooling zone, and efficiency level of the water heater. The Evaluators also found that many rebates did not have documentation filled for space heating type. The Evaluators recommend Avista verify heating type prior to completing rebates and ensure proper Avista TRM values are assigned for the specifications of the unique project.
- The **HVAC Program** in total displays a realization rate of 97.19% with 85,264 Therms verified natural gas savings in the Idaho service territory. The realization rate for the natural gas savings in the HVAC Program deviates from 100% due to verification activities which confirmed that four of the nine sampled G Smart Thermostat DIY with Natural Gas Heat projects lacked qualification for savings due to lack of occupancy senor or geolocation capabilities. The Evaluators recommend Avista confirm qualification of smart thermostats prior to rebating the project.

- The Evaluators attempted to estimate smart thermostat measure savings values through a billing analysis for the **HVAC Program**. However, because the results from the billing analyses for smart Thermostats were contradictory and/or inconclusive, the Evaluators elected to utilize Avista TRM values to estimate verified savings for these measures.
- The **Shell Program** displayed verified savings of 18,117 Therms with a realization rate of 92.71% against the expected savings for the program. The realization rate for the natural gas savings in the Shell Program deviates from 100% due to the differences in quantities between the Avista tracking database and the verified documents. The Evaluators conducted a billing analysis for the attic insulation and window replacement measures, however, due to unexpectedly low savings estimates, the Evaluators chose to verify savings through the Avista TRM.
- The **Fuel Efficiency Program** gas impacts are not claimed in the Idaho Gas report, however, the Evaluators found that the program resulted in 11,562 Therms penalty, which is detailed in the Idaho Electric impact evaluation report. Therms penalties are not aggregated into this report's Residential portfolio impact evaluation and instead are reported here for planning purposes.
- The **ENERGY STAR Homes Program** displayed a realization rate of 100% at 134 Therms saved across 1 project in PY2023. The Evaluators found no deviations in savings for this program.
- The **Small Home & MF Weatherization Program** in total displays a realization rate of 98.29% with 5,445 Therms verified natural gas energy savings in the Idaho service territory. The realization rate for the program deviates from 100% due one attic insulation project in which the Avista TRM value was not applied to the project appropriately. This project resulted in a 20% realization rate and contributed to the 50% realization rate for the attic insulation measure. All other sampled projects displayed realization rates between 98% and 102%. These were primarily due to small discrepancies in the square footage reported as well as a miscalculation of the value used in the TRM for Natural Gas Furnaces. In addition, U-values for window measures were not consistently tracked, which is an important savings unit assignment requirement. The Evaluators recommend Avista incorporate a u-value field to the tracking database and add additional QA/QC procedures for documenting square footage for these measures in the program in which multiple insulation projects occur.
- In the **Small Home & MF Weatherization Program**, the Evaluators found that many projects exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). The Evaluators recommend that Avista ensure projects meet the small home definition; projects that do not meet this definition should be rebated under the appropriate residential program.
- The **Multifamily Direct Install Program** displayed a realization rate of 100% at 227 Therms saved in PY2023. The Evaluators found no discrepancy between the savings values in the tracking database and the TRM values leading to a realization rate of 100% for these measures. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data in order to apply more specific savings values to each project.
- The **Appliance Program** displayed a realization rate of 65.53% at 396 Therms saved in PY2023. The realization rate for the natural gas savings in the Appliance Program deviates from 100%

due removal of savings from the Top Load Washer measure and the inflated savings from Energy Star Rated Clothes Dryer measure. The expected savings utilized a 2.72 Therms savings value for clothes dryers, but the appropriate RTF UES value is 9.59 Therms. The Evaluators recommend Avista update the clothes dryer measure to be in alignment with the RTF UES value. The Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions. The Evaluators recommend incorporating cubic volume in the Appliance Program tracking database.

- The Evaluators evaluated the **Midstream Program** in its launch year of PY2023. The Midstream Program displayed a realization rate of 35.20% at 48,830 Therms saved in PY2023. The program started in summer 2023. Through this program, Avista effectively converted several water heater and HVAC residential appliances from a downstream measure into a midstream delivery, effectively removing the barriers for end-use customers by removing the requirement to deliver rebate applications to Avista. The program is implemented by Energy Solutions. The implementer defined expected savings for each measure delivered in the program, which displayed savings drastically higher than the Avista TRM and RTF UES documented savings. Therefore, the realization rates for the program are 35% of expected savings. The Evaluators reviewed program documentation and found that the implementer engineering algorithm results were inflated due to incorporating code minimum baselines whereas the RTF and Avista TRM incorporate estimated market baseline. In addition, the Evaluators found that the implementer engineering algorithms were not applied properly, leading to even further inflated savings. The Evaluators note that, had the program utilized the Avista TRM to evaluate expected savings for the program, the realization rate for the program would have been near-100%. The Evaluators recommend that Avista and the implementers update the expected savings calculation methodology to incorporate market practice baseline rather than minimum code baseline values in order to remain consistent with the baseline methods utilized in the downstream measure programs and more accurately estimate expected savings in future iterations of this program.

1.2.1.2 Low-Income Programs

The Evaluators provide the following conclusions regarding Avista's Low-Income natural gas programs:

- The Evaluators found the **Low-Income** portfolio to demonstrate a total of 2,025 Therms with a realization rate of 94.82%.
- The Evaluators attempted to estimate measure-level Low-Income Program energy savings through billing analysis regression with a counterfactual group selected via propensity score matching. The Evaluators attempted to isolate each unique measure. However, participation for the Low-Income program resulted in a small number of customers with isolated measures and therefore the Evaluators conducted a whole-home billing analysis for all the natural gas measures combined in the Low-Income in order to estimate savings for the average household participating in the program, across all measures. However, the billing analysis results were not statistically significant. Therefore, the Evaluators found a realization rate of 91% from the desk review with Avista TRM values.

- The Evaluators received a lower number of project documents than intended due to the CAP agency having low bandwidth for fulfilling these time-consuming paperwork requests. During the review, the Evaluators found there were several projects with missing data. In total, eight projects were unable to be verified due to missing or incomplete data.
- During the review, the Evaluators found there were several projects with missing data. In total, seven projects were unable to be verified due to missing or incomplete data. The Evaluators note that the majority of deviations from 100% realization rate in the Low-Income were due to small differences in the reported savings and Avista TRM documentation 20% annual household energy caps not properly applied in a few instances. The Evaluators recommend additional QA/QC efforts are completed to ensure the program is properly applying the 20% annual household cap by using available household billing data.

1.2.1.3 Nonresidential Programs

The Evaluators provide the following conclusions regarding Avista's Nonresidential gas programs:

- The verified savings for the HVAC program are 12,969 verified Therms with a realization rate of 100%.
- The verified savings for the Food Service Equipment program is 3,930 therms with a realization rate of 100%.
- The verified savings for the Shell program is 7,117 Therms with a realization rate of 100.0%, as displayed in Table 5-11. Evaluators did not find any deviations from TRM UES.
- The verified savings for the Midstream program is 7,536 Therms with a realization rate of 41.5%, as displayed in Table 5-16. Adjusted savings comes from the RTF where available. Where not available, adjusted savings comes from program planning workbooks used by program implementors.
    - Results show that UES and prescriptive multipliers for Conveyor Ovens, Furnaces and Storage Water Heaters did not align with ex ante savings shown in the planning workbook, and were not applied to tracking data as originally intended.
    - Savings for food service equipment was assigned using UES in the program implementation workbook, however, did not provide the same estimates that were claimed, indicating that expected UES values were not applied correctly or consistently for Conveyor Ovens and Fryers.
    - Verified savings for griddles, dishwashers and boilers was taken from the RTF workbook and is specific to the equipment configuration, capacity and type of facility it is installed in.
    - Savings for Furnaces, Instantaneous Water Heaters and Storage Water Heaters was calculated using standard engineering algorithms, with equipment-specific inputs for capacity and efficiency, and EFLH values from the Midstream planning workbook. Groundwater temps were taken from the RTF and estimates of gallons of water used per year were taken from the IL TRM 12.0 and assigned to specific facility types. Expected

savings for both instantaneous and storage water heaters assumed annual water usage that varied between 348% and 461% of usage estimates in the IL and AR TRMs. Verified savings this for these measures used the more reasonable annual water usage estimates from the IL TRM 12.0, resulting in low verified savings

- The verified savings for the Site-Specific Program are 29,069 Therms with a realization rate of 116.8%.

1.2.2 Recommendations

The following section details the Evaluator's recommendations resulting from the program evaluations for each the Residential Portfolio, Low-Income Portfolio, and Nonresidential Portfolio.

1.2.2.1 Residential Programs

The Evaluators offer the following recommendations regarding Avista's Residential natural gas programs:

- The Evaluators note instances found in which the web-based rebate data indicates the household has electric space heating, but all other sources (project data and document verification) indicate natural gas space heating, and vice versa. The Evaluators recommend updating data collection standards in order for all sources of information to reflect the same values as the project documentation.
- The Evaluators found a handful of instances in which the rebated equipment did not meet the program minimum requirements for efficiency. The Evaluator recommend Avista check the source AHRI documentation and product level documentation to verify efficiency prior to incentivizing installation of the measure. For example, six of the smart thermostats did not qualify for RTF savings and two appliances were verified to lack ENERGY STAR qualifications.
- The Evaluators found that many projects claimed under the **Small Home & MF Weatherization Program** exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). The Evaluators recommend claiming projects on single family homes that are larger than 1,000 SQFT into the Shell Program.
- The Evaluators imputed home type and space heating type for a large number of sampled rebates, as the tracking database does not contain values for these characteristics or remain outdated. The mail-in rebates collect this information; however, it does not seem to be required to complete the rebate and therefore many rebates are missing this information. The Evaluators recommend verifying home type and space heating type during rebate application approval in order to apply correct savings values to each project.
- The Evaluators found a handful of instances where the rebated equipment did not meet the program minimum requirements for efficiency. The Evaluator recommend Avista check the source AHRI document to verify efficiency prior to incentivizing installation of the measure.
- In the **Water Heat Program**, the Evaluators found that Avista TRM savings values are slightly lower than the RTF savings assigned for the appropriate water heater tank size and tier

efficiency. The Evaluators found a majority of water heaters to be Tier 3 or higher, but the Avista TRM only includes savings for a combination of Tier 2 and Tier 3 savings. The Evaluators recommend that Avista document tier rating of heat pump water heaters to ensure proper validation of savings.

- In the **Energy Star Homes Program**, the Evaluators note that program application forms commonly lacked information about home primary and secondary space and water heating type. The Evaluators recommend updating the Avista measure savings database to match the primary heating type for dual fuel households.
- The **Small Home & MF Weatherization Program** displayed small discrepancies in the square footage reported; there was one project in which the square footage for the associated attic insulation was used in place of the project's wall insulation, and vice versa. The Evaluators recommend that Avista perform additional QA/QC efforts to ensure square footage is tracked properly, especially for projects in which multiple insulation projects occur.
- The **Small Home & MF Weatherization Program** displayed inconsistent u-values, which is an important savings unit assignment requirement. The Evaluators recommend Avista incorporate a u-value field to the tracking database and add additional QA/QC procedures for documenting square footage for these measures in the program.
- The Evaluators recommend removing the top load washer from **Appliance Program** offerings, as the RTF clothes washer workbook calculates negative savings for the top load washer. This indicates that the market practice baseline for this measure is already more efficient than the incentivized to load washer efficiency.
- In the **Appliance Program**, the Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions. The Evaluators recommend incorporating cubic volume in the Appliance Program tracking database.
- The Evaluators recommend Avista update the front load clothes washer Avista TRM value to correctly convert 120 kWh/unit to 4 Therms/unit. Currently, the Avista TRM reflects 6 Therms/unit. Additionally, The Evaluators recommend Avista update the clothes dryer Avista TRM value to correctly convert 281 kWh/unit to 9.6 Therms/unit. Currently, the Avista TRM reflects 2.72 Therms/unit.
- The Evaluators note that, had the **Midstream Program** utilized the Avista TRM to evaluate expected savings for the program, the realization rate for the program would have been near-100%. The Evaluators recommend Avista work with the implementer of the Midstream Program to update expected savings values in the implementer TRM in order to more accurately predict program-level savings in future program cycles.

1.2.2.2 Low-Income Programs

The Evaluators offer the following recommendations regarding Avista's Low-Income natural gas programs:

- The Evaluators note that the majority of deviations from 100% realization rate in the **Low-Income Program** is due to slight deviations between the reported savings and the Avista TRM as well as

some measures where 20% annual household energy caps were improperly applied. The Evaluators recommend verifying that the Avista TRM values and the 20% household cap are properly applied when calculating measure savings by utilizing available household billing data.

1.2.2.3 Nonresidential Programs

The Evaluators offer the following recommendations regarding Avista's Nonresidential Midstream natural gas program:

- Administrators should verify that UES and savings multipliers are applied consistently across measures. The Evaluators found that in many cases program planning estimates could not replicate claimed savings.
- Drivers of differences between implementor and RTF EUS for Food Equipment cannot be assessed, but are likely due to differences in baseline efficiency assumptions.
- The Evaluators suggest that program implementors calculated expected savings for HVAC measures using prescriptive algorithms and measure-specific characteristics. Capacities and efficiency levels very considerably within these measures and current planning materials only produce very general savings estimates.
- Hot water usage varies considerably between commercial facility types. For instantaneous and storage water heaters, develop expected savings estimates using annual hot water usage (in gallons) by specific building type.
- Refer to RTF savings estimates for griddles.

2. General Methodology

The Evaluators performed an impact evaluation on each of the programs summarized in Table 1-4. The Evaluators used the following approaches to calculate energy impact defined by the International Performance Measurement and Verification Protocols (IPMVP)[4] and the Uniform Methods Project (UMP)[5]:

- Simple verification (web-based surveys supplemented with phone surveys)
- Document verification (review project documentation)
- Deemed savings (RTF UES and Avista TRM values)
- Whole facility billing analysis (IPMVP Option C)

The Evaluators completed the above impact tasks for each the electric impacts and the natural gas impacts for projects completed in the Idaho Avista service territory.

The M&V methodologies are program-specific and determined by previous Avista evaluation methodologies as well as the relative contribution of a given program to the overall energy efficiency impacts. Besides drawing on IPMVP, the Evaluators also reviewed relevant information on infrastructure, framework, and guidelines set out for EM&V work in several guidebook documents that have been published over the past several years. These include the following:

- Northwest Regional Technical Forum (RTF)[6]
- National Renewable Energy Laboratory (NREL), United States Department of Energy (DOE) The Uniform Methods Project (UMP): Methods for Determining Energy Efficiency Savings for Specific Measures, April 2013[7]
- International Performance Measurement and Verification Protocol (IPMVP) maintained by the Efficiency Valuation Organization (EVO) with sponsorship by the U.S. Department of Energy (DOE)[8]

The Evaluators kept data collection instruments, calculation spreadsheets, and monitored/survey data available for Avista records.

2.1 Glossary of Terminology

As a first step to detailing the evaluation methodologies, the Evaluators have provided a glossary of terms to follow:

- **Deemed Savings** – An estimate of an energy savings outcome (gross savings) for a single unit of an installed energy efficiency measure. This estimate (a) has been developed from data sources

[4] https://www.nrel.gov/docs/fy02osti/31505.pdf
[5] https://www.nrel.gov/docs/fy18osti/70472.pdf
[6] https://rtf.nwcouncil.org/measures
[7] Notably, The Uniform Methods Project (UMP) includes the following chapters authored by ADM. Chapter 9 (Metering Cross-Cutting Protocols) was authored by Dan Mort and Chapter 15 (Commercial New Construction Protocol) was Authored by Steven Keates.
[8] Core Concepts: International Measurement and Verification Protocol. EVO 100000 – 1:2016, October 2016.

and analytical methods that are widely accepted for the measure and purpose and (b) are applicable to the situation being evaluated.

- **Expected Savings** – Calculated savings used for program and portfolio planning purposes.
- **Adjusted Savings** – Savings estimates after database review and document verification has been completed using deemed unit-level savings provided in the Avista TRM. It adjusts for such factors as data errors and installation rates.
- **Verified Savings** – Savings estimates after the updated unit-level savings values have been updated and energy impact evaluation has been completed, integrating results from billing analyses and appropriate RTF UES and Avista TRM values.
- **Gross Savings** – The change in energy consumption directly resulting from program-related actions taken by participants in an efficiency program, regardless of why they participated.
- **Free Rider** – A program participant who would have implemented the program measure or practice in absence of the program.
- **Net-To-Gross** – A factor representing net program savings divided by gross program savings that is applied to gross program impacts to convert them into net program load impacts.
- **Net Savings** – The change in energy consumption directly resulting from program-related actions taken by participants in an efficiency program, with adjustments to remove savings due to free ridership.
- **Non-Energy Benefits** – Quantifiable impacts produced by program measures outside of energy savings (comfort, health and safety, reduced alternative fuel, etc.).
- **Non-Energy Impacts** – Quantifiable impacts in energy efficiency beyond the energy savings gained from installing energy efficient measures (reduced cost for operation and maintenance of equipment, reduced environmental and safety costs, etc.).

2.2 Summary of Approach

This section presents our general cross-cutting approach to accomplishing the impact evaluation of Avista's Residential, Low-Income, and Nonresidential programs listed in Table 1-4. The Evaluators start by presenting our general evaluation approach. This chapter is organized by general task due to several overlap across programs.

The Evaluators outline the approach to verifying, measuring, and reporting the residential portfolio impacts as well as cost-effectiveness and summarizing potential program and portfolio improvements. The primary objective of the impact evaluation is to determine ex-post verified net energy savings. On-site verification and equipment monitoring was not conducted during this impact evaluation due to stay-at-home orders due to the COVID19 pandemic.

Our general approach for this evaluation considers the cyclical feedback loop among program design, implementation, and impact evaluation. Our activities during the evaluation estimate and verify annual energy savings and identify whether a program is meeting its goals. These activities are aimed to provide guidance for continuous program improvement and increased cost effectiveness for the 2022 and 2023 program years.

The Evaluators employed the following approach to complete impact evaluation activities for the programs. The Evaluators define two major approaches to determining net savings for Avista's programs:

- A *Deemed Savings* approach involves using stipulated savings for energy conservation measures for which savings values are well-known and documented. These prescriptive savings may also include an adjustment for certain measures, such as lighting measures in which site operating hours may differ from RTF values.
- A *Billing Analysis* approach involves estimating energy savings by applying a linear regression to measured participant energy consumption utility meter billing data. Billing analyses included billing data from nonparticipant customers. This approach does not require on-site data collection for model calibration. This approach aligns with the IPMVP Option C.
- A *Custom* approach, used for the Site-Specific program involves selecting the appropriate IPMVP option to apply to the specific measure or project. Typically this is Option A as most projects in the program are lighting retrofits, however Options B, C and D are also employed, depending upon the project. Specific methods are discussed in each site report.

The Evaluators accomplished the following quantitative goals as part of the impact evaluation:

- Verify savings with 10% precision at the 90% confidence level;
- Where appropriate, apply the RTF to verify measure impacts; and
- Where available data exists, conduct billing analysis with a suitable comparison group to estimate measure savings.

For each program, the Evaluators calculated adjusted savings for each measure based on the Avista TRM and results from the database review. The Evaluators calculated verified savings for each measure based on the RTF UES, Avista TRM, or billing analysis in combination with the results from document review. For the HVAC, Water Heat, and Fuel Efficiency programs, the Evaluators also applied in-service rates (ISRs) from verification surveys.

The Evaluators assigned methodological rigor level for each measure and program based on its contribution to the portfolio savings and availability of data.

The Evaluators analyzed billing data for all natural gas measure participants in the HVAC and Low-Income programs. The Evaluators applied billing analysis results to determine evaluated savings only for measures where savings could be isolated (that is, where a sufficient number of participants could be identified who installed only that measure). Program-level realization rates for the HVAC, Water Heat, and Fuel Efficiency programs incorporate billing analysis results for some measures.

2.2.1 Database Review

At the outset of the evaluation, the Evaluators reviewed the databases to ensure that each program tracking database conforms to industry standards and adequately tracks key data required for evaluation.

Measure-level net savings were evaluated primarily by reviewing measure algorithms and values in the tracking system to assure that they are appropriately applied using the Avista TRM. The Evaluators then aggregated and cross-check program and measure totals.

The Evaluators reviewed program application documents for a sample of incented measures to verify the tracking data accurately represents the program documents. The Evaluators ensured the home installed measures that meet or exceed program efficiency standards.

2.2.2 Verification Methodology

The Evaluators verified a sample of participating households for detailed review of the installed measure documentation and development of verified savings. The Evaluators verified tracking data by reviewing invoices and surveying a sample of participant customer households. The Evaluators also conducted a verification survey for program participants.

The Evaluators used the following equations to estimate sample size requirements for each program and fuel type. Required sample sizes were estimated as follows:

Equation 2-1 Sample Size for Infinite Sample Size

$$n = \left(\frac{Z \times CV}{d}\right)^2$$

Equation 2-2 Sample Size for Finite Population Size

$$n_0 = \frac{n}{1 + \left(\frac{n}{N}\right)}$$

Where,

- n = Sample size
- Z = Z-value for a two-tailed distribution at the assigned confidence level.
- CV = Coefficient of variation
- d = Precision level
- N = Population

For a sample that provides 90/10 precision, *Z* = 1.645 (the critical value for 90% confidence) and *d* = 0.10 (or 10% precision). The remaining parameter is *CV*, or the expected coefficient of variation of measures for which the claimed savings may be accepted. A *CV* of .5 was assumed for residential programs due to

the homogeneity of participation[9], which yields a sample size of 68 for an infinite population. Sample sizes were adjusted for smaller populations via the method detailed in Equation 2-2.

The following sections describe the Evaluator's methodology for conducting document-based verification and survey-based verification.

2.2.2.1 Document-Based Verification

The Evaluators requested rebate documentation for a subset of participating customers. These documents included invoices, rebate applications, pictures, and AHRI certifications for the following programs:

- Water Heat Program
- HVAC Program
- Shell Program
- Fuel Efficiency Program
- ENERGY STAR® Homes Program
- Small Home & MF Weatherization Program
- Multifamily Direct Install Program
- Appliances Program
- Low-Income Program

This sample of documents was used to cross-verify tracking data inputs. In the case the Evaluators found any deviations between the tracking data and application values, the Evaluators reported and summarized those differences in the Database Review sections presented for each program in Section 3.2 and Section 4.1.

The Evaluators developed a sampling plan that achieves a sampling precision of ±10% at 90% statistical confidence – or "90/10 precision" – to estimate the percentage of projects for which the claimed savings are verified or require some adjustment.

The Evaluators developed the following samples for each program's document review using Equation 2-1 and Equation 2-2. The Evaluators ensured representation in each state and fuel type for each measure.

[9] Assumption based off California Evaluation Framework:

https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/EE_and_Energy_Savings_Assist/CAEvaluationFramework.pdf

Table 2-1: Document-based Verification Samples and Precision by Program

Sector	Program	Gas Population	Sample (With Finite Population Adjustment)*	Precision at 90% CI
Residential	Water Heat	156	48	90% ± 9.76%
Residential	HVAC	1,641	65	90% ± 9.35%
Residential	Shell	383	58	90% ± 9.58%
Residential	ENERGY STAR® Homes	1	1	90% ± 0.00%
Residential	Small Home & MF Weatherization	132	45	90% ± 8.64%
Residential	Appliances	115	43	90% ± 9.79%
Residential	Midstream	578	61	90% ± 9.96%
Residential	Multifamily Direct Install	-	-	N/A
Low-Income	Low-Income	106	42	90% ± 10.52%
Total		**3,975**	**291**	**90% ± 4.06%**

*Assumes sample size of 68 for an infinite population, based on *CV* (coefficient of variation) = 0.5, *d* (precision) = 10%, *Z* (critical value for 90% confidence) = 1.645.

The table above represents the number of rebates in Idaho service territory only. The Evaluators ensured representation of state and fuel type in the sampled rebates for document verification.

2.2.2.2 Survey-Based Verification

The Evaluators conducted survey-based verification for the Water Heat Program, HVAC Program, and Appliances Program. The primary purpose of conducting a verification survey is to confirm that the measure was installed and is still currently operational and whether the measure was early retirement or replace-on-burnout.

The Evaluators summarize the final sample sizes of sampled Idaho Gas Avista projects shown in Table 2-2 for the programs listed. The Evaluators developed a sampling plan that achieved a sampling precision of ±5.80% at 90% statistical confidence for ISRs estimates at the measure-level during web-based survey verification.

Table 2-2: Survey-Based Verification Sample and Precision by Program

Sector	Program	Population	Respondents	Precision at 90% CI
Residential	Water Heat	156	24	90% ± 15.49%
Residential	HVAC	1,641	131	90% ± 6.90%
Residential	Appliances	115	27	90% ± 13.91%
Residential	Small Home & MF Weatherization	132	1	90% ± 82.25%
Total		**2,044**	**183**	**90% ± 5.80%**

The Evaluators implemented a web-based survey to complete the verification surveys. The findings from these activities served to estimate ISRs for each measure surveyed. These ISRs were applied to verification sample desk review rebates towards verified savings, which were then applied to the population of rebates. The measure-level ISRs resulting from the survey-based verification are summarized in Section 3.1.

2.2.2.3 Site-Specific Verification

For sampled projects in the Site-Specific program, the Evaluators conducted onsite visits to the facilities to verify installation, collected facility characteristic and collected any data needed to conducted savings calculations. In ID, one of two sites was visited to verify natural gas measures. Further details are available in the Site-Specific chapter.

2.2.3 Impact Evaluation Methodology

The Evaluators employed the following approach to complete impact evaluation activities for the programs. The Evaluators define two major approaches to determining net savings for Avista's programs:

- Deemed Savings
- Billing Analysis (IPMVP Option C)

The Site-Specific program also employed various IPMVP options, deepening upon the project and measure, and is discussed separately as it differs in approach from the approaches used in the remainder of the portfolio. In the following sections, the Evaluators summarize the general guidelines and activities followed to conduct each the deemed savings and billing analyses approaches above.

2.2.3.1 Deemed Savings

This section summarizes the deemed savings analysis method the Evaluators employed for the evaluation of a subset of measures for each program. The Evaluators completed the validation for specific measures across each program using the RTF unit energy savings (UES) values, where available. The Evaluators ensured the proper measure unit savings were recorded and used in the calculation of Avista's ex-ante measure savings. The Evaluators requested and used the technical reference manual Avista employed during calculation of ex-ante measure savings (Avista TRM). The Evaluators documented any cases where recommend values differed from the specific unit energy savings workbooks used by Avista.

In cases where the RTF has existing unit energy savings (UES) applicable to Avista's measures, the Evaluators verified the quantity and quality of installations and apply the RTF's UES to determine verified savings.

2.2.3.2 Billing Analysis

This section describes the billing analysis methodology employed by the Evaluators as part of the impact evaluation and measurement of energy savings for measures with sufficient participation. The Evaluators performed billing analyses with a matched control group and utilized a quasi-experimental method of producing a post-hoc control group. In program designs where treatment and control customers are not randomly selected at the outset, such as for downstream rebate programs, quasi-experimental designs are required.

For the purposes of this analysis, a household is considered a treatment household if it has received a program incentive. Additionally, a household is considered a control household if the household has not

received a program incentive. To isolate measure impacts, treatment households are eligible to be included in the billing analysis if they installed only one measure during the 2023 program year. Isolation of individual measures is necessary to provide valid measure-level savings. Households that installed more than one measure may display interactive energy savings effects across multiple measures that are not feasibly identifiable. Therefore, instances where households installed isolated measures are used in the billing analyses. In addition, the pre-period identifies the period prior to measure installation while the post-period refers to the period following measure installation.

The Evaluators utilized propensity score matching (PSM) to match nonparticipants to similar participants using pre-period billing data. PSM allows the evaluators to find the most similar household based on the customers' billed consumption trends in the pre-period and verified with statistical difference testing.

After matching based on these variables, the billing data for treatment and control groups are compared, as detailed in IPMVP Option C. The Evaluators fit regression models to estimate weather-dependent daily consumption differences between participating customer and nonparticipating customer households.

2.2.3.3 Cohort Creation

The PSM approach estimates a propensity score for treatment and control customers using a logistic regression model. A propensity score is a metric that summarizes several dimensions of household characteristics into a single metric that can be used to group similar households. The Evaluators created a post-hoc control group by compiling billing data from a subset of nonparticipants in the Avista territory to compare against treatment households using quasi-experimental methods. This allowed the Evaluators to select from a large group of similar households that have not installed an incented measure. With this information, the Evaluators created statistically valid matched control groups for each measure via seasonal pre-period usage. The Evaluators matched customers in the control group to customers in the treatment group based on nearest seasonal pre-period usage (e.g., summer, spring, fall, and winter) and exact 3-digit zip code matching (the first three digits of the five-digit zip code). After matching, the Evaluators conducted a *t*-test for each month in the pre-period to help determine the success of PSM.

While it is not possible to guarantee the creation of a sufficiently matched control group, this method is preferred because it is likely to have more meaningful results than a treatment-only analysis. Some examples of outside variables that a control group can sufficiently control for are changes in economies and markets, large-scale social changes, or impacts from weather-related anomalies such as flooding or hurricanes.

After PSM, the Evaluators ran the following regression models for each measure:

- Fixed effect Difference-in-Difference (D-n-D) regression model (recommended in UMP protocols)[10]
- Random effects post-program regression model (PPR) (recommended in UMP protocols)

[10] National Renewable Energy Laboratory (NREL) Uniform Methods Project (UMP) Chapter 17 Section 4.4.7.

- Gross billing analysis (treatment only)

The second model listed above (PPR) was selected because it had the best fit for the data, identified using the adjusted R-squared. Further details on regression model specifications can be found below.

2.2.3.4 Data Collected

The following lists the data collected for the billing analysis:

1. Monthly billing data for program participants (treatment customers)
2. Monthly billing data for a group of non-program participants (control customers)
3. Program tracking data, including customer identifiers, address, and date of measure installation
4. National Oceanic and Atmospheric Administration (NOAA) weather data between January 1, 2022 and December 31, 2023)
5. Typical Meteorological Year (TMY3) data

Billing and weather data were obtained for program year 2023 and for one year prior to measure install dates (2022).

Weather data was obtained from the nearest weather station with complete data during the analysis years for each customer by mapping the weather station location with the customer zip code.

TMY weather stations were assigned to NOAA weather stations by geocoding the minimum distance between each set of latitude and longitude points. This data is used for extrapolating savings to long-run, 30-year average weather.

2.2.3.5 Data Preparation

The following steps were taken to prepare the billing data:

1. Gathered billing data for homes that participated in the program.
2. Excluded participant homes that also participated in the other programs, if either program disqualifies the combination of any other rebate or participation.
3. Gathered billing data for similar customers that did not participate in the program in evaluation.
4. Excluded bills missing address information.
5. Removed bills missing fuel type/Unit of Measure (UOM).
6. Removed bills missing usage, billing start date, or billing end date.
7. Remove bills with outlier durations (<9 days or >60 days).
8. Excluded bills with consumption indicated to be outliers.
9. Remove duplicate bills and any bills with overlapping billing periods. If two billing periods overlapped, the bill with a start date that matched the previous bill's end date was included and the other bill was excluded. For example, if overlapping bill 1 had a 02/19/2023 start date, overlapping bill 2 had a 02/25/2023 start date, and the previous bill had a 02/19/2023 end date,

overlapping bill 2 would be removed. If there was no previous bill, the overlapping bill with the earlier start date was included and the other overlapping bill was removed.

10. Calendarized bills (recalculates billing dates, usage, and total billed days such that bills begin and end at the start and end of each month).
11. Obtained weather data from nearest NOAA weather station using 5-digit zip code per household.
12. Computed Heating Degree Days (HDD) and Cooling Degree Days (CDD) for a range of setpoints. The Evaluators assigned a setpoint of 65°F for both HDD and CDD. The Evaluators tested and selected the optimal temperature base for HDDs and CDDs based on model *R*-squared values.
13. Removed measure cohorts without at least 75 treatment customers.
14. Selected treatment customers with only one type of measure installation during the analysis years and combined customer min/max install dates with billing data (to define pre- and post-periods).
15. Restricted to treatment customers with install dates in specified range (typically January 1, 2023 through June 30, 2023) to allow for sufficient post-period billing data.
16. Restricted to control customers with usage less than or equal to two times the maximum observed treatment group usage. This has the effect of removing control customers with incomparable usage relative to the treatment group.
17. Removed customers with incomplete post-period bills (<6 months).
18. Removed customers with incomplete pre-period bills.
19. Restricted control customers to those with usage that was comparable with the treatment group usage.
20. Created a matched control group using PSM and matching on pre-period seasonal usage and zip code.

2.2.3.6 Regression Models

The Evaluators ran the following models for matched treatment and control customers for each measure with sufficient participation. For net savings, the Evaluators selected either Model 1 or Model 2. The model with the best fit (highest adjusted R-squared) was selected. The Evaluators utilized Model 3 to estimate gross energy savings.

Model 1: Fixed Effects Difference-in-Difference Regression Model

The following equation displays the first model specification to estimate the average daily savings due to the measure.

Equation 2-3: Fixed Effects Difference-in-Difference (D-n-D) Model Specification

$$sADC_{it} = \alpha_0 + \beta_1(Post)_{it} + \beta_2(Post \times Treatment)_{it} + \beta_3(HDD)_{it} + \beta_4(CDD)_{it} + \beta_5(Post \times HDD)_{it} + \beta_6(Post \times CDD)_{it} + \beta_7(Post \times HDD \times Treatment)_{it} + \beta_8(Post \times CDD \times Treatment)_{it} + \beta_9(Month)_t + \beta_{10}(Customer\ Dummy)_i + \varepsilon_{it}$$

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage reading *t* for household *i* during the post-treatment period
- $Post_{it}$ = A dummy variable indicating pre- or post-period designation during period *t* at home *i*
- $Treatment_i$ = A dummy variable indicating treatment status of home *i*
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*
- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home i *(if electric usage)*
- $Month_t$= A set of dummy variables indicating the month during period *t*
- $Customer\ Dummy_i$ = a customer-specific dummy variable isolating individual household effects
- ε_{it} = The error term
- α_0= The model intercept
- β_{1-10} = Coefficients determined via regression

The Average Daily Consumption (ADC) is calculated as the total monthly billed usage divided by the duration of the bill month. β_2 represents the average change in daily baseload in the post-period between the treatment and control group and β_7 and β_8 represent the change in weather-related daily consumption in the post-period between the groups. Typical monthly and annual savings were estimated by extrapolating the β_7 and β_8 coefficients with Typical Meteorological Year (TMY) HDD and CDD data. However, in the case of gas usage, only the coefficient for HDD is utilized because CDDs were not included in the regression model.

The equation below displays how savings were extrapolated for a full year utilizing the coefficients in the regression model and TMY data. TMY data is weighted by the number of households assigned to each weather station.

Equation 2-4: Savings Extrapolation

$$Annual\ Savings = \beta_2 * 365.25 + \beta_7 * TMY\ HDD + \beta_8 * TMY\ CDD$$

Model 2: Random Effects Post-Program Regression Model

The following equation displays the second model specification to estimate the average daily savings due to the measure. The post-program regression (PPR) model combines both cross-sectional and time series data in a panel dataset. This model uses only the post-program data, with lagged energy use for the same calendar month of the pre-program period acting as a control for any small systematic

differences between the treatment and control customers; in particular, energy use in calendar month *t* of the post-program period is framed as a function of both the participant variable and energy use in the same calendar month of the pre-program period. The underlying logic is that systematic differences between treatment and control customers will be reflected in the differences in their past energy use, which is highly correlated with their current energy use. These interaction terms allow pre-program usage to have a different effect on post-program usage in each calendar month.

The model specification is as follows:

Equation 2-5: Post-Program Regression (PPR) Model Specification

$$\begin{aligned} ADC_{it} = \alpha_0 &+ \beta_1(Treatment)_i + \beta_2\,(PreUsageSpring)_i + \beta_3(PreUsageSummer)_i \\ &+ \beta_4(PreUsageFall)_i + \beta_5(PreUsageWinter)_i + \beta_6(Month)_t \\ &+ \beta_7(Month \times PreUsageSpring)_{it} + \beta_8(Month \times PreUsageSummer_{)it} \\ &+ \beta_9(Month \times PreUsageFall)_{it} + \beta_{10}(Month \times PreUsageWinter)_{it} + \beta_{11}(HDD)_{it} \\ &+ \beta_{12}(CDD)_{it} + \beta_{13}(Treatment \times HDD)_{it} + \beta_{14}(Treatment \times CDD)_{it} + \varepsilon_{it} \end{aligned}$$

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage for reading *t* for household *i* during the post-treatment period
- $Treatment_i$ = A dummy variable indicating treatment status of home *i*
- $Month_t$ = Dummy variable indicating month of month *t*
- $PreUsageSpring_i$ = Average daily usage in the spring months across household *i*'s available pre-treatment billing reads
- $PreUsageSummer_i$ = Average daily usage in the summer months across household *i*'s available pretreatment billing reads
- $PreUsageFall_i$ = Average daily usage in the fall months across household *i*'s available pretreatment billing reads
- $PreUsageWinter_i$ = Average daily usage in the winter months across household *i*'s available pre-treatment billing reads
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*
- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home i *(if electric usage)*
- ε_{it} = Customer-level random error
- α_0= The model intercept for home *i*
- β_{1-14} = Coefficients determined via regression

The coefficient β_1 represents the average change in consumption between the pre-period and post-period for the treatment group and β_{13} and β_{14} represent the change in weather-related daily consumption in the post-period between the groups. Typical monthly and annual savings were estimated by extrapolating the β_{13} and β_{14} coefficients with Typical Meteorological Year (TMY) HDD and CDD data.

The equation below displays how savings were extrapolated for a full year utilizing the coefficients in the regression model and TMY data.

Equation 2-6: Savings Extrapolation

$$Annual\ Savings = \beta_1 * 365.25 + \beta_{11} * TMY\ HDD + \beta_{12} * TMY\ CDD$$

Model 3: Gross Billing Analysis, Treatment-Only Regression Model

The sections above detail the Evaluator's methodology for estimating net energy savings for each measure. The results from the above methodology report net savings due to the inclusion of the counterfactual comparison group. However, for planning purposes, it is useful to estimate gross savings for each measure. To estimate gross savings, the Evaluators employed a similar regression model; however, only including participant customer billing data. This analysis does not include control group billing data and therefore models energy reductions between the pre-period and post-period for the measure participants (treatment customers).

To calculate the impacts of each measure, the Evaluators applied linear fixed effects regression using participant billing data with weather controls in the form of Heating Degree Days (HDD) and Cooling Degree Days (CDD). The following equation displays the model specification to estimate the average daily savings due to the measure.

Equation 2-7: Treatment-Only Fixed Effects Weather Model Specification

$$ADC_{it} = \alpha_0 + \beta_1(Post)_{it} + \beta_2(HDD)_{it} + \beta_3(CDD)_{it} + \beta_4(Post \times HDD)_{it} + \beta_5(Post \times CDD)_{it} + \beta_6(Customer\ Dummy)_i + \beta_7(Month)_t + \varepsilon_{it}$$

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage for reading *t* for household *i* during the post-treatment period
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*
- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i (if electric usage)*
- $Post_{it}$ = A dummy variable indicating pre- or post-period designation during period *t* at home *i*
- $Customer\ Dummy_i$ = a customer-specific dummy variable isolating individual household effects
- ε_{it} = Customer-level random error
- α_0= The model intercept for home *i*
- β_{1-7} = Coefficients determined via regression

The results of the treatment-only regression models are gross savings estimates. The gross savings estimates are useful to compare against the net savings estimates. However, the treatment-only models are unable to separate the effects of national or regional events like a pandemic, recession, or weather event. For example, the pre-period and post-period for PY2023 may have been affected by changes in

remote work in Washington due to the tail end of the COVID-19 pandemic. Therefore, the results from this additional gross savings analysis are unable to reflect actual typical year savings. However, for planning purposes, these estimates may be useful.

2.2.3.7 Billing Heating Load Estimation

In addition to the regression based IPMVP Option C billing analysis, the Evaluators also employed a heating load estimation billing analysis. Heating load estimation is a prime methodology for estimating savings associated with space heating measures such as furnaces. This methodology follows IPMVP Option A, in which the estimation of a key parameter is used to calculate savings. The heating load estimation methodology follows the same data collection and data preparation steps outlined in Section 2.2.3.4 and Section 2.2.3.5, respectively. However, instead of ending with a regression analysis, post-period billing data are used to estimate customer heating load, which is used as an input in a deemed savings formula to calculate energy savings.

The first step in heating load estimation is calculating TMY3 weather normalized average daily consumption. To do so, customer-specific regressions are run to determine the effect of daily HDD on average daily consumption. This is a straightforward regression of the form:

Equation 2-8: Heating Load Regression

$$ADC_i = \alpha_0 + \beta_1 (HDD)_i$$

Where,

- *i* = the *i*th household
- ADC_i = Average daily usage for household *i* during the post-treatment period
- HDD_i = Average heating degree days (base with optimal Degrees Fahrenheit) at home *i*
- β_1 = Coefficient determined via regression

This regression is run separately for each customer to determine β_1, impact of HDD on average daily consumption (i.e., the change in Therms usage per HDD). From there, β_1 multiplied by HDD is subtracted from ADC and $\beta_1$multiplied by TMY3_HDD is added back to ADC to calculate TMY3 weather normalized average daily consumption. The actual HDD attributable Therms usage is subtracted from average daily consumption and the TMY_HDD attributable Therms are added back in, as outlined in the following equation.

Equation 2-9: Normalized Average Daily Consumption

$$NADC_i = ADC_i - \beta_1 * (HDD)_i + \beta_1 * (TMY\_HDD)_i$$

Where,

- *i* = the *i*th household
- $NADC_i$ = TMY normalized average daily usage for household *i* during the post-treatment period
- β_1 = Customer-specific Therms usage per HDD
- ADC_i = Average daily usage for household *i* during the post-treatment period
- HDD_i = Average heating degree days (base with optimal Degrees Fahrenheit) at home *i*

- TMY_HDD_i = Average TMY heating degree days at home *i*

Once TMY normalized average daily usage is calculated, the penultimate step to heat load estimation is calculating customer baseload usage. Customer baseload usage represents the energy customers use for non-heating needs, such as a gas stove or dryer. For gas heating measures, customer baseload usage can be calculated as the average NADC across June, July, and August. Customer-specific baseload usage is then subtracted from NADC and to determine customer daily heating load.

Customer heating loads are then used in the following deemed savings equation to calculate the annual savings associated with gas furnace installation.

Equation 2-10: Gas Furnace Savings

$$Savings_i = 365 * HL_i * (\frac{1}{Base_i} - \frac{1}{Eff_i})$$

Where,

- *i* = the *i*th household
- $Savings_i$ = Annual Therms savings for household *i* based on post-treatment period billing data
- 365 = Days in the year
- HL_i = Customer-specific daily heating load for household *i*
- $Base_i$ = Baseline furnace efficiency at home *i*, which is assumed to be 85.5% per the RTF Gas Furnace UES Measure[11]
- Eff_i = Installed furnace efficiency at home *i*, which is assumed to be 95%

2.2.4 Net-To-Gross

The Northwest RTF UES measures do not require NTG adjustments as they are built into the deemed savings estimates. In addition, billing analyses with counterfactual control groups, as proposed in our impact methodology, does not require a NTG adjustment, as the counterfactual represents the efficiency level at current market (i.e. the efficiency level the customer would have installed had they not participated in the program).

2.2.5 Non-Energy Benefits

The Evaluators used the Regional Technical Forum (RTF) to quantify non-energy benefits (NEBs) for residential measures with established RTF values where available. Measures with quantified NEBs include residential insulation, high efficiency windows, air source heat pumps, and ductless heat pumps.

In addition to the residential NEBs, the Evaluators applied the end-use non-energy benefit and health and human safety non-energy benefit to the Low-Income Program. The Evaluators understand that the two major non-energy benefits referenced above are uniquely applicable to the Low-Income Program. The Evaluators applied those benefits to the program impacts as well as additional non-energy benefits associated with individual measures included in the program. The Evaluators incorporated additional

[11] https://rtf.nwcouncil.org/measure/residential-gas-furnaces/

NEBs to the impact evaluation, as applicable. Additional details on the non-energy benefits applied can be found in Section 2.2.5.

3. Residential Impact Evaluation Results

The Evaluators completed an impact evaluation on Avista's Residential portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each natural gas impact evaluation in the Residential Portfolio in the Idaho service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, RTF, and billing analysis of participants and nonparticipants to evaluate savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data. Table 3-1 summarizes the Residential verified impact savings by program.

Table 3-1: Residential Verified Impact Savings by Program

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Water Heat	10,125	9,051	89.39%
HVAC	87,728	85,264	97.19%
Shell	19,541	18,117	92.71%
Fuel Efficiency	0	0	-
ENERGY STAR Homes	134	134	100.00%
Small Home & MF Weatherization	5,540	5,445	98.29%
Appliances	605	396	65.53%
Multifamily Direct Install	227	227	100.00%
Midstream	138,707	48,830	35.20%
Total Res	**262,607**	**167,465**	**63.77%**

In PY2023, Avista completed and provided incentives for residential natural gas measures in Idaho and reported total natural gas savings of 167,465 Therms, leading to an overall achievement of 63.77% of the expected savings for the residential programs. Further details of the impact evaluation results by program are provided in the sections following.

3.1 Simple Verification Results

The Evaluators surveyed 2,229 unique customers that participated in Avista's residential energy efficiency program from October 2022 and in December 2023 using an email survey approach. The Evaluators surveyed customers that received rebates for HVAC, Water Heater, Shell, Small Home & MF Weatherization, and Appliance Programs.

Table 3-2: Summary of Survey Response Rate

Population	Respondents
Initial email contact list	8,262
Invalid or bounced	416
Invalid or bounced email (%)	5.0%
Invitations sent (unique valid)	7,846
Completions	2,229
Response rate (%)	28.4%

3.1.1 In-Service Rates

The Evaluators calculated in-service rates of installed measures from simple verification surveys deployed to program participants for the Water Heat and HVAC Programs. The Fuel Efficiency program was surveyed for the electric measures; the sample is provided in the Idaho Electric Impact Evaluation report and does not contribute to the precision for the Idaho Gas impacts. The Evaluators asked participants if the rebated equipment is currently installed and working, in addition to questions about the new equipment fuel type. The Evaluators achieved ±5.80% precision across the programs surveyed for the natural gas measures in Avista's Idaho service territory, summarized in Table 3-3. When summarizing Idaho and Washington in-service rates, the Evaluators achieved ±5.51% precision across the programs, summarized in Table 3-4.

Table 3-3: State-Level Simple Verification Precision by Program

Sector	Program	Population	Respondents	Precision at 90% CI
Residential	Water Heat	156	24	90% ± 15.49%
Residential	HVAC	1,641	131	90% ± 6.90%
Residential	Appliances	115	27	90% ± 13.91%
Residential	Small Home & MF Weatherization	132	1	90% ± 82.25%
Total		**2,044**	**183**	**90% ± 5.80%**

Table 3-4: Mixed State-Level Simple Verification Precision by Program

Sector	Program	Population	Respondents	Precision at 90% CI
Residential	Water Heat	156	48	90% ± 15.49%
Residential	HVAC	1,641	65	90% ± 6.90%
Residential	Appliances	115	43	90% ± 13.91%
Residential	Small Home & MF Weatherization	132	45	90% ± 82.25%
Total		**2,044**	**201**	**90% ± 5.51%**

The measure-level ISRs determined from the verification survey for each program in which simple verification was conducted is presented in the tables below. The tables below summarize Idaho-level (state-level) respondents and ISR as well as Idaho and Washington-level (mixed state-level) respondents and ISR.

Table 3-5: Water Heat Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
G 50 Gallon Natural Gas Water Heater	4	100%	21	100%	Mixed state ISR
G Tankless Water Heater	20	100%	59	100%	Mixed state ISR

Table 3-6: HVAC Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
G FURNACE 95% (Multi-Stage or Modulating)	No Participation	N/A	54	100%	State-specific ISR
G FURNACE 95% (Multi-Stage)	No Participation	N/A	2	100%	State-specific ISR
G Natural Gas Boiler 96%+	No Participation	N/A	1	100%	State-specific ISR
G Natural Gas Boiler 95%	4	100%	14	100%	State-specific ISR
G Natural Gas Furnace	58	98%	98	98%	State-specific ISR
G Natural Gas Wall Furnace	1	100%	2	100%	State-specific ISR
G Smart Thermostat DIY with Natural Gas Heat	21	100%	52	100%	State-specific ISR
G Smart Thermostat Paid Install with Natural Gas Heat	47	100%	121	100%	State-specific ISR

Table 3-7: Small Home & MF Weatherization Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
G Multifamily 50 Gallon Natural Gas Water Heater*	0	100%	0	100%	Assume 100% ISR
G Multifamily Attic Insulation With Natural Gas Heat*	0	100%	0	100%	Assume 100% ISR
G Multifamily Energy Star Certified Insulated Door*	0	100%	0	100%	Assume 100% ISR
G Multifamily Energy Star Rated Front Load Washer*	0	100%	0	100%	Assume 100% ISR
G Energy Star Rated Front Load Washer*	No Participation	N/A	No Participation	100%	Assume 100% ISR
G Multifamily Energy Star Rated Top Load Washer*	0	100%	0	100%	Assume 100% ISR
G Multifamily FURNACE 95% (Multi-Stage)*	No Participation	N/A	0	100%	Assume 100% ISR
G Multifamily Natural Gas Boiler*	0	100%	0	100%	Assume 100% ISR
G Multifamily Natural Gas Furnace*	0	100%	0	100%	Assume 100% ISR
G Multifamily Smart Thermostat DIY with Natural Gas Heat*	0	100%	0	100%	Assume 100% ISR
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat*	1	100%	1	100%	Assume 100% ISR
G Multifamily Tankless Water Heater*	0	100%	0	100%	Assume 100% ISR
G Multifamily Window DIY Replc With Natural Gas Heat*	No Participation	N/A	0	100%	Assume 100% ISR
G Multifamily Window Replc With Natural Gas Heat*	0	100%	0	100%	Assume 100% ISR
G Multifamily Energy Star Rated Clothes Dryer*	No Participation	N/A	0	100%	Assume 100% ISR

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
G Multifamily Wall Insulation With Natural Gas Heat*	0	100%	0	100%	Assume 100% ISR

*These measures did not receive enough responses to meet 90/10 precision and therefore 100% in-service rate is assumed

Table 3-8: Appliances Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
G Energy Star Rated Clothes Dryer	6	100%	10	100%	Mixed state ISR
G Energy Star Rated Front Load Washer	14	100%	29	100%	Mixed state ISR
G Energy Star Rated Top Load Washer	7	86%	21	95%	Mixed state ISR

These ISR values were utilized in the desk reviews for the Water Heat, HVAC, Small Home & MF Weatherization, and Appliance Programs in order to calculate verified savings. Additional insights from the survey responses are summarized in Appendix B: Summary of Survey Respondents.

3.2 Program-Level Impact Evaluation Results

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Residential sector in the section below.

3.2.1 Water Heat Program

The Water Heat Program encourages customers to replace their existing electric or natural gas water heater with high efficiency equipment. Customers receive incentives after installation and after submitting a completed rebate form. Table 3-9 summarizes the gas measures offered under this program.

Table 3-9: Water Heat Program Measures

Measure	Description	Impact Analysis Methodology
G 50 Gallon Natural Gas Water Heater	Storage tank natural gas water heater, 50 gallons or less	Avista TRM
G Tankless Water Heater	Tankless natural gas water heater	Avista TRM

The following table summarizes the verified natural gas savings for the Water Heat Program impact evaluation.

Table 3-10: Water Heat Program Verified Natural Gas Savings

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G 50 Gallon Natural Gas Water Heater	19	305	414	305	100.00%
G Tankless Water Heater	137	9,820	9,590	8,746	89.06%
Total	**156**	**10,125**	**10,004**	**9,051**	**89.39%**

The Water Heat Program displayed verified savings of 9,051 Therms with a realization rate of 89.39% against the expected savings for the program. The following table summarizes the incentive costs from the program.

Table 3-11: Water Heat Program Costs

Measure	Incentive Costs
G 50 Gallon Natural Gas Water Heater	$1,300.00
G Tankless Water Heater	$54,800.00
Total	**$56,100.00**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Water Heat Program in the section below.

3.2.1.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Water Heat Program.

3.2.1.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Water Heat Program. The Evaluators selected a subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.1.

The Evaluators found all Water Heat Program rebates to have completed rebate applications with the associated water heater model number and efficiency values filled in either the Customer Care & Billing (CC&B) web rebate data or mail-in rebate applications.

In addition, the Evaluators note that the CC&B web rebate data reflected consistent values between the mail-in rebate applications, invoices, and AHRI certification documents submitted with the rebate application. The Evaluators found six deviations, however. The Evaluators found that for two G 50 Gallon Natural Gas Water Heaters, no savings were claimed. In addition, the Evaluators found four G Tankless Water Heater project documentation reflected boilers; the Evaluators therefore removed savings from these sampled projects.

3.2.1.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure. The Evaluators included questions such as:

- Was this water heater a new construction, or did it replace another water heater?

- Was the previous water heater functional?
- Is the newly installed water heater still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Water Heat Program.

Table 3-12 displays the ISRs for each of the Water Heat measures for Idaho and Washington territory combined.

Table 3-12: Water Heat Verification Survey ISR Results

Measure	Number of Rebates*	Number of Survey Completes	Program-Level Precision at 90% Confidence	In-Service Rate
G 50 Gallon Natural Gas Water Heater	78	21	90% ±8.31%*	100%
G Tankless Water Heater	355	59		100%

*This count includes rebates from Washington and Idaho

All survey respondents for each water heater measure described equipment to be currently functioning, leading to a 100% ISR. The Evaluators applied these ISRs to each rebate to quantify verified savings for each measure.

3.2.1.4 Impact Analysis

This section summarizes the verified savings results for the Water Heat Program. The Evaluators conducted a billing analysis for measures where participation allowed. The Evaluators calculated verified savings for the remaining measures using active values from the Avista TRM workbook. These values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.1.5 Billing Analysis

The results of the billing analysis for the Water Heat Program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Table 3-13 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis.

Table 3-13: Measures Considered for Billing Analysis, Water Heat Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations	Sufficient Participation for Billing Analysis
G 50 Gallon Natural Gas Water Heater	✓	51	
G Tankless Gas Water Heater	✓	225	✓

*This count includes rebates from Washington and Idaho

The Evaluators were provided a considerable pool of control customers to draw upon. The Evaluators used nearest neighbor matching with a 5 to 1 matching ratio. Therefore, each treatment customer was

matched to 5 similar control customers. The final number of customers in each the treatment and control group are listed in Table 3-14.

The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 3-14 provides annual savings per customer for each measure. Model 2 (PPR) was selected as the final model for the Water Heat Program as it provided the highest adjusted R-squared among the regression model for the tankless water heat measure. However, savings for the G Tankless Water Heater are lower than RTF savings and therefore not used towards estimating verified savings for the measure.

Table 3-14: Measure Savings, Water Heat Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
G Tankless Water Heater	225	224	23.82	10.1	37.55	.91	Model 2: PPR

*Not statistically significant

The Evaluators selected to utilize the billing analysis values to estimate verified savings for these measures. Further details of the billing analysis for the tankless water heater measure can be found Appendix A: Billing Analysis Results.

3.2.1.6 Verified Savings

The Evaluators reviewed and applied the current Avista TRM values along with verified tracking data to estimate net program savings for this measure. The verified savings for the program is 9,050.75 Therms with a realization rate of 89.39%, as displayed in Table 3-10.

The realization rate for the natural gas savings in the tankless and storage tank water heater measures deviated from 100% realization due to differences in home type, heating zone, cooling zone, and efficiency level of the water heater.

The Evaluators found that many rebates did not have documentation filled for space heating type. The Evaluators recommend Avista verify heating type prior to completing rebates and ensure proper Avista TRM values are assigned for the specifications of the unique project.

3.2.2 HVAC Program

The HVAC program encourages installation of high efficiency HVAC equipment and smart Thermostats through customer incentives. The program is available to residential electric or natural gas customers

with a winter heating season usage of 4,000 or more kWh, or at least 160 Therms of space heating in the prior year. Existing or new construction homes are eligible to participate in the program. Table 3-15 summarizes the measures offered under this program.

Table 3-15: HVAC Program Measures

Measure	Description	Impact Analysis Methodology
G Smart Thermostat Paid Install with Natural Gas Heat	Professionally installed connected Thermostats in natural gas-heated home	Avista TRM
G Natural Gas Boiler 95%	Natural gas boiler	Avista TRM
G Natural Gas Furnace	Natural gas forced air furnace	Avista TRM
G Smart Thermostat DIY with Natural Gas Heat	Self-installed connected Thermostats in natural gas-heated home	Avista TRM
G Natural Gas Wall Furnace	Natural gas forced air furnace	Avista TRM

The following table summarizes the verified natural gas savings for the HVAC Program impact evaluation.

Table 3-16: HVAC Program Verified Natural Gas Savings

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Natural Gas Boiler 95%	708	19,101	19,154	20,374	106.67%
G Natural Gas Furnace	16	1,767	1,798	1,767	100.00%
G Smart Thermostat DIY with Natural Gas Heat	693	60,726	60,726	59,679	98.28%
G Smart Thermostat Paid Install with Natural Gas Heat	223	6,052	6,112	3,362	55.56%
G Natural Gas Wall Furnace	1	82	82	82	100.00%
Total	**1,641**	**87,728**	**87,873**	**85,264**	**97.19%**

The HVAC Program displayed verified savings of 85,264 Therms with a realization rate of 97.19% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-17: HVAC Program Costs

Measure	Incentive Costs
G Natural Gas Boiler 95%	$106,868.54
G Natural Gas Furnace	$7,200.00
G Smart Thermostat DIY with Natural Gas Heat	$314,100.00
G Smart Thermostat Paid Install with Natural Gas Heat	$26,356.27
G Natural Gas Wall Furnace	$450.00
Total	**$454,974.81**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the HVAC Program in the section below.

3.2.2.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the HVAC Program.

3.2.2.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the HVAC Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in in Section 2.2.2.1.

The Evaluators found all HVAC Program rebates to have project documentation with the associated HVAC model number and efficiency values in either the CC&B web rebate data or mail-in rebate applications. In addition, all projects contained associated AHRI certifications, allowing the Evaluators to easily verify model specifications.

3.2.2.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.2. The Evaluators included questions such as:

- What type of Thermostat did this Thermostat replace?
- Is your home heating with electricity, natural gas, or another fuel?
- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the HVAC Program. In addition, the Evaluators asked participants how the COVID19 pandemic stay-at-home orders have affected their household's energy consumption. The responses to these additional questions can be found in Appendix A: Billing Analysis Results.

Table 3-18 displays the ISRs for each of the HVAC measures for Idaho natural gas territory alone. The ISRs resulted in ±6.90% precision at the 90% confidence interval for the program.

Table 3-18: HVAC Verification Survey ISR Results

Measure	Number of Rebates*	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
G FURNACE 95% (Multi-Stage or Modulating)	0	No Participation	90% ±6.90%	N/A
G FURNACE 95% (Multi-Stage)	0	No Participation		N/A
G Natural Gas Boiler 96%+	0	No Participation		N/A
G Natural Gas Boiler 95%	708	4		100%
G Natural Gas Furnace	16	58		98%
G Natural Gas Wall Furnace	694	1		100%
G Smart Thermostat DIY with Natural Gas Heat	223	21		100%
G Smart Thermostat Paid Install with Natural Gas Heat	1	47		100%

*This count includes rebates from Idaho only

Survey respondents described equipment to be currently functioning, leading to a 100% ISR for all measures except the G Furnace 95% measure. Although less than 100%, the ISR for the referenced measure still met or exceeded ISRs of 98%. The Evaluators applied the ISRs listed in Table 3-18 to each rebate to quantify verified savings for each measure.

3.2.2.4 Impact Analysis

This section summarizes the verified savings results for the HVAC Program. The Evaluators conducted a billing analysis for measures where participation allowed, however, the results were inconclusive. The Evaluators calculated verified savings for the remaining measures using active values from the Avista TRM workbook. These values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.2.5 Billing Analysis

The results of the billing analysis for the HVAC program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Table 3-19 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis.

Table 3-19: Measures Considered for Billing Analysis, HVAC Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
G FURNACE 95% (Multi-Stage)	✓	187	✓
G Natural Gas Boiler	✓	2	
G Natural Gas Furnace	✓	1,053	✓
G Smart Thermostat DIY with Natural Gas Heat	✓	427	✓
G Smart Thermostat Paid Install with Natural Gas Heat	✓	608	✓
G FURNACE 95% (Multi-Stage)	✓	187	✓

*This count includes rebates from Washington and Idaho

The Evaluators were provided a considerable pool of control customers to draw upon. The Evaluators used nearest neighbor matching with a 5 to 1 matching ratio. Therefore, each treatment customer was matched to 5 similar control customers. The final number of customers in each the treatment and control group are listed in Table 3-20.

The Evaluators performed three tests to determine the success of PSM:

4. *t*-test on pre-period usage by month
5. Joint chi-square test to determine if any covariates are imbalanced
6. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 3-20 provides annual savings per customer for each measure. Model 2 (PPR) was selected as the final model for the HVAC Program as it provided the highest adjusted R-squared among the regression models. Savings are not statistically significant at the 90% level for the DIY smart Thermostat measure.

Table 3-20: Measure Savings, HVAC Program

Measure	Treatment Cust	Control Cust	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
G FURNACE 95% (Multi-Stage)	187	183	20.28	37.19	3.36	0.91	Model 2: PPR
G Natural Gas Furnace	1053	1,019	13.82	20.23	7.41	0.92	Model 2: PPR
G Smart Thermostat Paid Install with Natural Gas Heat	427	422	13.78	23.69	3.87	0.92	Model 2: PPR
G Smart Thermostat DIY with Natural Gas Heat	608	594	-1.5*	5.64	-8.64	0.94	Model 2: PPR

*Not statistically significant

Because the results from these billing analyses are contradicting and/or inconclusive, the Evaluators elected to utilize Avista TRM values to estimate verified savings for the smart thermostat measures. Details for this analysis are provided in the following section. Further details of the billing analysis can be found Appendix A: Billing Analysis Results.

3.2.2.6 Verified Savings

The HVAC Program in total displays a verified savings of 85,350 Therms with a realization rate of 97.19% in the Idaho service territory, as displayed in Table 3-16.

The realization rate for the natural gas savings in the HVAC Program deviates from 100% due to verification activities which confirmed that four of the nine sampled G Smart Thermostat DIY with Natural Gas Heat projects lacked qualification for savings due to lack of occupancy senor or geolocation capabilities. The Evaluators recommend Avista confirm qualification of smart thermostats prior to rebating the project.

All other rebates were assigned savings equivalent to the expected savings through Avista TRM values.

3.2.3 Shell Program

The Shell Program provides incentives to customers for improving the integrity of the home's envelope with upgrades to windows and storm windows. Rebates are issued after the measure has been installed for insulation and window measures. Participating homes must have natural gas or natural gas heating and itemized invoices including measure details such as insulation levels, window values, and square footage. In order to be eligible for incentive, the single-family households, including fourplex or less, must demonstrate an annual electricity usage of at least 8,000 kWh or an annual gas usage of at least 340 Therms. Multifamily homes have no usage requirement. This program includes free manufactured home duct sealing implemented by UCONS. Table 3-21 summarizes the measures offered under this program.

Table 3-21: Shell Program Measures

Measure	Description	Impact Analysis Methodology
G Attic Insulation With Natural Gas Heat	Attic insulation for homes heated with natural gas	Avista TRM
G Energy Star Certified Insulated Door	ENERGY STAR-certified door for homes heated with natural gas	Avista TRM
G Floor Insulation With Natural Gas Heat	Floor insulation for homes heated with natural gas	Avista TRM
G Wall Insulation With Natural Gas Heat	Wall insulation for homes heated with natural gas	Avista TRM
G Window DIY Replc With Natural Gas Heat	High-efficiency window replacement for homes heated with natural gas, installed by the home owner	Avista TRM
G Window Replc With Natural Gas Heat	High-efficiency window replacement for homes heated with natural gas, installed by a contractor	Avista TRM

The following table summarizes the adjusted and verified natural gas savings for the Shell Program impact evaluation.

Table 3-22: Shell Program Verified Natural Gas Savings

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Attic Insulation With Natural Gas Heat	64	5,284	4,917	3,863	73.12%
G Energy Star Certified Insulated Door	42	1,667	1,147	1,875	112.50%
G Floor Insulation With Natural Gas Heat	8	166	150	84	50.68%
G Wall Insulation With Natural Gas Heat	11	405.45	431.45	0	0.00%
G Window DIY Replc With Natural Gas Heat	8	353	353	371	105.04%
G Window Replc With Natural Gas Heat	250	11,666	12,097	11,923	102.20%
Total	**383**	**19,541**	**19,095**	**18,117**	**92.71%**

The Shell Program displayed verified savings of 18,117 Therms with a realization rate of 92.71% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-23: Shell Program Costs

Measure	Incentive Costs
G Attic Insulation With Natural Gas Heat	$59,286.00
G Energy Star Certified Insulated Door	$6,000.00
G Floor Insulation With Natural Gas Heat	$5,068.38
G Wall Insulation With Natural Gas Heat	$5,246.75
G Window DIY Replc With Natural Gas Heat	$1,857.72
G Window Replc With Natural Gas Heat	$127,093.94
Total	**$204,552.79**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Shell Program in the section below.

3.2.3.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Shell Program.

3.2.3.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Shell Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.1.

The Evaluators reviewed each measure number of units, square footage, and insulation where available.

The Evaluators identified one Energy Star Door measure in which two doors were installed but the expected savings only accounted for one door, leading to a verified savings that was double the expected amount. This occurrence increased the realization rate to 113% for Energy Star certified insulated door measures as shown in Table 3-22

3.2.3.3 Verification Surveys

The Evaluators conducted verification surveys for Energy Star doors in Shell Program and found an in-service rate of 100%. The Evaluators did not conduct verification surveys for other measures in shell since weatherization measures historically have high verification rates.

3.2.3.4 Impact Analysis

This section summarizes the verified savings results for the Shell Program. The Evaluators calculated verified savings for the natural gas measures using the active Avista TRM values. The Evaluators calculated adjusted savings for each measure using the active Avista TRM values and verified tracking data. The Evaluators conducted a billing analysis for measures where participation allowed. However, the billing analysis results were not used due to unexpectedly low savings values. Therefore, the Avista TRM values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.3.5 Billing Analysis

The results of the billing analysis for the Shell program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Table 3-24 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis. The customers considered for attic insulation billing analysis include customers in both Washington and Idaho service territories to gather the maximum number of customers possible for precise savings estimates. Window was evaluated for ID alone.

Table 3-24: Measures Considered for Billing Analysis, Shell Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
G Attic Insulation With Natural Gas Heat	✓	97*	✓
G Window Replc With Natural Gas Heat	✓	342*	✓
G Attic Insulation and G Window Replc With Natural Gas Heat	✓	439*	✓

*This count includes rebates from Washington and Idaho

The Evaluators were provided a considerable pool of control customers to draw upon.. The final number of customers in each the treatment and control group are listed in Table 3-25.

The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 3-25 provides annual savings per customer for each measure. Model 2 (PPR) was selected as the final model for the Shell Program as it provided the highest adjusted R-squared among the regression models. Savings are statistically significant at the 90% level for all measures and the adjusted R-squared shows the model provided an excellent fit for the data (adjusted R-squared > 0.90).

Table 3-25: Measure Savings, Shell Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
G Attic Insulation With Natural Gas Heat	97	436	132.50*	36.06	228.93	0.92	Model 2: PPR
G Window Replc With Natural Gas Heat	342	436	140.13*	68.55	211.72	0.93	Model 2: PPR
G Attic Insulation and G Window Replc With Natural Gas Heat	439	436	148.80	77.00	220.6	0.93	Model 2: PPR

T The Evaluators found the G Attic Insulation and G Window Replacement measures with Natural Gas Heat display a statistically significant verified savings value of 148.80 Therms per year. Although the Evaluators estimated savings for these measures through billing analysis, the verified savings for the measures were calculated via Avista TRM due to much higher than expected billing analysis results. Further details of the billing analysis for the Shell measures can be found in Appendix A.

3.2.3.6 Verified Savings

The Shell Program in total displays a realization rate of 92.71% with 18,117 Therms verified natural gas savings in the Idaho service territory, as displayed in Table 3-22. The realization rate for the natural gas savings in the Shell Program is higher than 100% due primarily to differences in quantity in the tracking data and the verified documentation, which indicated for some project insufficient information for verified savings application, or quantity differences.

3.2.4 Fuel Efficiency Program

The Residential Fuel Efficiency Program encourages customers to consider converting their resistive electric space and water heating equipment to natural gas. This program is offered to residential customers in the Idaho service territory. Customers must use Avista electricity for electric straight-resistance heating or water heating to qualify for the rebate, which is verified by evaluating their energy use. The home's electric baseboard or furnace heat consumption must indicate at least 8,000 kWh during the previous heating season. Customers receive incentives after installation and after submitting a completed rebate form. Table 3-26 summarizes the measures offered under this program.

Table 3-26: Fuel Efficiency Program Measures

Measure	Description	Impact Analysis Methodology
E Electric To Natural Gas Furnace	Electric baseboard or forced air furnace heat to natural gas forced air furnace	Avista TRM
E Electric To Natural Gas Furnace & Water Heat	Electric to natural gas furnace and water heat combo	Avista TRM

The program does not contain any natural gas saving measures; however, the program includes a Therms penalty due to converting electric equipment to natural gas equipment. The verified Therms penalty is 11,562 Therms and represents an 86.39% realization rate against the expected Therms penalty amount of 13,384. The following table displays the Therms penalty by measure.

Table 3-27: Fuel Efficiency Program Verified Natural Gas Penalty

Measure	PY2023 Participation	Expected Penalty (Therms)	Adjusted Penalty (Therms)	Verified Penalty (Therms)	Verified Realization Rate
E Electric To Natural Gas Furnace	21	-9,429	-9,429	-8,172	86.67%
E Electric To Natural Gas Furnace & Water Heat	7	-3,955	-3,839	-3,390	85.71%
Total	**28**	**-13,384**	**-13,268**	**-11,562**	**86.39%**

The Therms penalties represented in the table above are not aggregated in the Residential portfolio impact evaluation and are summarized here for planning purposes. The costs associated with this program are claimed in the Idaho Electric Impact Evaluation Report. The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Fuel Efficiency Program in Idaho Electric Impact Evaluation Report for PY2023.

3.2.5 ENERGY STAR® Homes Program

The ENERGY STAR® Homes Program provides rebates for homes within Avista's service territory that attain an ENERGY STAR® certification. This program incentivizes ENERGY STAR® Eco-rated homes. Table 3-28 summarizes the measures offered under this program.

Table 3-28: ENERGY STAR® Homes Program Measures

Measure	Description	Impact Analysis Methodology
G Energy Star Home - Manufactured, Gas Only	ENERGY STAR-rated manufactured home with natural gas furnace	RTF UES
G Energy Star Home - Manufactured, Gas & Electric	ENERGY STAR-rated manufactured home with natural gas and electric	RTF UES

The following table summarizes the verified natural gas savings for the ENERGY STAR® Homes Program impact evaluation.

Table 328: ENERGY STAR® Homes Program Verified Natural Gas Savings

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Energy Star Home - Manufactured, Gas Only	1	134	133	134	100.00%
Total	**1**	**134**	**133**	**134**	**100.00%**

The ENERGY STAR® Homes Program displayed verified savings of 134 Therms with a realization rate of 100.00% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 329: ENERGY STAR® Homes Program Costs

Measure	Incentive Costs
G Energy Star Home - Manufactured, Gas Only	$600.00
Total	**$600.00**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the ENERGY STAR® Homes Program in the section below.

3.2.5.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the ENERGY STAR® Homes Program.

3.2.5.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the ENERGY STAR® Homes Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.1.

The Evaluators confirm that the Avista TRM and the application of Avista TRM values were correct for the gas rebates in the program.

3.2.5.3 Verification Surveys

The Evaluators did not conduct verification surveys for the ENERGY STAR® Homes Program.

3.2.5.4 Impact Analysis

This section summarizes the verified savings results for the ENERGY STAR® Homes Program. The Evaluators calculated verified savings for the natural gas measures using the most recent RTF workbook for the ENERGY STAR® Homes measures. These RTF UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.5.5 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate adjusted program savings for each of the ENERGY STAR® Homes measures. In addition, the Evaluators reviewed and applied the current RTF UES values for each measure along with verified tracking data to estimate net program savings.

The ENERGY STAR® Homes Program in total displays a realization rate of 100.00% with 134 Therms verified natural gas energy savings in the Idaho service territory, as displayed in Table 328.

The Evaluators did not conduct a verification survey for the ENERGY STAR® Homes Program and therefore did not adjust verified savings with an ISR.

3.2.6 Small Home & MF Weatherization Program

The Small Home & MF Weatherization Program is a residential prescriptive program that waives the energy usage requirement that is typically employed for residential prescriptive programs. This benefits small homes (less than 1,000 square feet in size) and multifamily dwellings (specifically customers in condominiums larger than five units in size). While this program is designed for all customers, it could also benefit members of Named Communities who reside in smaller homes.

This section summarizes the impact results of the evaluation results for the Small Home & MF Weatherization Program. Table 3-29 summarizes the measures offered under this program.

Table 3-29: Small Home & MF Weatherization Program Measures

Measure	Description	Impact Analysis Methodology
G Multifamily Attic Insulation With Natural Gas Heat	Attic insulation for multifamily homes with natural gas heat	Avista TRM
G Multifamily Smart Thermostat Paid	Connected thermostat for multifamily homes with electric heat, contractor-installed	Avista TRM
G Multifamily Furnace 95%	Install high efficiency furnace water heater in multifamily home	Avista TRM
G Multifamily Smart Thermostat DIY	Connected thermostat for multifamily homes with electric heat, self-installed	Avista TRM
G Multifamily Tankless Water Heater	Install high efficiency tankless water heater in multifamily home	Avista TRM
G Multifamily 50 Gallon Natural Gas Water Heater	Install high efficiency 50 gallon tank water heater in multifamily home	Avista TRM
G Multifamily Wall Insulation With Natural Gas Heat	Wall insulation for multifamily homes with electric heat	Avista TRM
G Multifamily Window Replc With Natural Gas Heat	Window replacement for multifamily homes with natural gas heat	Avista TRM

The following table summarizes the verified natural gas savings for the Small Home & MF Weatherization Program impact evaluation.

Table 3-30: Small Home & MF Weatherization Program Verified Natural Gas Savings

Measure	PY2023 Units	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Multifamily Attic Insulation With Natural Gas Heat	3	199	0	101	50.94%
G Multifamily Energy Star Rated Top Load Washer	1	6	6	6	100.00%
G Multifamily Smart Thermostat DIY with Natural Gas Heat	4	107	107	107	100.00%
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	29	773	773	773	100.00%
G Multifamily Natural Gas Furnace	44	2871	2871	2871	100.00%
G Multifamily 50 Gallon Natural Gas Water Heater	36	523	785	523	100.00%
G Multifamily Window Replc With Natural Gas Heat	7	629	6	632	100.46%

Measure	PY2023 Units	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Multifamily Energy Star Certified Insulated Door	2	82	55	82	100.00%
G Multifamily Tankless Water Heater	3	210	210	210	100.00%
G Multifamily Natural Gas Boiler	1	112	112	112	100.00%
G Multifamily Energy Star Rated Front Load Washer	1	6	6	6	100.00%
G Multifamily Wall Insulation With Natural Gas Heat	1	23	0	23	100.00%
Total	**132**	**5,540**	**4,930**	**5,445**	**98.29%**

The Small Home & MF Weatherization Program displayed verified savings of 5,445 Therms with a realization rate of 98.29% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-31: Small Home & MF Weatherization Program Costs

Measure	Incentive Costs
G Multifamily Attic Insulation With Natural Gas Heat	$2,532.00
G Multifamily Energy Star Rated Top Load Washer	$50.00
G Multifamily Smart Thermostat DIY with Natural Gas Heat	$451.38
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	$4,350.00
G Multifamily Natural Gas Furnace	$19,800.00
G Multifamily 50 Gallon Natural Gas Water Heater	$2,400.00
G Multifamily Window Replc With Natural Gas Heat	$3,030.28
G Multifamily Energy Star Certified Insulated Door	$300.00
G Multifamily Tankless Water Heater	$1,200.00
G Multifamily Natural Gas Boiler	$450.00
G Multifamily Energy Star Rated Front Load Washer	$50.00
G Multifamily Wall Insulation With Natural Gas Heat	$243.75
Total	**$34,857.41**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Small Home & MF Weatherization Program in the section below.

3.2.6.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Small Home & MF Weatherization Program.

3.2.6.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Small Home & MF Weatherization Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.1.

The rebate application form sufficiently collects all required RTF measure specification details. All rebate applications and tracking data contain smart Thermostat manufacturer and model number. The Evaluators were able to verify the models for RTF specifications for connected Thermostats.

The Evaluators found that many projects exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). The Evaluators recommend claiming projects on single family homes that are larger than 1,000 SQFT into the Small Home & MF Weatherization Program.

In addition, the Evaluators note that the current program rebate applications do not provide an option to indicate “Multifamily” home type. Rather, the current rebate application includes an option for “Single family”, “Manufactured”, “New construction”, and “Other”. The Evaluators recommend including an option for “Multifamily” to consistently apply RTF savings for each of the measures.

The Evaluators reviewed each measure number of units, square footage, and insulation where available. The Evaluators found no instances in which square footage quantity in the rebate application does not match the values presented in the project data attic insulation. The Evaluators also note that Avista consistently verified square footage and R-values with customers when information was unclear. The tracked quantity and U-values were then documented in the tracking database consistently.

The Evaluators found no duplicate rebates in the project data and therefore did not remove any rebates from verified savings.

3.2.6.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed non-weatherization measure. The Evaluators included questions such as:

- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Small Home & MF Weatherization Program. Table 3-32 displays the ISRs for each of the measures for the Idaho territory alone.

Table 3-32: Small Home & MF Weatherization Verification Survey ISR Results

Measure	Number of Rebates*	Number of Survey Completes*	Program-Level Precision at 90% Confidence	In-Service Rate
G Multifamily 50 Gallon Natural Gas Water Heater	36	0	90% ± 82.25%	Assume 100% ISR
G Multifamily Attic Insulation With Natural Gas Heat	3	0		Assume 100% ISR
G Multifamily Energy Star Certified Insulated Door	2	0		Assume 100% ISR
G Multifamily Energy Star Rated Front Load Washer	1	0		Assume 100% ISR
G Energy Star Rated Front Load Washer	0	No Participation		Assume 100% ISR
G Multifamily Energy Star Rated Top Load Washer	1	0		Assume 100% ISR
G Multifamily FURNACE 95% (Multi-Stage)	0	No Participation		Assume 100% ISR
G Multifamily Natural Gas Boiler	1	0		Assume 100% ISR
G Multifamily Natural Gas Furnace	44	0		Assume 100% ISR
G Multifamily Smart Thermostat DIY with Natural Gas Heat	4	0		Assume 100% ISR
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	29	1		Assume 100% ISR
G Multifamily Tankless Water Heater	3	0		Assume 100% ISR
G Multifamily Window DIY Replc With Natural Gas Heat	0	No Participation		Assume 100% ISR
G Multifamily Window Replc With Natural Gas Heat	7	0		Assume 100% ISR

*This count includes rebates from Idaho only

The response rate for this verification survey did not meet 90/10 precision goals for either single state or mixed state. Therefore, the Evaluators assumed 100% in-service rate for these measures. However, survey respondents for each smart thermostat, water heater, and furnace measure described equipment to be currently functioning, further supporting the 100% ISR assumption. The Evaluators applied these ISRs to each rebate to quantify verified savings for each measure.

3.2.6.4 Impact Analysis

This section summarizes the verified savings results for the Small Home & MF Weatherization Program. The Evaluators calculated verified savings for the natural gas measures using the most recent Avista TRM for the Small Home & MF Weatherization measures. These values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.6.5 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net adjusted program savings for those measures. Final verified savings were estimated using the appropriate Avista TRM values associated with each measure, verified through a sample of projects. The Small Home & MF Weatherization Program displayed 98.29% realization with 5,445 Therms saved, as displayed in Table 3-30.

The realization rate for the natural gas savings in the Small Home & MF Weatherization Program deviated from 100% due to one attic insulation project in which the Avista TRM value was not applied to the project appropriately. This project resulted in a 20% realization rate and contributed to the 50% realization rate for the attic insulation measure. All other sampled projects displayed realization rates between 98% and 102%.

3.2.7 Multifamily Direct Install Program

The Multifamily Direct Install Program (MFDI) Program is administered by SBW Consulting, Inc (SBW). This program provides direct installation and audits for customers to install direct install measures and identify additional energy efficiency opportunities. This program is available to customers who receive electric service from Avista and have a five-unit or more multifamily property. The program also serves hard-to-reach customer segment as well as Avista's low- and limited-income population. Table 3-33 summarizes the measures offered under this program along with the impact evaluation methods for each measure.

Table 3-33: Multifamily Direct Install Program Measures

Measure	Impact Analysis Methodology
Screw-in LED lamp (3.8)	SBW TRM
Screw-in LED lamp (4.8)	SBW TRM
Screw-in LED lamp (A-line 100W)	SBW TRM
Screw-in LED lamp (A-line 40W)	SBW TRM
Screw-in LED lamp (A-line 60W)	SBW TRM
Screw-in LED lamp (BR30)	SBW TRM
Screw-in LED lamp (BR40)	SBW TRM
Screw-in LED lamp (G25)	SBW TRM
Screw-in LED lamp (PAR30)	SBW TRM
Screw-in LED lamp (PAR38)	SBW TRM
Screw-in LED lamp (R20)	Avista TRM/SBW TRM
Faucet aerator (1 GPM)	RTF UES, Aerators_v1_1/SBW TRM
Kitchen Aerator	RTF UES, Aerators_v1_1/SBW TRM
VendingMiser	SBW TRM

The following table summarizes the verified natural gas savings for the Multifamily Direct Install Program (MFDI) Program impact evaluation.

Table 3-34: Multifamily Direct Install Program Verified Natural Gas Savings

Measure	PY2023 Units	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Faucet aerator (1 GPM)	47	187	187	100%
Kitchen Aerator	21	40	40	100%
Total	**68**	**227**	**227**	**100%**

The Multifamily Direct Install Program displayed verified savings of 227 Therms with a realization rate of 100.00% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-35: Multifamily Direct Install Program Costs

Measure	Incentive Costs
Faucet aerator (1 GPM)	$712.00
Kitchen Aerator	$168.00
Total	**$880.00**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for Multifamily Direct Install Program in the section below.

3.2.7.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Multifamily Direct Install Program.

3.2.7.2 Database Review & Document Verification

The program administrators do not track data separately from the tracking data. Therefore, there were no documents for the Evaluators to cross-verify for the Multifamily Direct Install Program.

To verify savings, the Evaluators reviewed the tracking data and verified savings using RTF UES values. The Evaluators found no discrepancy between the savings values in the tracking database and the RTF UES values leading to a realization rate of 100% for these measures. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data in order to apply more specific savings values to each project.

The Evaluators found no duplicate rebates in the project data and therefore did not remove any rebates from verified savings.

3.2.7.3 Verification Surveys

The Evaluators did not conduct survey verification for the Multifamily Direct Install Program since the MFDI measure savings values have in-service rates embedded.

3.2.7.4 Impact Analysis

This section summarizes the verified savings results for the Multifamily Direct Install Program. The Evaluators calculated verified savings for the natural gas measures using the most recent Avista TRM and SBW TRM values for the Multifamily Direct Install Program measures. These values were applied to all gas measures in the program data.

3.2.7.5 Verified Savings

The program administrators do not house project-level documents. Therefore, there were no documents for the Evaluators to cross-verify for the Multifamily Direct Install Program.

To verify savings, the Evaluators reviewed the tracking data and verified savings using Avista TRM and SBW TRM values. The Evaluators found no discrepancy between the savings values in the tracking database and the TRM values leading to a realization rate of 100% with 227 Therms saved for these measures as displayed in Table 3-34. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data in order to apply more specific savings values to each project.

The Evaluators did not conduct survey verification for the Multifamily Direct Install Program, as the MFDI measure savings values have in-service rates embedded.

3.2.8 Appliance Program

The Appliances Program is residential prescriptive program that offers incentives for customers to upgrade their existing clothes washers and dryers to ENERGY STAR-rated clothes dryers and washers.

This section summarizes the impact results of the evaluation results for the Appliances Program. Table 3-36 summarizes the measures offered under this program.

Table 3-36: Appliance Program Measures

Measure	Description	Impact Analysis Methodology
G Energy Star Rated Clothes Dryer	ENERGY STAR-certified clothes dryer for residential homes	RTF UES
G Energy Star Rated Front Load Washer	ENERGY STAR-certified front loading clothes washer for residential homes	RTF UES
G Energy Star Rated Top Load Washer	ENERGY STAR-certified top loading clothes washer for residential homes	RTF UES

The following table summarizes the verified natural gas savings for the Appliance Program impact evaluation.

Table 3-37: Appliance Program Verified Natural Gas Savings

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Energy Star Rated Clothes Dryer	19	38	182	134	352.59%
G Energy Star Rated Front Load Washer	64	386	262	262	67.92%
G Energy Star Rated Top Load Washer	32	181	131	0	0.00%
Total	**115**	**605**	**575**	**396**	**65.53%**

The Appliance Program displayed verified savings of 396 Therms with a realization rate of 65.53% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-38: Appliance Program Costs

Measure	Incentive Costs
G Energy Star Rated Clothes Dryer	$650.00
G Energy Star Rated Front Load Washer	$3,200.00
G Energy Star Rated Top Load Washer	$1,600.00
Total	**$5,450.00**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Appliance Program in the section below.

3.2.8.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Appliance Program.

3.2.8.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Appliance Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in in Section 2.2.2.1.

The Evaluators found all Appliance Program rebates to have project documentation with the associated model number and efficiency values in either the CC&B web rebate data or mail-in rebate applications. In addition, documents included AHRI certifications or model numbers necessary to verify AHRI certifications. This allowed Evaluators to easily verify model specifications and apply savings.

3.2.8.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.2. The Evaluators included questions such as:

- What type of clothes washer/dryer did this clothes washer/dryer replace?
- Is your home's water heated with electricity, natural gas, or another fuel?
- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Appliance Program. The responses to these additional questions can be found in Appendix A.

Table 3-39 displays the ISRs for each of the Appliance measures for Idaho and Washington natural gas territory combined, as the Idaho-only territory responses did not meet 90/10 precision goals. The ISRs resulted in ±9.55% precision at the 90% confidence interval for the program.

Table 3-39: Appliance Verification Survey ISR Results

Measure	Number of Rebates*	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
G Energy Star Rated Clothes Dryer	40	10	90% ±9.55%	100%*
G Energy Star Rated Top Load Washer	143	21		95%*
G Energy Star Rated Front Load Washer	126	29		100%*

*This count includes Idaho and Washington rebates

Survey respondents described equipment to be currently functioning, leading to a 95-100% ISR for all measures. The Evaluators applied the ISRs listed in Table 3-39 to each rebate to quantify verified savings for each measure.

3.2.8.4 Impact Analysis

This section summarizes the verified savings results for the Appliance Program. The Evaluators calculated verified savings for the remaining measures using active values from the Avista TRM workbook. These values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.8.5 Billing Analysis

The Evaluators did not complete a billing analysis for the measures in the Appliance Program.

3.2.8.6 Verified Savings

The Appliance Program in total displays a verified savings of 396 Therms with a realization rate of 65.53% in the Idaho service territory, as displayed in Table 3-37.

The realization rate for the natural gas savings in the Appliance Program deviates from 100% due removal of savings from the Top Load Washer measure and the inflated savings from Energy Star Rated Clothes Dryer measure. The expected savings utilized a 2.72 Therms savings value for clothes dryers, but the appropriate RTF UES value is 9.59 Therms. The Evaluators recommend Avista update the clothes dryer measure to be in alignment with the RTF UES value.

3.2.9 Midstream Program

Avista converted several residential and nonresidential measures from a downstream delivery channel to a midstream delivery channel via local distributors. As Avista notes, midstream approaches have proven successful in other parts of the Pacific Northwest, as well as nationally. The Midstream Program currently offers midstream incentives to residential customers for measures such as:

- Residential natural gas furnace
- Residential natural gas tankless water heaters

The nonresidential midstream measures and impact evaluation results are presented in Section 3.2.9. This change in delivery channel is seen to expand the benefits gained from the consumer with respect to the midstream incentive design rather than the downstream incentive design, as well as how customers use this offering.

This section summarizes the estimated savings Avista has calculated for the Midstream Program. The Evaluators conducted the first impact evaluation for the measures in this program for PY2023. Table 3-40 summarizes the measures offered under this program.

Table 3-40: Midstream Program Measures

Measure	Description	Impact Analysis Methodology
G Natural Gas Furnace	High efficiency natural gas furnace installation	Avista TRM
G Natural Gas Tankless Water Heater	High efficiency natural gas water heater installation	Avista TRM

The following table summarizes the estimated electric energy savings for the Midstream Program impact evaluation.

Table 3-41: Midstream Program Verified Natural Gas Savings

Measure	PY2023 Units	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Realization Rate
G Natural Gas Furnace	524	136,577	158,334	45,104	33.02%
G Natural Gas Tankless Water Heater	54	2,129	2,129	3,726	174.97%
Total	**578**	**138,707**	**160,463**	**48,830**	**35.20%**

The Midstream Program displayed estimated savings of 48,830 Therms with a realization rate of 35.20%. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-42: Midstream Program Costs by Measure

Measure	Incentive Costs
G Natural Gas Furnace	$235,800.00
G Natural Gas Tankless Water Heater	$6,750.00
Total	**$242,550.00**

The Evaluators describe the impact evaluation tasks completed for this program in the subsections below.

3.2.9.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Midstream Pilot. The Evaluators selected a subset of rebates to cross-verify tracking data inputs, summarized in Section 2.2.2.1.

The Evaluators found all selected rebates documented the information necessary to accurately characterize savings for the program within the Idaho natural gas service territory. The Evaluators verified the model number, efficiency, quantity, and Avista TRM values necessary to calculate verified savings. The Midstream tracking data is tracked and delivered separately from the remaining residential portfolio, often demonstrating extensive detail on product characteristics.

During review, the Evaluators found that the implementer's engineering algorithms, in which expected savings are calculated, differed greatly from the UES previously defined for each measure in the Avista TRM and RTF UES values. That is, the implementer's engineering equations resulted in savings double or triple the amount for the average air source heat pump and heat pump water heater. In addition, the Evaluators found that the engineering algorithms applied to the tracking database equipment were not applied properly to the tracking data inputs. The reasoning for this discrepancy is unclear. The tracking database displays measure-level savings about 40% inflated compared to measure-level savings had the designated baseline and annual operating hours aligned with those values defined in the implementer TRM. This discrepancy is separate from the adjustment for market practice baseline by the RTF.

3.2.9.2 Verification Survey

The Evaluators did not conduct verification surveys for the Midstream Program in PY2023 due to the nature of the midstream delivery channel; customers are not aware that they are participating in the program because they are not required to fill out a downstream rebate application.

3.2.9.3 Impact Analysis

This section summarizes the verified savings results for the Midstream Program. The Evaluators attempted to conduct a billing analysis for each measure with sufficient participation. For measures in which billing analysis was not feasible or displayed inconclusive results, the Evaluators evaluated verified savings for the measure through the Regional Technical Forum workbooks in place at the time of the biennium plan for the Midstream Program.

The Evaluators reviewed the expected savings workbook from the program implementer, Energy Solutions. The implementer defined expected Therm savings for each measure prior to the rollout of the program. The Evaluators note that the expected savings workbook values from the implementer vary from the Avista TRM for the previous prescriptive measure savings expectations. For this reason, it is expected that the realization rate will portray discrepancies between the expected and verified savings.

The Evaluators estimated verified savings using billing analysis results of participating Midstream Program customers as well as Avista's TRM developed for residential prescriptive measures.

3.2.9.4 Billing Analysis

The results of the billing analysis for the Midstream Program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Table 325 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis.

Table 3-43: Measures Considered for Billing Analysis, Midstream Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
G Natural Gas Furnace	✓	27	
G Natural Gas Tankless Water Heater	✓	7	✓

The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 326 provides annual savings per customer for both measures combined. The post-only heating load extrapolation method using engineering algorithm was used to estimate the natural gas furnace savings. This method is further detailed in Section 2.2.3.7.

Table 3-44: Measure Savings, Midstream Program

Measure	Annual Savings per Customer (Therms)
G Natural Gas Furnace	47.43

The Evaluators found the G Natural Gas Furnace displayed a statistically significant verified savings value of 47.43 Therms per year. Although the Evaluators estimated savings for these measures through billing analysis, the verified savings for the measures were calculated via Avista TRM due to a low adjusted R-Squared value indicating poor fit. Further details of the billing analysis for the Midstream measures can be found in Appendix A.

3.2.9.5 Verified Savings

The Evaluators reviewed the Energy Solutions implementer expected savings values along with verified tracking data to estimate net adjusted program savings for those measures. In order to calculate verified savings, the Evaluators utilized industry-standard engineering algorithms using purchased equipment efficiency values and RTF-defined market practice baseline values, where appropriate. The Midstream Program displayed 35.20% realization with 48,830 Therms saved, as displayed in Table 3-30.

The program verified savings resulted in a low realization rate largely due to the fact that the expected savings were inflated due to incorporation of baselines that did not represent market baseline, as the Avista TRM does. The Evaluators compared the implementer-provided expected savings to the previously defined measure-level expected savings defined in the TRM and concluded that, had the Avista TRM been used to define program expected savings, the realization rate would have been 100% realization rather than 35% realization. This difference is seen in the discrepancy between the expected savings value and the adjusted savings value presented in Table 3-30.

The Evaluators did not make any additional adjustments to the purchased equipment, efficiency level of the equipment nor the quantity, as the verification efforts confirmed the details were properly tracked. Therefore, the difference between the established values in the implementer minimum code baseline and the Avista TRM, as well as incorrectly applied engineering algorithms were the driving factor for the low realization rate. The Evaluators recommend that Avista and the implementers update the expected savings calculation methodology to incorporate market practice baseline rather than minimum code baseline in order to remain consistent with the baseline methods utilized in the downstream measure programs and more accurately estimate expected savings in future iterations of this program.

4. Low-Income Impact Evaluation Results

The Low-Income Program delivers energy efficiency measures to low-income residential customers in its Idaho service territory with a partnership with five network Community Action Agencies ("Agencies") and one tribal weatherization organization. The Agencies qualify income to prioritize and treat households based on several characteristics. In-house or contract crews install approved program measures. In addition, the Agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures.

The Evaluators completed an impact evaluation on Avista's Low-Income portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each natural gas impact evaluation in the Low-Income Portfolio in the Idaho service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, and RTF values to evaluate verified savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data. Table 4-1 summarizes the Low-Income verified impact savings by program.

Table 4-1: Low-Income Verified Impact Savings by Program

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Low-Income	2,136	2,025	94.82%
Total Low-Income	2,136	2,025	94.82%

In PY2023, Avista completed and provided incentives for low-income gas measures in Idaho and achieved total natural gas savings of 2,025 Therms. The Low-Income Program met savings expectations based on reported savings with an achieved realization rate of 94.82%. Further details of the impact evaluation results by program are provided in the sections following.

4.1 Program-Level Impact Evaluation Results

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Low-Income sector in the section below.

4.1.1 Low-Income Program

The Low-Income Program delivers energy efficiency measures to low-income residential customers in its Idaho service territory with a partnership with five network Community Action Agencies ("Agencies") and one tribal weatherization organization. The Agencies qualify income to prioritize and treat households based on several characteristics. In-house or contract crews install approved program measures. In addition, the Agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures.

Avista provides CAP agencies with the following approved measure list, which are reimbursed in full by Avista. Avista also provides a rebate list of additional energy saving measures the CAP agencies are able to utilize which are partially reimbursed. The following table summarizes the measures offered under this program.

Table 4-2 summarizes the measures offered under this program.

Table 4-2: Low-Income Program Measures

Measure	Impact Analysis Methodology
Air Infiltration - G - ID	Avista TRM
Attic Insulation - G - ID	
Duct Insulation - G - ID	
Duct Sealing - G - ID	
Exterior Doors - G - ID	
Health Safety Repair - G - ID	
Natural Gas Furnace - G - ID	
Windows - G - ID	

Table 4-3 summarizes the verified natural gas savings for the Low-Income Program impact evaluation.

Table 4-3: Low-Income Program Verified Natural Gas Savings

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G 50 Gallon Natural Gas Water Heater	9	63.45	63.45	63	100.00%
G Air Infiltration	5	61	61	50	81.98%
G Attic Insulation With Natural Gas Heat	1	108	108	50	45.95%
G Duct Insulation	1	5.25	7	3	61.26%
G Duct Sealing	1	20.17	20.17	9	45.95%
G Exterior Doors	5	57.96	57.96	45	78.35%
G Health Safety and Repair	8	0	0	0	N/A
G Natural Gas Furnace	28	1,743	1,743	1,743	99.99%
G Window Replc With Natural Gas Heat	4	77	62	62	79.96%
Total	**62**	**2,136**	**2,122**	**2,025**	**94.82%**

The Low-Income Program displayed verified savings of 2,025 Therms with a realization rate of 94.82% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 4-4: Low-Income Program Costs

Measure	Incentive Costs
G 50 Gallon Natural Gas Water Heater	$53,750.52
G Air Infiltration	$422.30
G Attic Insulation With Natural Gas Heat	$1,725.00
G Duct Insulation	$82.80
G Duct Sealing	$104.08
G Exterior Doors	$5,870.74
G Health Safety and Repair	$35,796.13
G Natural Gas Furnace	$234,177.50
G Window Replc With Natural Gas Heat	$12,200.12
Total	**$344,129.19**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Low-Income Program in the section below.

4.1.1.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Low-Income Program.

4.1.1.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Low-Income Program. The Evaluators selected a subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.1.

During the review, the Evaluators found there were several projects with missing data. In total, seven projects were unable to be verified due to inconsistent tracking data values. One of these projects was the only attic insulation measure, resulting in the 46% realization rate.

The required information necessary to complete verification activities and proper expected savings calculations are: measure installed square footage for insulation measures, measure quantity for appliance measures, and total building annual energy usage in order to calculate proper building savings cap at 20% annual energy usage.

4.1.1.3 Verification Surveys

The Evaluators did not conduct verification surveys for the Low-Income Program.

4.1.1.4 Impact Analysis

This section summarizes the verified savings results for the Low-Income Program. The Evaluators calculated verified savings for Low-Income Program measures using the Avista TRM. However, a whole building billing analysis was completed to supplement the findings from the desk review.

4.1.1.5 Billing Analysis

The results of the billing analysis for the Low-Income Program are provided below.

The Evaluators attempted to estimate measure-level Low-Income Program energy savings through billing analysis regression with a counterfactual group selected via propensity score matching. The Evaluators attempted to isolated each unique measure. In doing so, the Evaluators also isolate the measure effects using the customer's consumption billing data. However, participation for the Low-Income program resulted in a small number of customers with isolated measures and therefore the Evaluators were unable to estimate measure-level savings through billing analysis.

The Evaluators instead conducted a whole-home billing analysis for all the natural gas measures combined in order to estimate savings for the average household participating in the program, across all measures. The Evaluators successfully created a matched cohort for the natural gas measure households. Customers were matched on zip code (exact match) and their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household. The Evaluators were provided a considerable pool of control customers to draw upon. The Evaluators used

nearest neighbor matching with a 5 to 1 matching ratio. Therefore, each treatment customer was matched to 5 similar control customers.

Table 4-5 provides annual savings per customer for each measure. Model 2 (PPR) was selected as the final model for the Low-Income Program as it provided the highest adjusted R-squared among the regression models. However, savings for this model are not statistically significant at the 90% level, indicated by the lower 90% confidence bound at 0 Therms saved per year. The customers considered for billing analysis include customers in both Washington and Idaho service territories to gather the maximum number of customers possible for precise savings estimates.

Table 4-5: Measure Savings, Low-Income Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
All Gas Measures (Therms)	168	130	13.64*	0	31.23	0.92	Model 2: PPR

*Not statistically significant

Due to lack of statistical significance from the billing analysis results, The Evaluators did not apply these regression savings estimates to the program. Instead, the Evaluators estimated savings through the program by applying Avista TRM values to verified quantities. Further details of the billing analysis can be found in Appendix A.

4.1.1.6 Verified Savings

Due to lack of significance in the billing analyses, the Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net program savings for those measures. Adjusted savings were estimated using the Avista TRM. The Low-Income Program in total displays a realization rate of 94.82% with 2,025 Therms verified natural gas savings in the Idaho service territory, as displayed in Table 4-3.

The Evaluators note that there were few notable deviations between the expected and verified savings leading to a realization rate close to 100%.

5. Nonresidential Impact Evaluation Results

The Evaluators completed an impact evaluation on Avista's Non-Residential portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each natural gas impact evaluation in the Non-Residential Portfolio in the Idaho service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM 2023, RTF, IPMVP, supplemental sources and billing analysis of participants to evaluate savings. The approach selected for each program allowed for the strongest estimate of achieved savings practical for each program, dependent on each program's delivery method, magnitude of savings, number of participants, and availability of data. Table 5-1 summarizes the Non-Residential verified impact savings by program.

Table 5-1: Non-Residential Verified Impact Savings by Program

Program	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
HVAC	12,969	12,969	12,969	100.0%
Food Service Equipment	3,930	3,930	3,930	100.0%
Shell	7,117	7,117	7,117	100.0%
Midstream (NR)	18,140	12,737	7,536	41.5%
Site-Specific	24,891	24,891	29,069	116.8%
Total	**67,047**	**61,644**	**60,621**	**90.4%**

In PY2023, Avista completed and provided incentives for non-residential natural gas measures in Idaho and reported total natural gas energy savings of 60,621 Therms. All programs exceeded savings claims, leading to an overall achievement of 90.4% of the expected savings for the non-residential programs. Further details of the impact evaluation results by program are provided in the sections following.

5.1 Verification Results

Before conducting the impact analyses, the Evaluators conducted a database review for all prescriptive programs. The Evaluators selected a random subset of rebate applications and associated documents from participating customers to cross-verify tracking data inputs. These documents included invoices, rebate applications, pictures, AHRI certificates and similar types of documents for the following programs:

- HVAC Program
- Food Service Equipment Program
- Shell Program

This sample of documents was used to cross-verify tracking data inputs. In the case the Evaluators found any deviations between the tracking data and application values, the Evaluators reported and summarized those differences in the appropriate report chapters.

The Evaluators developed a sampling plan that achieves a sampling precision of ±10% at 90% statistical confidence – or "90/10 precision" – to estimate the percentage of projects for which the claimed savings are verified or require some adjustment.

Table 5-2 displays program populations, sample sizes for document verification and resulting precision.

Table 5-2: Non-Residential Program-level Verification Precision

Program	Population	Sampled	Precision
HVAC	36	36	±0.0%
Food Service Equipment	16	16	±0.0%
Shell	12	12	±0.0%
Midstream[12]	43	43	±0.0%
Site-Specific	3	3	±0.0%

5.1.1 On-Site Verification

Unlike Residential measures, non-residential measures typically have a 100% installation rate or a deemed in-service rate (ISR) included in RTF and Avista TRM UES. The exception to this rule are custom projects, such as those in the Site-Specific programs. For this the Evaluators conducted two on-site visits to verify full installation and equipment operation as described in the project scope.

5.2 Program-Level Impact Evaluation Results

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, for the Non-Residential sector in the section below.

[12] By design, the Midstream program tracking data is per measure, rather than per project. The number 43 represents the total number of measures verified using make/model info included in tracking data.

5.2.1 Prescriptive HVAC Program

The Prescriptive Natural Gas HVAC Program encourages customers to select highly efficient natural gas heating equipment solutions for their business. Installing high efficiency equipment helps lower operating costs and save energy. The prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who heat with Avista natural gas are eligible for this program. Customers must submit a completed rebate form, invoices, and an AHRI certificate within 90 days after the installation has been completed.

Table 5-3 summarizes the measures rebated in PY2023 under this program.

Table 5-3: Prescriptive HVAC Program Measures

Measure	Impact Analysis Methodology
Natural Gas Boiler	Avista TRM UES
Multi-Stage Furnace	Avista TRM UES
Single-Stage Furnace	Avista TRM UES
Unit Heater	Avista TRM UES

The following table displays the claimed, adjusted and verified savings from the Prescriptive HVAC program.

Table 5-4: Prescriptive HVAC Program Verified Natural Gas Savings

Measure	PY2023 Participation (Savings Units)	Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Realization Rate
95 Percent AFUE or greater NG multi stage furnace 225	21	7,807	7,807	7,807	100.0%
95 Percent or greater AFUE NG single stage furnace 225	14	4,404	4,404	4,404	100.0%
90 Percent AFUE or greater NG boiler 300	1	758	758	758	100.0%
Totals:	**36**	**12,969**	**12,969**	**12,969**	**100.0%**

The following table summarizes the incentives associated with the program.

Table 5-5: Prescriptive HVAC Program Incentives

Measure	Incentive Costs
95 Percent AFUE or greater NG multi stage furnace 225	$24,050
95 Percent or greater AFUE NG single stage furnace 225	$13,200
90 Percent AFUE or greater NG boiler 300	$2,376
Total	**$39,626**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Prescriptive HVAC Program in the section below.

5.2.1.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive HVAC Program. The Evaluators review all rebate applications to cross-verify tracking data inputs,

summarized in Section 2.2.2.1. Verification of project documents included data points such as input BTUs, efficiency levels and costs of the equipment.

Table 5-6 shows the project population, the number of projects checked and the overall precision.

Table 5-6: Prescriptive HVAC Program Verification Precision

Population	Sampled	Precision
36	36	±0.0%

The Evaluators did not find any substantive deviations between project applications and program tracking data. The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Prescriptive HVAC Program.

5.2.1.2 Impact Analysis

The RTF does not currently offer a savings estimates for non-residential furnaces or the specific configuration of the non-residential boiler rebated through the PY2023 Program. The Evaluators calculated verified savings for commercial furnaces and boilers using the Avista TRM. Final verified savings were calculated by applying the appropriate TRM UES to a census of measures.

5.2.1.3 Verified Savings

The Evaluators reviewed and applied the current TRM UES values for commercial furnaces or the specific commercial boiler resulting in 12,969 verified Therms with a realization rate of 100%, as displayed in Table 5-4.

5.2.2 Food Service Equipment Program

The Food Service Equipment Program offers incentives for commercial customers who purchase or replace food service equipment with ENERGY STAR-qualified equipment. This prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista natural gas to operate the equipment submitted for a rebate are eligible for this program. Customers must submit a completed rebate form and invoices within 90 days after the installation has been completed. Avista will send incentive checks to the customers or their designees after each project is approved. The website is also used to communicate program requirements, incentives, and forms.

Table 5-7 summarizes the measures rebated in PY2023 under this program.

Table 5-7: Prescriptive Food Service Equipment Program Measures

Measure	Impact Analysis Methodology
Combination oven	Avista TRM
Fryer	Avista TRM

The following table summarizes the claimed, adjusted and verified Therms savings for the program.

Table 5-8: Prescriptive Food Service Equipment Program Verified Natural Gas Savings

Measure	PY2023 Participation (Projects)	Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Realization Rate
Commercial Convection Oven Natural Gas full size	2	3,030	3,030	3,030	100.0%
Commercial Fryer Gas	14	900	900	900	100.0%
Total	**16**	**3,930**	**3,930**	**3,930**	**100.0%**

The following table summarizes the incentives associated with the program.

Table 5-9: Prescriptive Food Service Equipment Program Costs by Measure

Measure	Measure Count	Total Natural Gas Incentives
Commercial Convection Oven Natural Gas full size	6	$6,000
Commercial Fryer Gas	2	$1,400
Total	**8**	**$7,400**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Prescriptive Food Service Equipment Program in the section below.

5.2.2.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Food Service Equipment Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.1. Data points checked between project applications and program tacking include fuel type, capacity, ENERGYSTAR® status, quantity, and measure cost values.

Table 5-10 shows the project population, the number of projects checked and the overall precision.

Table 5-10: Prescriptive Food Service Equipment Program Verification Precision

Population	Sampled	Precision
16	16	±0.0%"

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Prescriptive Food Service Equipment Program and did not find any substantive differences between program tracking and project documents.

5.2.2.2 Impact Analysis

Both measures that appear in the PY2023 program, there is no current RTF measure offering to supply UES, or the RTF measure does not include calculations for Therms savings. In these instances, the Evaluators used Avista TRM values. Evaluators did not find any deviations between claimed and verified TRM UES.

Final verified savings were calculated by applying the appropriate UES to a census of measures.

5.2.2.3 Verified Savings

The Evaluators reviewed and applied the appropriate UES values to verified tracking data to estimate program savings for these measures. The verified savings for the program is 3,930 Therms with a realization rate of 100%, as displayed in Table 5-8.

5.2.3 Prescriptive Shell Program

The Commercial Prescriptive Shell Program offers incentives to commercial customers who improve the envelopes of their existing buildings by adding insulation, which may make a business more energy-efficient and comfortable. Avista issues payment to the customer after the measure has been installed by a licensed contractor. Commercial customers must have an annual heating footprint for a fuel provided by Avista.

Customers must submit a completed rebate form, invoices, and an insulation certificate within 90 days after the installation has been completed. Avista will send incentive checks to customers or their designees after each project is approved. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. Avista's website is also used to communicate program requirements, incentives, and forms.

Table 5-11 summarizes the measures rebated in PY2023 under this program.

Table 5-11: Prescriptive Shell Program Measures

Measure	Impact Analysis Methodology
Attic Insulation	Avista TRM UES
Wall Insulation	Avista TRM UES

The following table summarizes the claimed, adjusted and verified Therm savings for the program.

Table 5-12: Prescriptive Shell Program Verified Natural Gas Savings

Measure	PY2023 Participation (Projects)	Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Realization Rate
Attic =< R11 to R45+	5	3,603	3,603	3,603	100.0%
Attic =< R11 to R30-R44	3	565	565	565	100.0%
Wall =< R4 to 19+	3	2,909	2,909	2,909	100.0%
Wall =< R4 to R11-R18	1	41	41	41	100.0%
Totals	**12**	**7,117**	**7,117**	**7,117**	**100.0%**

The following table summarizes the incentive and non-incentive costs associated with the program.

Table 5-13: Prescriptive Shell Program Costs by Measure

Measure	Measure Count (Square Feet Installed)	Incentive Costs
Attic =< R11 to R45+	27,713	$32,918
Attic =< R11 to R30-R44	6,274	$6,067
Wall =< R4 to 19+	8,081	$10,101
Wall =< R4 to R11-R18	170	$164
Totals	**42,238**	**$49,250**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Prescriptive Shell Program in the section below.

5.2.3.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Shell Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.1. Data points checked between project applications and program tacking include R-levels, square footage of installation, HVAC configuration and measure cost values. Below, Table 5-14 shows the project population, the number of projects checked and the overall precision.

Table 5-14: Prescriptive Shell Program Verification Precision

Population	Sampled	Precision
12	12	±0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Prescriptive Shell Program and there were no substantive deviations between program tracking data and project documents.

5.2.3.2 Impact Analysis

This section summarizes the verified savings results for the Shell Program. The Evaluators calculated verified savings for the natural gas measures using the active Avista TRM values. Final verified savings were calculated by applying the appropriate UES to a census of measures.

5.2.3.3 Verified Savings

The Evaluators reviewed and applied the current TRM UES values for the Attic and Wall Insulation measures along with verified tracking data to estimate net program savings for this measure. The verified savings for the program is 7,117 Therms with a realization rate of 100.0%, as displayed in Table 5-11. Evaluators did not find any deviations from TRM UES.

5.2.4 Nonresidential Midstream Program

Avista designed the Midstream Program to shift the onus of applying for rebates from end-use customers to distributors. Not only does this reduce customers'/contractors' administrative burden (i.e., no need to submit paperwork tracking energy efficient installations), but it is also anticipated to increase high-efficiency equipment options at competitive prices. Midstream rebates provide an immediate discount on eligible products, which appear as a line item on customer invoices. Starting on July 1, 2023, the Midstream Program replaced Avista's residential and commercial downstream space-heating and water-heating programs as well as the commercial food service equipment rebate program.

Through the Midstream Program, Avista seeks to achieve three overall objectives:

- Provide greater long-term, cost-effective savings for residential and commercial customers alike
- Reduce Avista's administrative burden in processing space-heating, water-heating, and commercial kitchen equipment applications
- Accelerate the market transformation of energy-efficient equipment

The Midstream Program provides bought-down equipment to both Residential and Commercial entities. This chapter discusses and presents results only for the non-residential measures. See Section 3.2.9 the residential portion.

Table 5-15 summarizes the measures rebated in PY2023 under this program.

Table 5-15: Non-Residential Midstream Program Measures

Category	Measure	Impact Savings Methodology
Food Service	Conveyor Oven	Pre-Approved Implementation Workbook
	Dishwasher	Pre-Approved Implementation Workbook
	Fryer	RTF
	Griddle	RTF
Domestic Water Heating	Instantaneous Water Heater	Engineering Algorithm
	Storage Water Heater	Engineering Algorithm
HVAC	Furnace	Engineering Algorithm
	Boiler	RTF

The following table summarizes the verified electric energy savings for the Midstream Program impact evaluation.

Table 5-16: Non-Residential Midstream Program Verified Therms Savings

Measure	PY2023 Participation (Measures)	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Realization Rate
Conveyor Oven	3	1,266	615	615	48.6%
Dishwasher	3	264	264	264	100.0%
Fryer	10	6,228	3,120	3,120	50.1%
Boiler	1	319	730	361	113.5%
Furnace	11	1,157	1,244	1,313	113.5%
Griddle	3	1,517	395	395	26.0%
Instantaneous Water Heater	7	4,642	1,886	1,790	38.6%
Storage Water Heater	5	2,748	2,849	1,064	38.7%
Total	**43**	**18,140**	**11,104**	**8,922**	**49.2%**

The following table summarizes the incentive and non-incentive costs associated with the program.

Table 5-17: Non-Residential Midstream Program Incentives

Measure	Measure Count	Incentive Costs
Conveyor Oven	3	$6,600
Dishwasher	3	$2,650
Fryer	10	$12,000
Boiler	1	$1,710
Furnace	11	$10,800
Griddle	3	$7,200
Instantaneous Water Heater	7	$9,892
Storage Water Heater	5	$7,623
Totals	**43**	**$58,475**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Midstream Program in the section below.

5.2.4.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Midstream Program. Due to the program delivery pathway, the Program does not include project applications. For this program, the Evaluators examined a representative sample of projects to ensure that program tracking data accurately reflected measure characteristics used in assessing savings. Data points checked include: equipment configurations, capacities and efficiency levels.

Table 5-18 shows the project population, the number of measures checked and the overall precision.

Table 5-18: Non-Residential Midstream Program Verification Precision

Population	Sampled	Precision
43	43	0.0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Midstream Program and no substantive equipment specifications differed from those in the tracking data.

5.2.4.2 Impact Analysis

Once verification was completed, to estimate program savings for these measures the Evaluators reviewed and applied the appropriate UES values from the RTF. If a measure was not covered by an RTF entry then a UEF from the Avista TRM was used as the source for verified savings. For measures not included in either the RTF or Avista TRM, verified savings was calculated using standard engineering algorithms with project-specific specs and RTF inputs.

5.2.4.3 Verified Savings

The verified savings for the program is 7,536 Therms with a realization rate of 41.5%, as displayed in Table 5-16. Adjusted savings comes from the RTF where available. Where not available, adjusted savings comes from program planning workbooks used by program implementors.

Results show that UES and prescriptive multipliers for Conveyor Ovens, Furnaces and Storage Water Heaters did not align with ex ante savings shown in the planning workbook, and were not applied to tracking data as originally intended.

Savings for food service equipment was assigned using UES in the program implementation workbook, however, did not provide the same estimates that were claimed, indicating that expected UES values were not applied correctly or consistently for Conveyor Ovens and Fryers.

Verified savings for griddles, dishwashers and boilers was taken from the RTF workbook and is specific to the equipment configuration, capacity and type of facility it is installed in.

Savings for Furnaces, Instantaneous Water Heaters and Storage Water Heaters was calculated using standard engineering algorithms, with equipment-specific inputs for capacity and efficiency, and EFLH values from the Midstream planning workbook. Groundwater temps were taken from the RTF and estimates of gallons of water used per year were taken from the IL TRM 12.0 and assigned to specific facility types. Expected savings for both instantaneous and storage water heaters assumed annual water usage that varied between 348% and 461% of usage estimates in the IL and AR TRMs. Verified savings this for these measures used the more reasonable annual water usage estimates from the IL TRM 12.0, resulting in low verified savings.

5.2.4.4 Recommendations for Future Program Cycles

- Administrators should verify that UES and savings multipliers are applied consistently across measures. The Evaluators found that in many cases program planning estimates could not replicate claimed savings.
- Drivers of differences between implementor and RTF EUS for Food Equipment cannot be assessed, but are likely due to differences in baseline efficiency assumptions.
- The Evaluators suggest that program implementors calculated expected savings for HVAC measures using prescriptive algorithms and measure-specific characteristics. Capacities and efficiency levels very considerably within these measures and current planning materials only produce very general savings estimates.
- Hot water usage varies considerably between commercial facility types. For instantaneous and storage water heaters, develop expected savings estimates using annual hot water usage (in gallons) by specific building type.
- Refer to RTF savings estimates for griddles.

5.2.5 Site-Specific Program

The Site-Specific Program provides calculated incentives to support the installation of qualifying energy efficiency equipment at commercial/industrial sites. These projects typically have a higher degree of complexity than the traditional prescriptive offerings and rely on custom calculations of savings and incentive levels. Examples of these projects include process improvements, upgrades to specialized equipment used in manufacturing, lighting installations that rely on specialized controls, and other measures designed around the customer's specific needs.

The program approach strives for a flexible response to energy efficiency projects that have demonstrable Therm savings within program criteria and are typically composed of custom HVAC, envelope, and industrial process load projects that do not fit the prescriptive path. In PY2023 four projects were completed, consisting of the replacement of heated pool covers and boiler replacements.

The following table summarizes the verified natural gas energy savings for the Site-Specific Program impact evaluation.

Table 5-19: Site-Specific Program Verified Natural Gas Savings

PY2023 Participation	Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Verified Realization Rate
3	24,891	24,891	29,069	116.8%

The Site-Specific Program displayed verified savings of 29,069 Therms with a realization rate of 116.8% against the expected savings for the program.

Table 5-20: Site-Specific Program Costs

Program	Incentive Costs
Site-Specific	$87,120

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Site-Specific Program in the section below.

5.2.5.1 Sample Design

In their review, the Evaluators conducted reviews of all three natural gas savings projects completed during the PY2023 program year. The Evaluators obtained the project-related documentation for review. These documents typically included spec sheets, building characteristics, calculators, invoices, project photos, and trending data. This information allowed the Evaluators to replicate claimed savings estimates and develop M&V plans to be used in assessing verified savings and collecting on-site data.

Using project-specific M&V plans, the Evaluators visited each sites to verify measure installation and operating parameters, as well as building parameters and other data necessary to determine verified savings. The Evaluators were able to conduct visits at two of the three project sites.

5.2.5.2 Impact Approaches

For projects SSOP_108641 and SSOP_ 109167 whole facility billing analyses (Option C) were feasible and provided statistically robust savings estimate. For project SSOP_121553 a retrofit isolation approach was taken using a standard engineering algorithm and project-specific inputs Specified methodology and

inputs are discussed in individual site reports, located in Appendix C: Site-Specific Site Reports. Site-Level Realization

Adjusted and verified savings were developed for each site. Table 5-21 presents realization at the site level, with program-level savings.

Table 5-21: Site-Specific Expected, Adjusted and Verified Therm Savings by Project

Project ID	Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Realization Rate
SSOP_121553	228	228	240	105.1%
SSOP_108641	1,667	1,667	18,298	1097.6%
SSOP_109167	22,996	22,996	10,531	45.8%
Total	**24,891**	**24,891**	**29,069**	**116.8%**

5.2.5.3 Discussion of Non-100% Realization

- **SSOP_108641 -** Measured savings are higher than ex ante predictions.
- **SSOP_109167 -** Measured savings are lower than ex ante predictions.
- **SSOP_111467 –** Verified water heater setpoint was 5 degrees lower than listed in project documentation.

5.2.5.4 Verified Savings

The Site-Specific Program in total displays a realization rate of 116.8% with 29,069 Therms verified natural gas energy savings in the Idaho service territory, as displayed in Table 5-22.

Table 5-22: Site-Specific Impact Summary

Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Realization Rate
24,891	24,891	29,069	116.8%

6. Appendix A: Billing Analysis Results

This appendix provides additional details on the billing analyses conducted for each program.

6.1 Shell Program

The results of the billing analysis for the Shell program are provided below. Table 6-1 shows customer counts for customers considered for billing analysis (i.e. customers with single-measure installations) and identifies measures that met the requirements for a billing analysis. A billing analysis was completed for measures that had at least 75 customers with single-measure installations. This ensured that measures would have a sufficient sample size after applying PSM data restrictions (e.g. sufficient pre- and post-period data). The billing analysis included participants in Washington and Idaho service territories (439 total) to acquire the maximum number of customers possible. The billing analysis on individual measures did not find significant savings due to variability observed in the data. The results reported combine measures across Idaho and Washington to produce a statistically significant estimate. See Table 6-5 for the non-significant results for individual measures. The rest of the section reports the combined analysis.

Table 6-1: Measures Considered for Billing Analysis, Shell Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
G Attic Insulation With Natural Gas Heat	✓	97*	✓
G Window Replc With Natural Gas Heat	✓	342*	✓
G Attic Insulation and G Window Replc With Natural Gas Heat	✓	439*	✓

*This count includes rebates from Washington and Idaho

The Evaluators were successful in creating a matched cohort for each of the measures with sufficient participation. Customers were matched on zip code (exact match) and their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household. The Evaluators were provided a considerable pool of control customers to draw upon, as shown in Table 6-2. Also shown in Table 6-2, are the impact of various restrictions on the number of treatment and control customers that were included in the final regression model. The “Starting Count” displays the beginning number of customers available prior to applying the data restrictions, while the “Ending Count” displays the number of customers after applying data restrictions and final matching.

Table 6-2: Cohort Restrictions, Shell Program

Measure	Data Restriction	# of Treatment Customers	# of Control Customers
G Attic Insulation With Natural Gas Heat	Starting Count	357	7,286
	Install Date Range: January 1, 2023 to June 30, 2023	357	7,286
	Control Group Usage Outlier (>2X max treatment usage)	355	7,280

	Incomplete Post-Period Bills (<6 months)	107	6,945
	Incomplete Pre-Period Bills (<10 months)	103	6,012
	Ending Count (Matched by PSM)	97	97
G Window Replc With Natural Gas Heat	Starting Count	1,057	7,286
	Install Date Range: January 1, 2023 to June 30, 2023	1,057	7,286
	Control Group Usage Outlier (>2X max treatment usage)	1,040	7,281
	Incomplete Post-Period Bills (<6 months)	356	6,946
	Incomplete Pre-Period Bills (<10 months)	351	6,013
	Ending Count (Matched by PSM)	342	342

Figure 6-1 and Figure 6-2 display the density of each variable employed in propensity score matching for the combined measures, before and after conducting matching.

For the combined measures, the covariate balance shows small differences between the treatment and control groups before and after matching.

Figure 6-1: Covariate Balance Before Matching, Shell Attic Insulation and Shell Window Replacement, Washington and Idaho

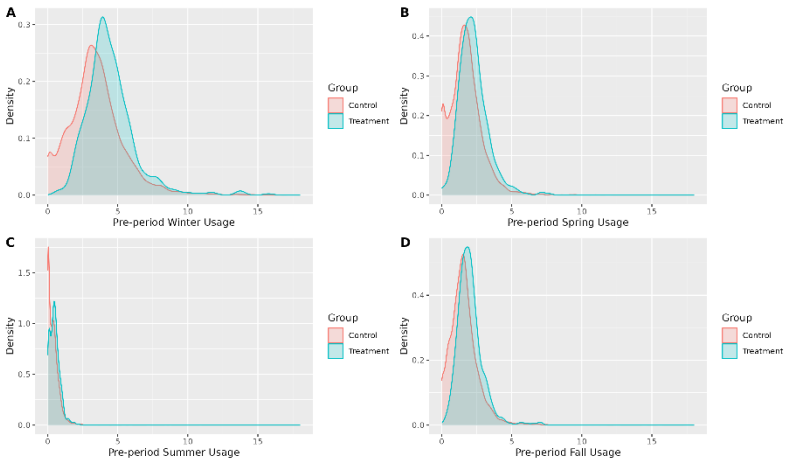
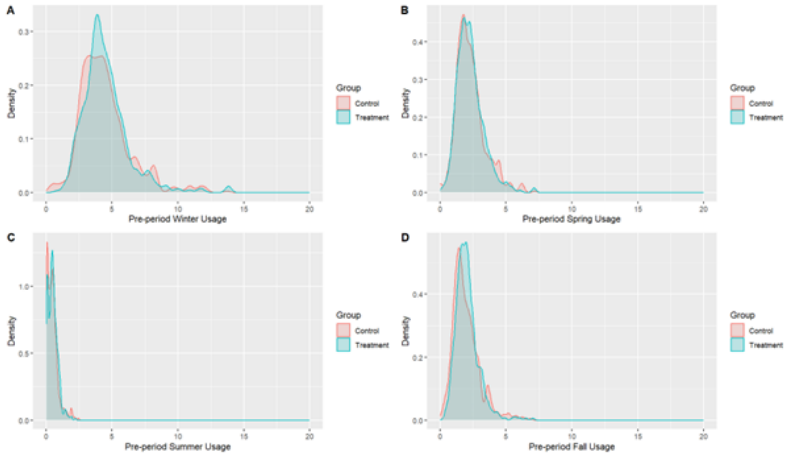


Figure 6-2: Covariate Balance After Matching, Shell Attic Insulation and Shell Window Replacement, Washington and Idaho



The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure. The t-test displayed no statistically significant differences at the 95% level in average daily consumption between the treatment and control groups for any month in the pre-period.

Table 6-3 -provides results for the *t*-test on pre-period usage between the treatment and control groups after matching for the Shell program. The P-Value is over 0.05 for each month, meaning pre-period usage between treatment and control groups is similar at the 95% confidence level.

Table 6-3: Pre-period Usage T-test for Attic Insulation and Window Replacement Washington and Idaho, Shell Program

Month	Average Daily Usage (Therms), Control	Average Daily Usage (Therms), Treatment	T Statistic	Std Error	P-Value	Reject Null?
Jan	2.227	2.296	-1.059	0.046	0.290	No
Feb	2.222	2.290	-1.053	0.046	0.293	No
Mar	2.218	2.294	-1.182	0.046	0.237	No
Apr	2.199	2.285	-1.334	0.046	0.183	No
May	2.213	2.288	-1.151	0.046	0.250	No
Jun	2.204	2.281	-1.196	0.046	0.232	No
Jul	2.202	2.288	-1.342	0.046	0.180	No
Aug	2.202	2.290	-1.350	0.046	0.177	No
Sep	2.203	2.290	-1.347	0.046	0.178	No
Oct	2.217	2.286	-1.059	0.046	0.290	No
Nov	2.218	2.284	-1.013	0.046	0.311	No

Dec	2.215	2.288	-1.114	0.046	0.265	No

Table 6-4 provides customer counts for customers in the final regression model by assigned weather station ID for each measure. In addition, TMY HDD and CDD from the nearest available TMY weather station is provided as well as the weighted HDD/CDD for each measure. The HDD and CDD was weighted by the number of treatment customers assigned to a weather station.

Table 6-4: TMY Weather, Shell Program

Measure	USAF Station ID	# of Treatment Customers	TMY USAF ID	TMY HDD	TMY CDD	Weighted TMY HDD	Weighted TMY CDD
G Attic Insulation With Natural Gas Heat and G Window Replc With Natural Gas Heat	720322	2	726985	4207	245	6050	422
	726817	14	726985	4207	245	6050	422
	727827	7	727827	5301	724	6050	422
	727830	33	727830	5347	861	6050	422
	727834	68	727834	6773	343	6050	422
	727850	11	727850	6436	224	6050	422
	727855	4	727855	7224	437	6050	422
	727856	350	727856	6052	437	6050	422
	727857	40	727857	6322	265	6050	422
	727870	24	727857	6322	265	6050	422

Table 6-5 provides annual savings per customer for the Shell program for each measure and regression model. The PPR model was selected for ex post savings because it provided the best fit for the data (highest adjusted R-squared).

Table 6-5: Measure Savings for All Regression Models, Shell Program

Measure	Model	# of Treatment Customers		# of Control Customers	Annual Savings/ Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared
G Attic Insulation and G Window Replc With Natural Gas Heat	Diff-in-diff	439	436	23.84*	0.00	85.89	0.61	0.93
	PPR	439		436	148.80	77.00	220.67	
	Treatment Only (Gross)	439	436	69.44*	0.00	154.61	0.64	

*Not statistically significant

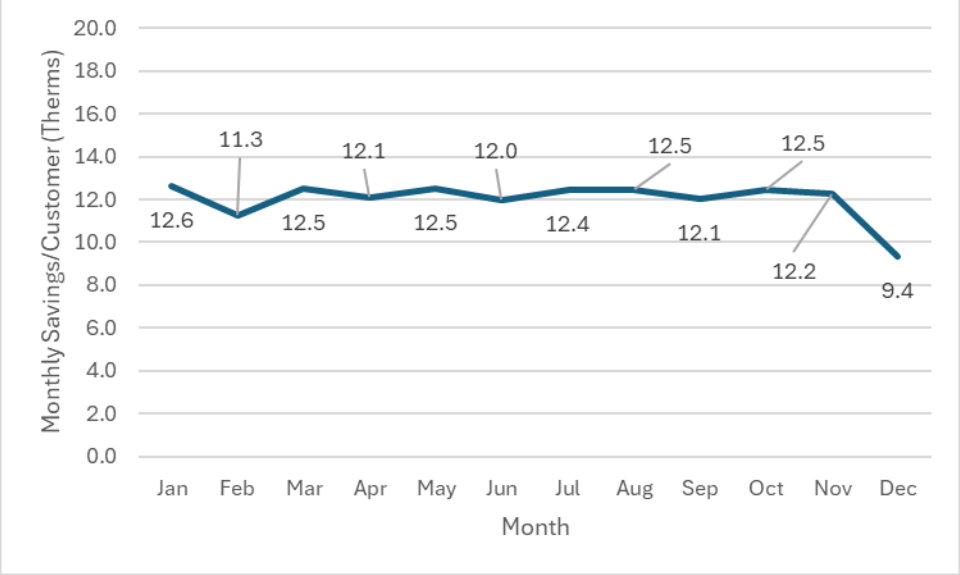
Savings are statistically significant at the 90% level for the combined measures and the adjusted R-squared shows the model provided an excellent fit for the data. The results of the billing analysis indicate no statistically significant savings were found for the window replacement measures.

Table 6-6: Measure Savings, Shell Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
G Attic Insulation and G Window Replc With Natural Gas Heat	439	436	148.80	77.00	220.67	0.93	Model 2: PPR

Figure 6-3 provides monthly TMY savings per customer for the Shell program. As expected for gas weatherization measures, the greatest savings occur during the winter months.

Figure 6-3: Monthly Savings, Shell Program



6.2 Low-Income Program

The Evaluators conducted a whole-home billing analysis for all the natural gas measures combined in order to estimate savings for the average household participating in the program, across all measures. The Evaluators successfully created a matched cohort for the natural gas measure households. Customers were matched on their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household.

The Evaluators were provided a considerable pool of control customers to draw upon, as shown in Table 6-7. The Evaluators used propensity score matching. Also shown in Table 6-7, are the impact of various restrictions on the number of treatment and control customers that were included in the final regression model. The “Starting Count” displays the beginning number of customers available prior to applying the data restrictions, while the “Ending Count” displays the number of customers after applying data restrictions and final matching.

Table 6-7: Cohort Restrictions, Low-Income Program

Measure	Data Restriction	# of Treatment Customers	# of Control Customers
Whole home natural gas	Starting Count	278	296
	Install Date Range: January 1, 2022 to Dec 31, 2022	278	296
	Control Group Usage Outlier (>2X max treatment usage)	223	287
	Incomplete Post-Period Bills (<6 months)	142	177
	Incomplete Pre-Period Bills (<10 months)	136	171
	Ending Count (Matched by PSM)	130	168

Figure 6-4 and Figure 65

Figure 6-5 display the density of each variable employed in propensity score matching for the combined natural gas measures before and after conducting matching.

The distributions prior to matching appear to be less similar in summer, with control customers averaging higher usage. However, after matching, the pre-period usage distribution in summer is more similar between the groups. The remaining pre-period seasons (winter, summer, fall), closely overlap before and after matching, indicating little differences exist on average between the groups prior to matching and validating the initial selection of control customers.

Figure 6-44: Covariate Balance Before Matching, Low Income Gas Measures

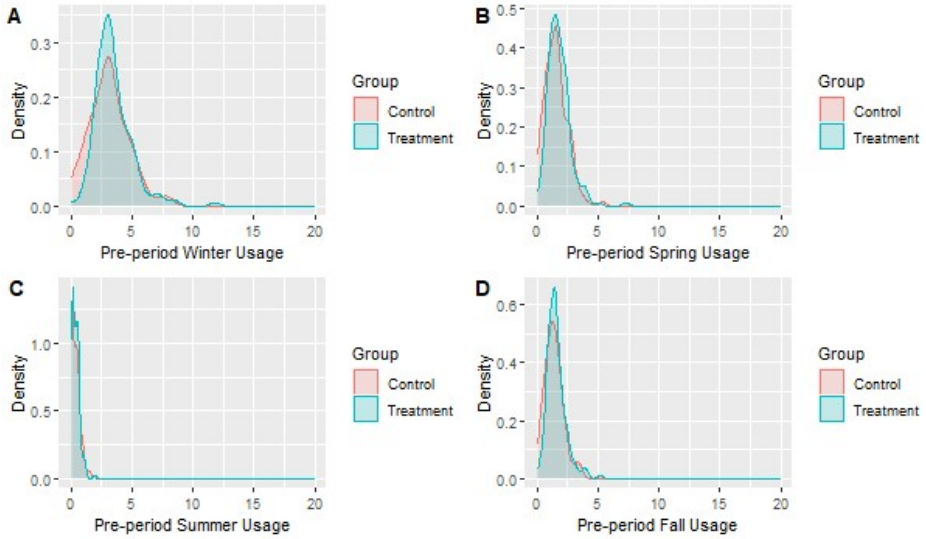
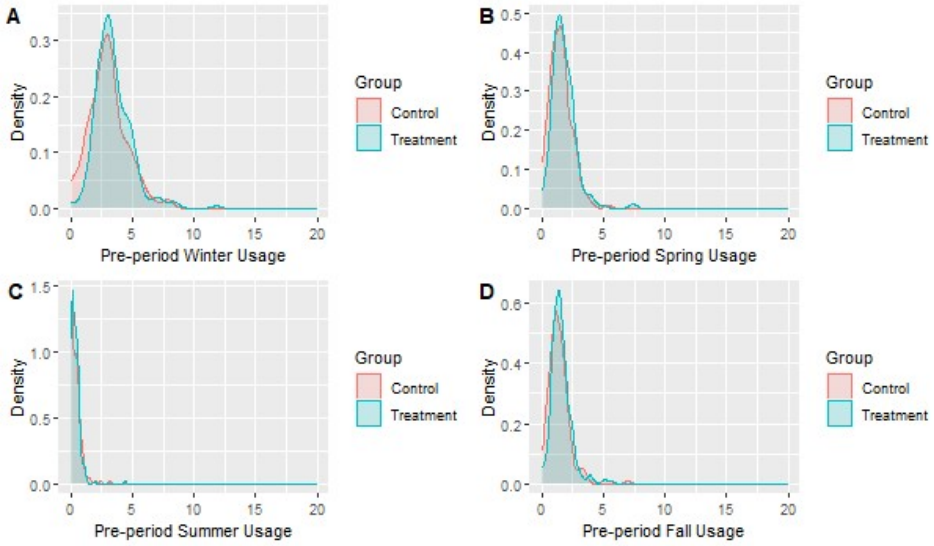


Figure 6-55: Covariate Balance After Matching, Low Income Gas Measures



The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure. The t-test displayed no statistically significant differences at the 95% level in average daily consumption between the treatment and control groups for any month in the pre-period. In addition, the chi-squared test returned a p-value well over 0.05 for all measures, indicating that pre-period usage was balanced between the groups. Lastly, the standardized difference test returned values well under the recommended cutoff of 25, and always falling under 10, further indicating the groups were well matched on all included covariates.

Table 6-8 provides results for the *t*-test on pre-period usage between the treatment and control groups after matching for the Low-Income program. The P-Value is over 0.05 for each month, meaning pre-period usage between treatment and control groups is similar at the 95% confidence level.

Table 6-8: Pre-period Usage T-test for Gas Measures, Low-Income Program

Month	Average Daily Usage (Therms), Control	Average Daily Usage (Therms), Treatment	T Statistic	Std Error	P-Value	Reject Null?
Jan	3.07	3.60	-3.23	0.16	0.00	Yes
Feb	2.82	3.14	-2.18	0.15	0.03	Yes
Mar	2.20	2.39	-1.57	0.12	0.12	No
Apr	1.48	1.79	-3.32	0.09	0.00	Yes
May	0.73	1.00	-4.46	0.06	0.00	Yes
Jun	0.42	0.46	-1.19	0.04	0.23	No
Jul	0.32	0.26	2.07	0.03	0.04	Yes
Aug	0.30	0.25	1.94	0.03	0.05	No
Sep	0.38	0.40	-0.50	0.03	0.62	No
Oct	1.06	1.24	-2.87	0.06	0.00	Yes
Nov	2.47	2.66	-1.63	0.12	0.10	No
Dec	2.87	3.04	-1.27	0.13	0.20	No

Table 6-9 provides customer counts for customers in the final regression model by assigned weather station ID for each measure. In addition, TMY HDD and CDD from the nearest available TMY weather station is provided as well as the weighted HDD/CDD for each measure. The HDD and CDD was weighted by the number of treatment customers assigned to a weather station.

Table 6-9: TMY Weather, Low-Income Program

Measure	USAF Station ID	# of Treatment Customers	TMY USAF ID	TMY HDD	TMY CDD	Weighted TMY HDD	Weighted TMY CDD
All Gas Measures	725895	3	725895	6853	238	5954	416
	725970	15	725970	4726	541	5954	416
	725975	6	725975	5778	329	5954	416
	726817	3	726985	4207	245	5954	416
	726886	1	726886	7130	247	5954	416
	726904	1	726904	4003	323	5954	416
	727830	2	727830	5347	861	5954	416
	727834	6	727834	6773	343	5954	416
	727850	2	727850	6436	224	5954	416
	727855	1	727855	7224	437	5954	416
	727856	112	727856	6052	437	5954	416

	727857	11	727857	6322	265	5954	416
	727870	5	727857	6322	265	5954	416

Table 6-10 provides annual savings/customer for the Low-Income program the program. Model 2 (PPR) was selected as the final model for the Low Income Program as it provided the highest adjusted R-squared among the regression models. Savings are statistically significant at the 90% level for all measures and the adjusted R-squared shows the model provided an excellent fit for the data (adjusted R-squared > 0.90).

Table 6-10: Measure Savings for All Regression Models, Low-Income Program

Measure	Model	# of Treatment Customers	# of Control Customers	Annual Savings/Customer	90% Lower CI	90% Upper CI	Adjusted R-Squared
All Gas Measures	Diff-in-diff	130	168	59.58*	0	164.49	0.55
	PPR	130	168	13.64*	0	31.23	0.92
	Treatment Only (Gross)	130	168	69.22*	0	242.63	0.60

*Not statistically significant

The results of the billing analysis indicate no statistically significant savings were found for the gas measures.

6.3 HVAC Program

Four gas measures met the inclusion criteria necessary for billing analyses. Key components of these inclusion criteria included having at least 75 customers who only installed a single measure, full details can be found in Section 2.2.3.5. These four measures were Smart Thermostat Contractor Install, Smart Thermostat Self Install, High Efficiency Natural Gas Furnaces, and Natural Gas Multi-Stage or Modulating Furnaces. The Evaluators employed a regression-based pre vs. post billing analysis methodology, as outlined in Section 2.2.3.6, to calculate the savings associated with thermostat installation. Of note, the PSM process to create matching control cohorts for these two thermostat measures involved a caliper of 0.2, a ratio of 1, and a “nearest” matching methodology. In contrast, the Evaluators used a heating load estimation methodology, as outlined in Section 2.2.3.7, to assess furnace savings. Heating load estimation only requires post-period billing data from treatment customers, so PSM was not necessary for this analysis.

As detailed in Section 2.2.3.6, the regression model with the highest adjusted R-squared was selected for reporting. For smart thermostats, as outlined in the table below, the PPR regression yielded the best fit.

Table 6-11: Thermostat Regression Adjusted R-squared

Measure	DnD Adj R-squared	PPR Adj R-squared	Treatment Only Adj R-squared
Smart Thermostat Contractor Install	0.58	0.91	0.83
Smart Thermostat Self Install	0.59	0.93	0.83

Both smart thermostat regressions yielded statistically significant results, which suggests that both contractor and self-installed smart thermostats are associated with a decrease in customer gas usage. Full regression results for contractor and self-installed thermostats are outlined below in Table 6-12 and Table 6-13, respectively.

Table 6-12: Contractor Installed Thermostat PPR Results

Metric	Value
Treatment sample population (*n*)	200
Control sample population (*n*)	200
Annual savings (Therms)	16.95
Pooled Standard Error	10.55
90% Confidence Interval	17.35
90% Relative Precision	1.02
P value	0.02

Table 6-13: Self Installed Thermostat PPR Results

Metric	Value
Treatment sample population (*n*)	356
Control sample population (*n*)	356
Annual savings (Therms)	29.46
Pooled Standard Error	6.80
90% Confidence Interval	11.19
90% Relative Precision	0.38
P value	< 0.01

Meanwhile, the heating load estimation methodology was used to calculate annual savings for High Efficiency Natural Gas Furnaces and Natural Gas Multi-Stage or Modulating Furnaces. Since this calculation methodology is based on a deemed savings algorithm (not a regression) it does not produce measures of goodness of fit or statistical significance. However, the Evaluators did calculate standard error, 90% confidence and precision metrics for this analysis. A full outline of the key billing analysis results associated with each HVAC furnace measure can be found below.

Table 6-14: Natural Gas Furnace Heating Load Estimation Results

Metric	Value
Treatment sample population (*n*)	109
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%[13]
Installed Furnace Efficiency	95%
Annual savings (Therms)	48.22
Pooled Standard Error	0.80
90% Confidence Interval	1.32
90% Relative Precision	0.03

Table 6-15: Natural Gas Multi-Stage or Modulating Furnace Heating Load Estimation Results

Metric	Value
Treatment sample population (*n*)	46.5[14]
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%
Installed Furnace Efficiency	95%
Annual savings (Therms)	48.25
Pooled Standard Error	1.88
90% Confidence Interval	3.10
90% Relative Precision	0.06

Of note, heating load estimation savings are highly dependent on the baseline used in calculations. The 88.5% baseline outlined in the Regional Technical Forum's gas furnace UES measure workbook represents a precise regional estimate. However, if the federal minimum standard of 80% was used in heating load calculations instead, estimated annual savings would reach 123 Therms for both Natural Gas Furnaces and Natural Gas Multi-Stage or Modulating Furnaces.

6.4 Water Heat Program

The only gas measure that met inclusion criteria for the Water Heat program was Natural Gas Tankless Water Heaters. The Tankless Water Heater cohort began with 187 treatment customers; however, after preprocessing, billing data from 129 customers was used in the regression analyses. As with smart thermostats, a caliper of 0.2, a ratio of 1, and a "nearest" matching methodology was used to develop a matched control cohort of non-participant customers. The Difference-in-Difference regression yielded an adjusted R-squared of 0.55, the PPR yielded an adjusted R-squared of 0.98, and the Treatment Only regression yielded an adjusted R-squared of 0.80. As such PPR was selected for reporting. The following table outlines the PPR results for Natural Gas Tankless Water Heater program.

[13] The Regional Technical Forum outlines current practice furnace efficiency as 88.5% as of the July 2021 publication of the Gas Furnace UES workbook version 1.1.

[14] Heating load estimation is calculated monthly, so 46.5 is the average customers included in each month of valid billing data in 2023.

Table 6-16: Natural Gas Tankless Water Heater PPR Results

Metric	Value
Treatment sample population (*n*)	129
Control sample population (*n*)	129
Annual savings (Therms)	21.62
Pooled Standard Error	10.55
90% Confidence Interval	17.36
90% Relative Precision	0.80
P value	< 0.01

6.5 Midstream Program

The only billing analyses for the Midstream program that yielded valid results were for the Residential Furnace and Residential HVAC measures. While the Residential Heat Pump Water Heater and Residential Water Heater programs passed the PSM, they only had 7 and 4 treatment customers each, making the results of the regression analysis invalid due to such small sample sizes. As with the HVAC program, the heating load savings estimate methodology was employed for both of these space heating measures. Key savings results for the midstream residential furnace and HVAC measures are outlined below.

Table 6-17: Midstream Residential Furnace Heating Load Estimation Results

Metric	Value
Treatment sample population (*n*)	26.5[15]
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%
Installed Furnace Efficiency	95%
Annual savings (Therms)	47.43
Pooled Standard Error	1.14
90% Confidence Interval	1.88
90% Relative Precision	0.04

Table 6-18: Midstream Residential HVAC Heating Load Estimation Results

Metric	Value
Treatment sample population (*n*)	13.4
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%
Installed Furnace Efficiency	95%
Annual savings (Therms)	51.73
Pooled Standard Error	4.81
90% Confidence Interval	7.91
90% Relative Precision	0.15

[15] As above, heating load estimation is calculated monthly, so 26.5 represents the average customers included in each month of valid billing data in 2023.

7. Appendix B: Summary of Survey Respondents

This section summarizes additional insights gathered from the simple verification surveys deployed by the Evaluators for the impact evaluation of Avista's Residential and Low-Income Programs.

Survey respondents confirmed installing between one and three measures that were rebated by Avista, displayed in Table 7-1. This table is missing information from 29 low-income, CEEP, and MFDI survey respondents who did not indicate the number nor type of measures they received.

Table 7-1: Type and Number of Measures Received by Respondents

Measure Category	Total	Percent (n=305)
No Measures	304	13.8%
One Measure	1218	55.4%
Two Measures	440	20.0%
Three Measures	171	7.8%
Four Measures	47	2.1%
Five or more measures	20	0.9%
HVAC	289	13.1%
Water Heater	136	6.2%
Smart Thermostat	515	23.4%
Clothes Washer	297	13.5%
Clothes Dryer	189	8.6%

The Evaluators asked respondents to provide information regarding their home, as displayed in Table 7-2. Similar to previous impact evaluation findings, the majority of respondents noted owning a single-family home between 1,000-3,000 square feet with central air conditioning.

Table 7-2: Survey Respondent Home Characteristics[16]

Question	Response	Percent
Do you rent your home? (n=755)	Own	93.8%
	Rent	1.9%
	Own and rent to someone else	1.3%
	I don't know	0.1%
	Prefer not to answer	2.9%
Which of the following best describes your home? (n=755)	Single-family house detached	86.0%
	Single-family house attached to one or more other houses	2.3%
	Mobile or manufactured home	8.2%
	Apartment with 2 to 4 units	0.8%
	Apartment with 5+ units	0.3%
	Other	1.4%
	I don't know	0.2%
	Prefer not to answer	0.7%
Does your home have central air conditioning? (n=755)	Yes	72.6%
About how many square feet is your home? (n=629)	Less than 1,000ft^2	6.6%
	1,000-1,999ft^2	42.4%
	2,000-2,999ft^2	32.3%
	3,000-3,999ft^2	13.5%
	4,000ft^2 or more	5.2%
When was your home built? (n=719)	Before 1950	20.0%
	1950 to 1959	10.3%
	1960 to 1969	6.6%
	1970 to 1979	15.3%
	1980 to 1989	7.7%
	1990 to 1999	15.3%
	2000 to 2009	13.2%
	2010 to 2019	4.7%
	2020 to Present	5.6%
	I don't know	1.1%
	Prefer not to answer	0.2%

[16] Four contractors or construction companies were not asked these questions.

8. Appendix C: Site-Specific Site Reports

This section displays site reports for each sampled project in the Site-Specific Program.

Project Number SSOP_108641

Project Background

The participant is a school district that received incentives from Avista for replacing an inefficient boiler with a single efficient model at a senior high school. The Evaluators verified the participant had replaced:

- (1) Ajax 68% efficient natural gas boiler with (1) Riello Array 90% efficient natural gas boiler

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. Savings for the boiler measure was calculated using a weather-optimized billing analysis. The regression used one full year of pre-project natural gas billing data, one full year of post-project billing data and TM3 data, with HDD based on a fitted, optimized heating point (50 degrees).

The yearly operation does not vary over time. Equipment setpoints and maintenance schedules will also remain unchanged.

Savings Calculations

Using inputs described above, the Evaluators calculated boiler savings as follows:

HDD and Model Fit

HDD base	'Pre' model R^2	'Post 'Model R^2
50	0.96	0.95

Pre/Post Use and Therm Savings

Expected Therm Savings	Annual Pre Usage (Therms)	Annual Post Usage (Therms)	Verified Therm Savings	Realization Rate
1,667	40,280	21,983	18,298	1,098%

Results

For project #108641 the therm realization rate is 1,098%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified Therm Savings	Therm Realization Rate
One (1) 90% NG boiler replacing one (1) 68% NG boiler	18,298	1,098%
Totals:	**18,298**	**1,098%**

Measured savings are higher than ex ante predictions.

Project Number SSOP_109167

Project Background

The participant is a hospital that received incentives from Avista for replacing two end of life boilers with three efficient models. The Evaluators verified the participant had replaced:

- (2) American Standard 82% efficient natural gas boilers with (3) Lochinvar 96% efficient natural gas boilers

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. Savings for the boiler measure was calculated using a weather-optimized billing analysis. The regression used 8 months of pre-project natural gas billing data, one full year of post-project billing data and TM3 data, with HDD based on a fitted, optimized heating point (50 degrees).

The yearly operation does not vary over time. Equipment setpoints and maintenance schedules will also remain unchanged.

Savings Calculations

Using inputs described above, the Evaluators calculated boiler savings as follows:

HDD and Model Fit

HDD base	'Pre' model R^2	'Post 'Model R^2
50	0.83	0.97

Pre/Post Use and Therm Savings

Expected Therm Savings	Annual Pre Usage (Therms)	Annual Post Usage (Therms)	Verified Therm Savings	Realization Rate
22,996	156,648	146,117	10,531	46%

Results

For project #108641 the therm realization rate is 1,098%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified Therm Savings	Therm Realization Rate	Therm Adjustments
One (3) 96% NG boiler replacing one (2) 82% NG boiler	10,531	46%	0
Totals:	**10,531**	**46%**	**0**

Measured savings are lower than ex ante predictions.

Project Number SSOP_121553

Project Background

The participant is an assembly that received incentives from Avista for replacing the facility's three electric water heaters with a new efficient natural gas system. The Evaluators verified the participant had installed:

- (1) Tankless water heater
- (1) 82 gallon tank water heater

M&V Methodology

The Evaluators reviewed all project documentation including plans, photos, invoices and simulation outputs, to verify the installation of rebated equipment. The Evaluators attempted to conduct a key parameter retrofit analysis (Option A).

To verify savings, the Evaluators instead examined materials used to develop expected savings estimates, scrutinizing each of the inputs and cross-checked the model results using engineering algorithms. The Evaluators found all assumptions and inputs to be reasonable given the project and prescriptive calculations yielded similar Therms savings estimated, corroborating savings claims.

Savings Parameters

Specific input parameters assumed in the analysis and confirmed by the Evaluators are:

Measure Parameters/Characteristics

Baseline				Efficient					Therm Savings	Therm Reductions	Total Therm Savings
Eff	DB Air Entering (F)	DB Air Leaving (F)	Tank Volume (gal)	Eff	DB Air Entering (F)	DB Air Leaving (F)	Tank Volume (gal)	R-Value			
68%	68	160	50	95%	55	160	52200 (gal/year)	0.56	194.4	45.6	240.0
				95%	68	160	82	12.5			

**The top row of the efficient columns defines the tankless heater*

Results

For project # SSOP_121533, the realization rate is 105.%.

Verified Gross Savings & Realization Rates

Measure	Verified	
	Therms Savings	Realization Rate
Water Heater Retrofit	240	105%
Totals:	**240**	**105%**

A cause of discrepancy is that the implementer reported the temperature of the water exiting to be 155 F, rather than 160 F.

APPENDIX C – 2023 COST-EFFECTIVENESS TABLES

Electric

Electric Portfolio

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 18,834,190	$ 15,458,671	1.22
Utility Cost Test (UCT)	$ 11,725,343	$ 8,069,657	1.45
Participant Cost Test (PCT)	$ 22,657,795	$ 7,389,014	N/A*
Ratepayer Impact (RIM)	$ 11,725,343	$ 23,618,605	0.50

* Participant Cost Test is not appropriate to apply to Low Income benefits and costs. These totals include Low Income totals aggregated with Residential and Commercial totals.

Electric Portfolio (Without Low-Income)

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 12,037,002	$ 14,595,785	0.82
Utility Cost Test (UCT)	$ 11,447,282	$ 7,080,337	1.62
Participant Cost Test (PCT)	$ 15,513,031	$ 7,515,448	2.06
Ratepayer Impact (RIM)	$ 11,447,282	$ 22,003,649	0.52

Residential

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 3,434,404	$ 2,341,695	1.47
Utility Cost Test (UCT)	$ 2,844,719	$ 1,058,041	2.69
Participant Cost Test (PCT)	$ 6,222,228	$ 1,283,654	4.85
Ratepayer Impact (RIM)	$ 2,844,719	$ 6,690,584	0.43

Commercial/Industrial

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 8,602,598	$ 12,254,090	0.70
Utility Cost Test (UCT)	$ 8,602,563	$ 6,022,296	1.43
Participant Cost Test (PCT)	$ 9,290,803	$ 6,231,794	1.49
Ratepayer Impact (RIM)	$ 8,602,563	$ 15,313,064	0.56

Low Income

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 6,797,188	$ 862,886	7.88
Utility Cost Test (UCT)	$ 278,060	$ 989,320	0.28
Participant Cost Test (PCT)	$ 7,144,764	$ (126,434)	N/A*
Ratepayer Impact (RIM)	$ 278,060	$ 1,614,956	0.17

* Participant Cost Test is not appropriate to apply to Low Income benefits and costs. These totals include Low Income totals aggregated with Residential and Commercial totals.

Natural Gas

Natural Gas Portfolio

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 2,386,009	$ 6,665,220	0.36
Utility Cost Test (UCT)	$ 2,071,628	$ 2,059,959	1.01
Participant Cost Test (PCT)	$ 28,574,595	$ 4,605,261	N/A*
Ratepayer Impact (RIM)	$ 2,071,628	$ 30,320,172	0.07

* Participant Cost Test is not appropriate to apply to Low Income benefits and costs. These totals include Low Income totals aggregated with Residential and Commercial totals.

Natural Gas Portfolio (Without Low-Income)

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 2,181,858	$ 6,618,921	0.33
Utility Cost Test (UCT)	$ 2,052,532	$ 1,698,835	1.21
Participant Cost Test (PCT)	$ 28,090,503	$ 4,920,086	5.71
Ratepayer Impact (RIM)	$ 2,052,532	$ 29,660,012	0.07

Residential

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 1,642,344	$ 6,167,894	0.27
Utility Cost Test (UCT)	$ 1,526,609	$ 1,256,435	1.22
Participant Cost Test (PCT)	$ 21,366,135	$ 4,911,459	4.35
Ratepayer Impact (RIM)	$ 1,526,609	$ 22,506,835	0.07

Commercial/Industrial

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 539,514	$ 451,026	1.20
Utility Cost Test (UCT)	$ 525,923	$ 442,399	1.19
Participant Cost Test (PCT)	$ 6,724,369	$ 8,627	779.45
Ratepayer Impact (RIM)	$ 525,923	$ 7,153,177	0.07

Low Income

Cost-Effectiveness Test	Benefits	Costs	Ratio
Total Resource Cost (TRC)	$ 204,151	$ 46,299	4.41
Utility Cost Test (UCT)	$ 19,095	$ 361,124	0.05
Participant Cost Test (PCT)	$ 484,091	$ (314,825)	N/A*
Ratepayer Impact (RIM)	$ 19,095	$ 660,159	0.03

* Participant Cost Test is not appropriate to apply to Low Income benefits and costs. These totals include Low Income totals aggregated with Residential and Commercial totals.

APPENDIX D – 2023 EXPENDITURES BY PROGRAM

Program	Electric	Natural Gas	Total
Energy Efficiency			
Low-Income/CEEP			
Low-Income	$ 745,899	$ 344,129	$ 1,090,028
Residential			
Water Heat	$ 1,615	$ 56,100	$ 57,715
HVAC	$ 128,179	$ 454,975	$ 583,154
Shell	$ 81,921	$ 204,553	$ 286,474
Fuel Efficiency	$ 64,050	$ –	$ 64,050
ENERGY STAR Homes	$ 14,000	$ 600	$ 14,600
Multifamily Weatherization	$ 13,078	$ 34,857	$ 47,936
Multifamily Direct-Install	$ 101,263	$ 880	$ 102,143
Appliances	$ 38,100	$ 5,450	$ 43,550
Midstream	$ 115,290	$ 242,550	$ 357,840
Always-on Home Energy Report	$ –	$ –	$ –
Commercial/Industrial			
Prescriptive Lighting	$ 1,969,025	$ –	$ 1,969,025
Small Business Lighting	$ 1,832,804	$ –	$ 1,832,804
HVAC	$ 8,400	$ 39,626	$ 48,026
Food Service Equipment	$ –	$ 7,400	$ 7,400
Grocer	$ 280	$ –	$ 280
Shell	$ 2,423	$ 49,250	$ 51,673
Green Motors	$ –	$ –	$ –
Midstream	$ 21,350	$ 58,475	$ 79,825
Site-Specific	$ 402,074	$ 87,120	$ 489,194
Energy Efficiency Total	**$ 5,539,751**	**$ 1,585,968**	**$ 7,125,716**
Market Transformation			
Northwest Energy Efficiency Alliance	$ 587,551	$ 176,755	$ 764,306
Market Transformation Total	**$ 587,551**	**$ 176,755**	**$ 764,306**
Other Programs and Activities			
General Implementation	$ 367,961	$ 35,253	$ 403,214
Labor Costs	$ 1,559,330	$ 192,835	$ 1,752,165
Advertising and Outreach	$ 97,619	$ 10,846	$ 108,465
Third Party Implementation	$ 483,965	$ 235,060	$ 719,025
Pilot Programs	$ 28,579	$ 350	$ 28,929
EM&V/CPA	$ 189,452	$ 105,501	$ 294,953
Other	$ (7,548)	$ –	$ (7,548)
Other Programs and Activities Total	**$ 2,719,358**	**$ 579,844**	**$ 3,299,202**
Grand Total*	**$ 8,846,660**	**$ 2,342,565**	**$ 11,189,225**

* Totals may differ from tariff rider spend due to differences between vendor invoice cadence and ledger close dates.

APPENDIX E – 2023 ENERGY EFFICIENCY ACTIVITY BY PROGRAM

	Electric				Natural Gas			
Energy Efficiency Program	Participants		Evaluated Savings (kWh)	Utility Cost	Participants		Evaluated Savings (Therms)	Utility Cost
Low-Income								
Weatherization	61	Homes	34,080	$ 161,648	17	Homes	219	$ 20,405
HVAC	41	Units	137,090	$ 734,114	28	Units	1,743	$ 234,178
Water Heat	–	Units	–	$ –	9	Units	63	$ 47,268
Lighting	17	Units	102	$ 507	–	N/A	–	$ –
Health and Safety	22	HHS	–	$ 92,089	8	HHS	–	$ 35,796
ENERGY STAR Refrigerator	1	Units	39	$ 961	–	N/A	–	$ –
Low-Income Total	**142**		**171,311**	**$ 989,320**	**62**		**2,025**	**$ 344,129**
Residential								
ENERGY STAR Homes	14	Homes	47,508	$ 27,768	1	Homes	134	$ 805
HVAC	266	Furnace, Tstat	307,573	$ 217,313	1,641	Furnace, Tstat	85,264	$ 585,556
Water Heat	7	Units	4,066	$ 2,793	156	Units	9,051	$ 69,962
Multifamily Direct-Install	2,744	Units (Measures)	172,921	$ 151,375	68	Units (Measures)	227	$ 1,228
Shell	158	Windows, Insulation	155,539	$ 126,996	383	Windows, Insulation	18,117	$ 232,299
Appliances	555	Washer/ Dryer	81,599	$ 61,747	115	Washer/ Dryer	396	$ 6,056
Fuel Efficiency	28	Units	193,123	$ 120,017	–	Units	–	$ –
Midstream	263	Units	683,356	$ 313,325	578	Units	48,830	$ 317,333
Multifamily Weatherization	63	Units (Measures)	81,535	$ 36,707	132	Units (Measures)	5,445	$ 43,196
Residential Total	**4,098**		**1,727,220**	**$ 1,058,041**	**3,074**		**167,464**	**$ 1,256,435**
Commercial/Industrial								
Commercial Grocer & Food Equipment	20	Projects	1,928	$ 533	16	Projects	3,930	$ 20,109
Variable Freq Drive/ HVAC	3	Projects	42,924	$ 14,024	36	Projects	12,969	$ 81,567
Shell	7	Projects	37,320	$ 7,312	12	Projects	7,117	$ 72,266
Green Motors	–	Motor Rewind	–	$ –	–	N/A	–	$ –
Prescriptive Lighting	60,149	Projects	7,978,849	$ 3,014,360	–	N/A	–	$ –
Site-Specific	23	Projects	2,556,219	$ 736,972	3	Projects	29,069	$ 181,128
Midstream	12	Projects	58,355	$ 28,995	43	Projects	8,922	$ 87,328
Small Biz Lighting	11,195	Units	2,956,164	$ 2,220,101	–	N/A	–	$ –
Commercial/ Industrial Total	**71,409**		**13,631,759**	**$ 6,022,296**	**110**		**62,007**	**$ 442,398**
Energy Efficiency Total	**75,649**		**15,530,290**	**$ 8,069,657**	**3,246**		**231,496**	**$ 2,042,963**

APPENDIX F – 2023 PROCESS EVALUATION REPORT

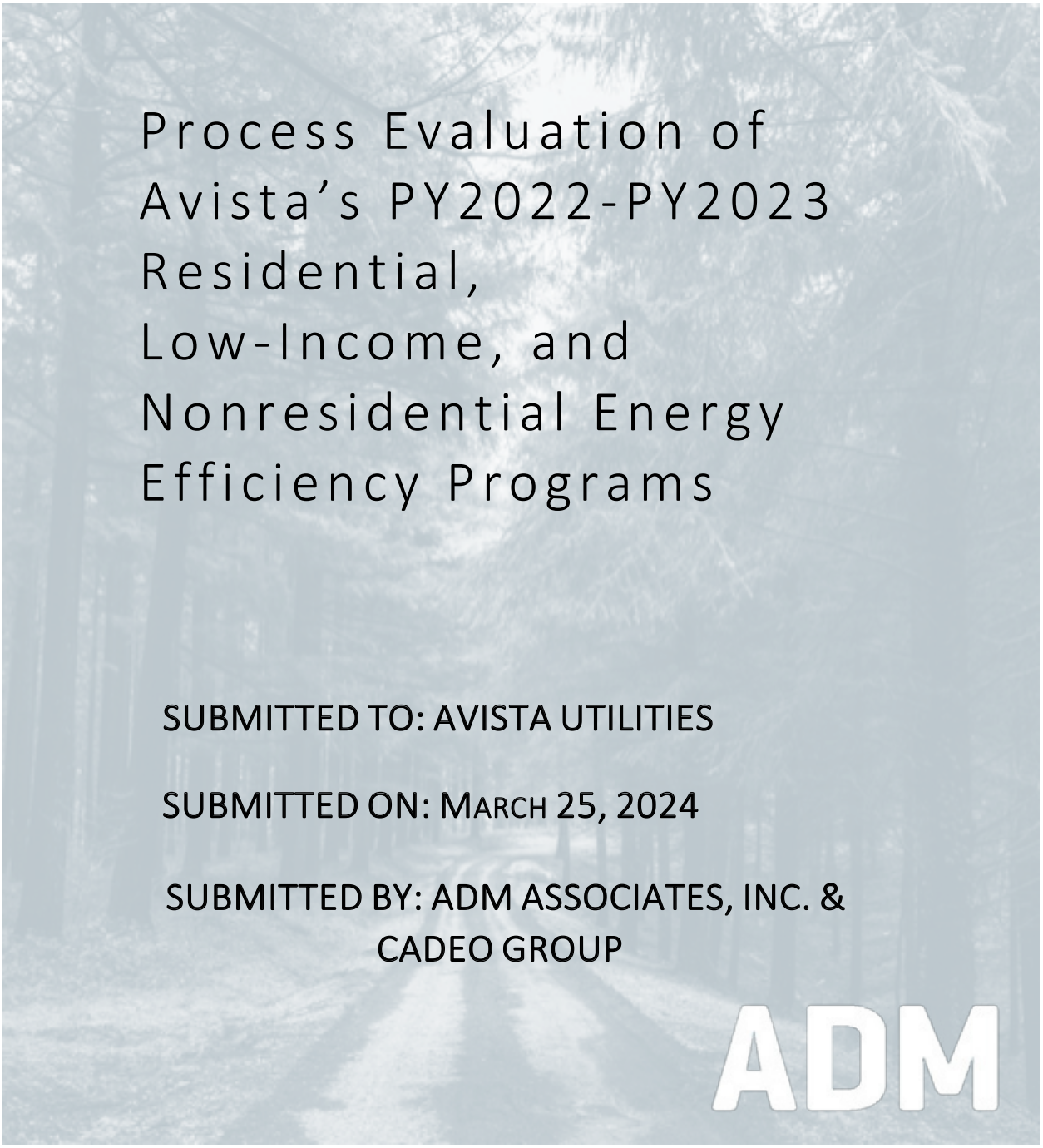


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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 EXECUTIVE SUMMARY

This report is a summary of the Residential, Low-Income, and Nonresidential Electric and Natural Gas Evaluation Process evaluation effort for the 2022 and 2023 program years (PY2022 and PY2023) portfolio of programs for Avista Corporation (Avista) in the Washington and Idaho service territory. The evaluation was administered by ADM Associates, Inc. and Cadeo Group, LLC (herein referred to as the "Evaluators").

1.1 RESEARCHABLE ISSUES

This report addresses research issues established for this evaluation, which include the following:

- **Understanding:** Establish a general understanding of the utility's current and past experience with the Residential, Low-Income, and Nonresidential electric and natural gas programs
- **Communication/Awareness:** Characterize how customers first learned about the program and the best channels to use to reach these customers
- **Point of Entry:** Identify ease of application process, barriers to participation, and put together suggestions to encourage participation in all programs
- **Participation Experience:** Identify customers' and market actors' level of satisfaction with services received, participation drivers, timeliness, suggestions for improvement, customer preference for online tracking and other potential program features
- **Impact/Effectiveness:** Identify satisfaction with program outcome, savings, other benefits customers perceive from participation
- **Additional Offerings:** Establish suggestions for program or service improvement to encourage customers to meet ongoing energy management needs

In the course of developing the final evaluation research plan, the following additional research issues applicable to all the Avista programs were identified:

- Is there a consistent and recognized branding across programs?
- Are there programs or program elements that are working at cross-purposes with each other?
- Are there significant overlaps across programs?
- Are the programs reaching all customer types, and if not, what additional steps or approaches may be required to reach them?
- Are important segments of the residential population not participating in any program?
- Are there elements of programs that can become more standardized and efficient?
- What are the growth areas within the residential market and residential efficiency potential, and how can the current programs address these areas of growth?
- How are the programs performing as determined by their POPMs?
- What information should be routinely tracked in order to measure progress relative to the Program Performance Metrics (PPMs) established for these programs?

Additional research issues for specific programs are included as part of the discussion of the individual program results. These research issues formed the basis evaluation. All of the data collection and analysis activities were designed to address them.

1.2 Data Collection and Analysis Methods

The evaluation utilized several data collection and analysis methods:

- **Web surveys:** For programs with data that included valid email addresses and customer names, the Evaluators fielded a web-based survey to collect information on multiple topics related to the process evaluation research issues discussed above. A total of 2,905 participant web surveys were completed. Further detail of the precision is summarized in Section 3.3.1.
- **In-depth interviews:** In addition to the web surveys, the Evaluators completed in-depth interviews of key market actors involved with the programs, including program staff, trade allies, builders, and distributors. The in-depth interviews were less structured than the web surveys; however, this more flexible approach allowed the interviewer to ask follow up questions and collect additional detail on important evaluation topics. A total of 61 in-depth interviews were completed, in addition to interviews with Avista program and management personnel. Further detail of the precision is summarized in Section 3.5.2.

Table 1-1 summarizes the electric programs offered to residential and low-income customers in the Washington Avista service territory in PY2022-PY2023 as well as the Evaluators' evaluation tasks and impact methodology for each program.

Table 1-1: Process Evaluation Activities by Program and Sector

Sector	Program	Participant/ Non-participant Surveys	Contractor Interviews	Staff Interviews
Residential	Water Heat	✓	✓	✓
Residential	HVAC	✓	✓	✓
Residential	Shell	✓	✓	✓
Residential	ENERGY STAR® Homes	✓		✓
Residential	Small Home & MF Weatherization	✓	✓	✓
Residential	Appliances	✓	✓	✓
Residential	AeroBarrier	✓		✓
Residential	Multi-family Direct Install	✓		✓
Residential	Midstream		✓	✓
Low-Income	Low-Income	✓	✓	✓
Low-Income	Community Energy Efficiency Program (CEEP)	✓		✓
Nonresidential	Lighting	✓	✓	✓
Nonresidential	HVAC	✓	✓	✓
Nonresidential	Food Service Equipment	✓		✓
Nonresidential	Grocer	✓		✓
Nonresidential	Shell	✓		✓
Nonresidential	Midstream		✓	✓
Nonresidential	Green Motors	✓		✓
Nonresidential	Site-Specific	✓	✓	✓

1.3 Conclusions and Recommendations

The following section details the Evaluators' conclusions and recommendations for each of the Residential, Low-Income, and Commercial Portfolio program evaluations.

1.3.1 Conclusions

1.3.1.1 Portfolio-Wide

The Evaluators provide the following conclusions regarding Avista's portfolio of electric programs:

1. **Satisfaction –** Across all programs, satisfaction among participants and trade allies was high. Respondents appreciate the assistance provided by Avista and the assistance and other program measures encouraged energy efficient equipment purchases and behavior changes. The most common reasons for dissatisfaction included insufficient incentives amounts and confusing program requirements, including the conversion from downstream prescriptive rebates to a midstream delivery channel.
2. **Program Awareness & Marketing –** Among non-participants in both the residential and commercial sectors, program awareness was low. Avista should consider increasing and modifying marketing efforts to better reach currently underserved populations. Moreover, responding trade allies in both sectors desire more co-branded marketing materials for program promotion.
3. **Midstream program –** Confusion regarding the new midstream program exists across customers, trade allies, and distributors. Avista should consider increased training and promotional campaigns related to the new midstream model.
4. **Barriers to Engagement –** The upfront cost of energy efficient equipment was the largest barrier to program engagement for both residential and nonresidential customers, followed by confusion around specific requirements to meet program criteria to redeem incentives.

1.3.1.2 Program-Level

The Evaluators provide the following conclusions regarding Avista's programs:

1.3.1.2.1 Residential Prescriptive Programs

5. **Program awareness –** Contractors and retailers and the Avista website were the most popular sources of program awareness for respondents from both the appliance rebate and weatherization programs.
6. **Program motivation –** About 50-60% of survey respondents from both the appliance rebate and weatherization programs were very or moderately interested in upgrading equipment in their homes for health and safety reasons, improving comfort, and increasing energy efficiency.
7. **Popular measures –** Among survey respondents, smart thermostats (n=497) and windows (n=463) were the most popular measures received through the residential single-family homes program.
8. **Experience with contractor –** Among the respondents who confirmed their use of a contractor to install their equipment (appliance rebate=551, weatherization=232), the majority of these respondents were satisfied with the work completed by their contractor. Previous experience with the contractor or a personal referral were the most popular ways respondents found contractors across both the programs. Few respondents indicated that their contractor provided them recommendations for other energy efficient upgrades (appliance=90, weatherization=35)
9. **Satisfaction –** In general, respondents were satisfied with all aspects of the appliance rebate and weatherization programs. The most common reasons for dissatisfaction were related to

insufficient rebates and a lack of transparency regarding program requirements and eligibility criteria.

10. **Program tenure –** Program tenure varied across the trade allies and midstream distributors interviewed. Some (n=15) of the interviewed trade allies had been engaged with the program for multiple years, while the midstream distributors were all new due to the infancy of the Midstream Program, which launched in the summer of 2023.
11. **Program promotion** – More than half of the weatherization and appliance rebate focused trade allies were not aware of Avista sponsored marketing materials (n=14). Across all the trade allies in both downstream and midstream models, trade allies completed the lion's share of program marketing and lead generation on their own, relying heavily on word of mouth.
12. **Program process** – Midstream distributors highlighted some issues with the website and general application flow of the midstream program, but noted that the program is new. Some appliance rebate trade allies also cited confusion over the new midstream program and how that might impact their work and program application processing moving forward.
13. **Barriers to energy efficient upgrades** – Both groups of trade allies cited upfront costs and low incentive rates as key barriers for customer engagement and program participation.

1.3.1.2.2 Multi-Family Direct Install

1. **Program Suspension –** The challenges caused by the COVID-19 pandemic forced the program staff to suspend the program in March of 2020. The program was then relaunched in April of 2022 (several months in during the 2022-2023 evaluation year). Despite this challenge, the program implementer, SBW, continued to operate the program with adjustments to its operational procedures.
2. **Program Satisfaction –** The property managers of the participating multi-family buildings expressed high satisfaction with the program. The program started with a high rate of participation (an average of 3,000 measures installed per month), but participation had greatly declined by the end of 2023 (an average of 1,000 measure installs per month). The program staff assessed the market is on the diminishing curve of opportunity.

1.3.1.2.3 Low-Income

1. **Program Implementation** – The Low-Income Program continues to effectively leverage existing CAP agency weatherization program infrastructure. Program integration has allowed the CAP agencies to take a holistic approach to deep energy efficiency upgrades and expand the measures available to customers.
2. **Program Satisfaction** – Most survey respondents expressed satisfaction with the program overall and reported increased satisfaction with Avista as a result of program participation. Despite mostly high satisfaction rates, some respondents expressed dissatisfaction with the quality of work performed by the CAP agencies.
3. **Program Challenges –** CAP agencies struggle to recruit and retain qualified crew members and subcontractors that meet prevailing wage requirements. Moreover, many income-qualified customers remain underserved due to a lack of funding committed to addressing expensive pre-weatherization health and safety repairs and long application wait times.

1.3.1.2.4 Home Energy Audit

1. **Program Engagement –** Despite a program pause during 2020-2021 due to the COVID-19 pandemic, the program has experienced significant attention and customer interest. Between 2022 and 2023, home audits nearly quadrupled, increasing from 121 in PY2022 to 463 in PY2023. This increase in program popularity has resulted in a lengthy waitlist with customers having to wait 5-6 months to receive an audit.
2. **Program Impact –** Survey respondents suggested that as result of the program, they are more interested in energy saving behaviors and in making energy efficient equipment improvements. Some respondents noted that they engaged in other Avista energy efficiency programs following their home energy audit, indicating that the HEA program is fueling interest in other offerings.
3. **Program Experience** – In general, survey respondents were satisfied with the HEA program. The area with the most dissatisfaction was the amount of time to receive the audit.

1.3.1.2.5 On Bill Repayment

1. **Marketing** – The OBR program has gained traction through effective marketing campaigns targeted at customers and trade allies.
2. **Increases Energy Efficient Equipment Purchases** – Most OBR survey respondents (69%) reported that they were unlikely to have purchased the energy efficient equipment without the OBR program assistance, and 85% of respondents indicated that the financing helped them make these improvements sooner.
3. **Program Satisfaction** – Survey respondents were generally satisfied with the OBR program and likely to recommend it to others.

1.3.1.2.6 Always On

1. **Program motivation –**About half of respondents were very or extremely interested in additional home improvements that would improve their health and safety, improve their comfort, and increase their home's overall energy efficiency.
2. **Program participation –** More than half of respondents remembered receiving an email alert from the Always On Program (61.3%, n=106). The majority of these respondents noted that when they receive the email they at least skim through the content (90.6%, n=96). Most respondents are satisfied with the number of updates provided through the program (68.2%, n=118).
3. **Website engagement –** Among the 100 respondents who read at least part of the email alert, more 16.0% (n=16) visited Avista's website to learn more about "always on" load. Of these, all but two found the tips Avista provides on the website to be at least somewhat helpful (n=14).
4. **Desired information –** Respondents indicated that they are interested in learning about other energy usage and reduction tips for a variety of equipment types including water heating, space heating, and space cooling.
5. **Change in bill –** Perceived changes in respondents' utility bill amounts varied. About one-quarter explained their bill remained the same (26.0%, n=45) while 12.7% (n=22) noted their bill decreased and 13.9% (n=24) indicated their bill increased; 47.4% (n=82) could not speak to changes in their bill.

1.3.1.2.7 Residential Non-Participants

1. **Program Awareness –** Most of the non-participant respondents were not aware of Avista's energy efficiency rebates and program (67.1%, n=94). Among those respondents who were aware of Avista programs (32.9%, n=46), messages on utilities bill and utility emails were the most common sources of program awareness. Additionally, respondents who were aware of Avista's programs were most familiar with the appliance rebates program and less similar with home energy audit offering and new construction rebates.
2. **Energy efficiency familiarity –** Just under one-third of non-participant respondents had received a home energy assessment, purchased new equipment, or had an equipment tune up in the past three years (32.1%, n=45).
3. **Interest in Avista programming** -- More than one-third of respondents were somewhat or very interested in participating in Avista programs. Respondents were most interested in learning more about the weatherization program (25.0%, n=35) and water heater incentives (23.6%, n=33).

1.3.1.2.8 Commercial Rebates (Prescriptive Lighting, Appliances, Small Business Direct Install, Site Specific)

1. **Program Awareness –** Across the various pathways, survey respondents most commonly learned about the rebate offerings from contractors, equipment vendors, and/or energy consultants. Survey respondents indicated email is the most effective way to communicate with them about rebate opportunities.
2. **Marketing Materials –** Half of the interviewed trade allies did not know about Avista's program-specific marketing materials (n=12), but agreed these resources would be useful to have.
3. **Barriers to Engagement –** The upfront cost of energy efficient equipment was the largest barrier to program engagement. Survey and interview respondents explained that firms are motivated to buy energy efficient equipment for the cost savings potential, but often lack the upfront capital to do so.
4. **Prior Energy Efficient Equipment Experience –** About half of the survey respondents across the various pathways noted that they had previously installed energy efficient equipment in their facilities.
5. **Program Experience –** Survey and interview respondents tended to be satisfied with all aspects of the program. Areas of dissatisfaction for both survey respondents and interviewed trade allies included difficulty finding necessary information on Avista's website and the range of eligible equipment.
6. **Site Specific Program Experience –** Interviewed trade allies reported the most challenges with the site-specific pathway offered through the program. These respondents cited confusion over the general process and frustration with the length of time required by the M&V review period.

1.3.1.2.9 Midstream

1. **Program process** – Midstream distributors highlighted some issues with the website and general application flow of the program, but noted that the program is new.

1.3.1.2.10 Non-Residential Non-participant

1. **Program Awareness –** About half of all respondents (53.6%, n=30) were aware of Avista's non-residential focused incentive programs, however a quarter of respondents explained that they

did not take advantage of Avista's incentives because they did not have enough information about the offerings (26.7%, n=24).

2. **Energy efficiency familiarity –** Almost half of respondents did not replace or upgrade electrical appliances in the last three years (48.2%, n=27). Among the 24 respondents who did replace and/or upgrade equipment in the last three years, lighting (29.6%, n=16) and HVAC equipment (22.2%, n=12) were the most common.
3. **Interest in Avista programming** -- All but two respondents indicated they were at least somewhat interested in Avista's incentive programs.

1.3.2 Recommendations

The following section details the Evaluator's recommendations resulting from the program evaluations for each the Residential, Low-Income, and Nonresidential Portfolios.

1.3.2.1 Portfolio-Wide

The Evaluators offer the following recommendations regarding Avista's portfolio of programs:

1. **Program requirements –** Consider enhancing website and marketing materials to make program eligible measures, eligibility requirements, and required documentation clearer and more transparent for each of the offered programs.
2. **Support staff training and trade ally development** – Staff should consider developing and providing vetted lists of qualified trade ally contractors that are willing to work with CAP agencies and incorporate OBR training to contractors to encourage customers to take advantage of financing opportunities. Additionally, Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.
3. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment, nor offered home energy audits. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience. Continue to deploy customer-focused promotional and marketing campaigns through email communication, as customers identified this as the most favorable method of communication. Increased focus should be placed on the weatherization and appliance, furnace, HVAC, and water heating rebate offerings as respondents expressed the most interest in those offerings. Continue to promote the OBR program through various channels, such as bill inserts, newsletters, and trade ally networks, to maintain and increase customer awareness and participation. Consider a wide distribution of Avista-branded marketing materials to trade allies so that the trade allies can better promote and explain the program to their customers.
4. **Other programs follow-on activities** – Increase coordination with other the Avista energy efficiency programs to increase the rates of actions taken on customer-level recommended improvements. Specifically, program staff should share participant information with other programs' staff and suggest they follow up directly to assist with the auditor recommendations specific to the audited household.

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

1.3.2.1.1 Commercial Non-Participant

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment nor did they feel they had enough information about the offerings to make informed decisions for improving the energy efficiency of their facility. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience for non-residential program participation.

1.3.2.1.2 Always On

1. **Expand content provided in alerts –** Consider including other energy saving tips and recommendations in the email alerts and website, aside from information regarding always on load. Topic areas of interest include information regarding energy efficient equipment as well as other behavior changes customers can make to reduce their energy usage.

1.3.2.2 Program-Level

The Evaluators offer the following recommendations regarding Avista's programs:

1.3.2.2.1 Residential Prescriptive Rebate Programs

1. **Promotional campaigns –** Consider increasing promotional campaigns that highlight the impact energy efficient equipment can have on customers' home safety, comfort, energy bills, and overall energy efficiency.
2. **Contractor training and cobranded marketing materials –** Contractors serve as the backbone of the residential prescriptive rebate programs, serving as the primary awareness source and marketing avenue. Consider offering contractors more training opportunities to educate them about the program, as well as providing them co-branded marketing materials to increase legitimacy and program recognition. During training, encourage contractors to help customers identify other areas of the home in need of improvement to maximize customers' benefit and lead to deeper energy retrofits.
3. **Increase training opportunities –** Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.
4. **Program requirements –** Consider enhancing website and marketing materials to make program eligible measures, eligibility requirements, and required documentation clearer and more transparent.

1.3.2.2.2 Multi-Family Direct Install

1. **Customer Recruitment –** If Avista funds a similar program targeting multi-family buildings in the future, recruitment of property managers who are willing to cooperate and provide time – as experienced by the program particularly during the post-pandemic period – is anticipated to be a major hurdle. The program should develop a thoughtful outreach and marketing approach that leverages motivation and interest to most building owners and property managers (tenants' satisfaction, increased home security and home comfort, values of upgrades, and convenience of program participation) in addition to the bill reduction benefits designed for tenants.

1.3.2.2.3 Low-Income

1. **Support staff training and trade ally development** – A lack of trained crew members and willing subcontractors in which to partner has reduced CAP agencies' ability to complete projects in a timely fashion and has resulted in a long wait list for the program. Avista should consider sponsoring more Building Performance Center training opportunities for more CAP agencies. Additionally, staff should consider developing and providing vetted lists of qualified trade ally contractors that are willing to work with CAP agencies in their areas. Expanding the trade ally network, may also reduce the travel burden for existing trade allies, as CAP agencies are only able to reimburse travel if five or more projects are scheduled.
2. **Establish funding that supports pre-weatherization repairs** – Continue to develop a deferral maintenance program that assists homes in need of pre-weatherization repairs. Once this deferral maintenance program is rolled out, staff should monitor its usage and determine the level of funding needed in the long term.
3. **Investigate dissatisfied customers due to work quality** – Consider working with CAP agencies to investigate projects of customers who expressed dissatisfaction with the quality of work and equipment installations conducted by the CAP agencies and their subcontractors.

1.3.2.2.4 Home Energy Audit

1. **Address the backlog issue** – Program staff should continue to prioritize resolving the pending application backlog to reduce wait times and improve customer satisfaction. Recommendations include hiring additional auditors or streamlining the auditing process to lessen burdens on participating customers.
2. **Provide a list of recommended contractors** – Consider providing a list of vetted contractors to customers to help them make the recommended improvements more actionable for homeowners interested in completing the recommended energy efficiency upgrades.
3. **Other programs follow-on activities** – Increase coordination with other the Avista energy efficiency programs to increase the rates of actions taken on the recommended improvements. Specifically, program staff should share participant information with other programs' staff and suggest they follow up directly to assist with the auditor recommendations specific to the audited household.
4. **Track the HEA referral process**– Although it is still too early to analyze the effect of the HEA program in terms of subsequent participation in other Avista programs, as more than half of the survey respondents noted they are still planning to implement the audit recommendations, Avista should develop a system to easily track HEA program participants' participation in other programs.

1.3.2.2.5 On Bill Repayment

1. **Education and training of contractors** – Provide more education and training to contractors about the OBR financing process to minimize payment confusion and improve the customer experience.
2. **Online billing information** – Enhance Avista's online billing website to clearly separate the OBR repayment portion from the total billed amount, allowing customers to better understand their actual energy costs as well as remaining financed amounts.
3. **Increased promotion** – Continue to promote the OBR program through various channels, such as bill inserts, newsletters, and trade ally networks, to maintain and increase customer awareness and participation.

1.3.2.2.6 Always On

2. **Expand content provided in alerts –** Consider including other energy saving tips and recommendations in the email alerts and website, aside from information regarding always on load. Topic areas of interest include information regarding energy efficient equipment as well as other behavior changes customers can make to reduce their energy usage.

1.3.2.2.7 Residential Non-Participant

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment, nor offered home energy audits. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience. Increased focus should be placed on the weatherization and appliance, furnace, HVAC, and water heating rebate offerings as respondents expressed the most interest in those offerings.
2. **Expand energy efficient tips circulation –** Consider expanding the pool of people who receive tips on how to save energy through various behavioral changes, or expand on behavioral additional energy conservation habits on Avista website. Introducing customers to the concept of energy efficiency may increase future buy-in for equipment purchases and tune ups.

1.3.2.2.8 Commercial Rebates (Prescriptive Lighting, Appliances, Small Business Direct Install, Site Specific)

1. **Program marketing –** Continue to deploy customer-focused promotional and marketing campaigns through email communication, as customers identified this as the most favorable method of communication. Consider a wide distribution of Avista-branded marketing materials to trade allies so that the trade allies can better promote and explain the program to their customers.
2. **Eligible Equipment –** Consider expanding equipment eligible for rebates based on trade ally recommendations. Trade ally respondents had more difficulties with the site-specific program than the midstream, prescriptive lighting, appliance rebate, and direct install programs. Integrating more measures into these midstream and downstream rebate pathways may alleviate pressure put on the site-specific pathway.

1.3.2.2.9 Midstream

1. **Increase training opportunities –** Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

1.3.2.2.10 Commercial Non-Participant

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment nor did they feel they had enough information about the offerings to make informed decisions for improving the energy efficiency of their facility. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience for non-residential program participation.

2 INTRODUCTION

ADM evaluated Avista's portfolio of energy efficiency programs for PY2022 and PY2023 combined. This work was completed in conjunction with the impact evaluation for Avista's portfolio, summarized in separate impact evaluation reports.

This report focuses on the process evaluation of Avista's PY2022-PY2023 portfolio in the state of Washington and Idaho for the electric and natural gas programs and pilots offered through Avista. This report identifies opportunities and offers recommendations to improve the effectiveness of each the design, implementation, enrollment process, marketing and outreach, quality assurance process, along with other elements, for all of the programs offered to Avista's customers through its energy efficiency portfolio.

2.1 SUMMARY OF EVALUATION

The Evaluators tailored their evaluation questions and activities by program for Avista's portfolio of programs. However, many of the data collection activities were similar. The main activities the Evaluators conducted were:

- Database and records review for quality assurance and quality control (QA/QC)
- Participant web surveys
- Non-participant web surveys
- Stakeholder interviews
- Trade ally interviews
- Distributor interviews

The following table lists the evaluation activities conducted for each program during the evaluation period. A full list of survey instruments is provided in Appendix A of this process evaluation report and the interview guides displayed in Appendix B of this report.

Table 2-1: Residential Process Evaluation Activities by Program

Program	Process Evaluation Activity				
	Participant Survey	Non-participant Survey	QA/QC Review	Staff Interview	Trade Ally Interview
Water Heat	X	X	X	X	X
HVAC	X	X	X	X	X
Shell	X	X	X	X	X
ENERGY STAR Homes	X	X	X	X	X
Small Home & MF Weatherization	X	X	X	X	X
Appliances	X	X	X	X	X
AeroBarrier	X	X	X	X	X
Multi-family Direct Install	X	X	X	X	X
Low-Income	X	X		X	X
Prescriptive Lighting	X	X		X	X
Prescriptive HVAC	X	X		X	X
Prescriptive Food Service Equipment	X	X		X	X
Prescriptive Grocer	X	X			X
Prescriptive Shell	X	X		X	X
Prescriptive Green Motors	X	X		X	X
Site-Specific	X	X		X	X

2.2 Organization of the Report

This report includes the process evaluation findings across all programs in the portfolio-wide assessment[1]. This section examines the portfolio's overall participant feedback, marketing and outreach, energy efficiency attitudes and behaviors, and participant decision-making across programs.

Each program is assessed in more detail in the individual chapters that follow. Program chapters contain a summary of the collected data and evaluation of program-level achievements and barriers. Chapters are organized according to sector (Residential and Nonresidential).

3 Process Evaluation Methods and Data Collection

The Evaluators performed a process evaluation on each of the programs summarized in Table 1-1. Our approach to the process evaluation was to:

- Gain in-depth understanding of program operations, challenges, and evaluation needs through Avista and implementation contractor key staff interviews at both the beginning and end of the evaluation cycle, complemented with program documentation review.
- Update assessment of Avista success in achieving the goals and objectives.

[1] The impact evaluation findings, conclusions, and recommendations for this evaluation period are reported in a separate impact evaluation report.

- Report findings on customer experiences with the program and demographic characteristics collected as part of survey efforts.
- Collect feedback from program participants and non-participants.

Process evaluations in general assess organizational and procedural aspects of programs to provide feedback on aspects of programs that are functioning well and contribute recommendations when areas of improvement are identified. The Evaluators completed the above process tasks for projects completed in the Washington and Idaho electric and natural gas Avista service territory.

The process activities are cross-cutting across programs; however, some program-specific research objectives are explored for certain programs. The objectives are determined by Avista evaluation goals as well as the relative contribution of a given program to the overall energy efficiency impacts. The Evaluators kept data collection instruments, calculation spreadsheets, and monitored/survey data available for Avista records.

3.1 Summary of Approach

This section presents our general cross-cutting approach to accomplishing the process evaluation of Avista's Residential, Low-Income, and Nonresidential programs listed in Table 1-1. The Evaluators start by presenting our general evaluation approach. This chapter is organized by general task due to several overlapping activities across programs.

Our general approach for this evaluation considers the cyclical feedback loop among program design, implementation, and process evaluation. Our activities during the evaluation identifies barriers to program participation or satisfaction as well as characterizes whether a program is meeting its goals. These activities are aimed to provide guidance for continuous program improvement and program operations effectiveness for the 2022 and 2023 program years.

3.2 Database Review

At the outset of the evaluation, the Evaluators reviewed the databases to ensure that each program tracking database conforms to industry standards and adequately tracks key data required for evaluation.

To prepare for and understand program design and delivery, the Evaluator reviewed program materials and documentation provided by Avista. This included detailed program descriptions, program hand-out materials, and the Avista website. Additionally, the program team reviewed program tracking data to understand how the program tracks and documents program participation and key variables.

3.3 Sampling Methodology

The Evaluators deployed participant and non-participant surveys for each program.

The Evaluators used the following equations to estimate sample size requirements for each program and fuel type. Required sample sizes were estimated as follows:

Equation 3-1: Sample Size for Infinite Sample Size

$$n = \left(\frac{Z \times CV}{d}\right)^2$$

Equation 3-2: Sample Size for Finite Population Size

$$n_0 = \frac{n}{1 + \left(\frac{n}{N}\right)}$$

Where,

- n = Sample size
- Z = Z-value for a two-tailed distribution at the assigned confidence level.
- CV = Coefficient of variation
- d = Precision level
- N = Population

For a sample that provides 90/10 precision, *Z* = 1.645 (the critical value for 90% confidence) and *d* = 0.10 (or 10% precision). The remaining parameter is *CV*, or the expected coefficient of variation of measures for which the claimed savings may be accepted. A *CV* of .5 was assumed for residential programs due to the homogeneity of participation[2], which yields a sample size of 68 for an infinite population. Sample sizes were adjusted for smaller populations via the method detailed in Equation 3-2.

3.3.1 Sampling Plan

The Evaluators deployed surveys for each of the Residential and Nonresidential programs offered through Avista in PY2022 and PY2023. The primary purpose of conducting these surveys is to gather information about customer satisfaction, customer feedback, and to confirm that the measure was installed and is still currently operational.

The Evaluators summarize the final sample sizes shown in Table 3-1 for the each of the programs in Washington and Idaho for both the electric and natural gas fuels. The Evaluators developed a sampling plan that achieved a sampling precision of ±1.58% at 90% statistical confidence for participant responses and ±4.84% at 90% statistical confidence for the non-participant responses at the measure type- level during web-based survey verification.

[2] Assumption based off California Evaluation Framework:

https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/EE_and_Energy_Savings_Assist/CAEvaluationFramework.pdf

Table 3-1: PY2022-PY2023 Survey Sample and Precision by Program

Sector	Program	Contacts	Responses	Percent of Contacts	Precision
Residential & Low Income	Single Family Home - Weatherization	5,281	648	12.27%	90% ± 3.03%
	Single Family Home - Appliances	3,226	1,291	40.02%	90% ± 1.77%
	Low Income	692	108	15.61%	90% ± 7.28%
	Home Energy Audit	1,252	97	7.75%	90% ± 8.02%
	On Bill Repayment Program	187	27	14.44%	90% ± 14.68%
	Always On Pilot Program	50,060	173	0.35%	90% ± 6.24%
	Non-Participants	1,395	145	10.39%	90% ± 6.47%
Non-Residential	Prescriptive Lighting, Appliances, Small Business Direct Install	6,839	266	3.89%	90% ± 4.94%
	Site Specific	82	6	7.32%	90% ± 32.53%
	Non-Participants	1,141	144	12.62%	90% ± 6.41%
Total	**Participants**	**67,619**	**2,616**	**3.87%**	**90% ± 1.58%**
	Non-participants	**2,536**	**289**	**11.40%**	**90% ± 4.56%**

3.4 Web Surveys

The Evaluator administered participant surveys to samples of program participants to collect data on the participant experience with the program to inform the process evaluation. The Evaluator administered a survey to participants in the residential and non-residential programs throughout 2022 and 2023 in waves based on customers' participation date. As a key evaluation activity, the Evaluator also conducted web-based surveys with Avista customers who did not participate in the residential and non-residential programs in 2022 and 2023.

3.4.1 Survey Administration Procedures

Respondents with available emails were sent an invitation to the survey. Non-respondents were then sent up to two reminder emails. Customers were offered a $20 visa gift card to complete the survey.

3.5 In-Depth Interviews

This section summarizes the Evaluators' approach to conducting in-depth interviews for program staff, trade allies, builders, and distributors.

3.5.1 Program Staff Interviews

The Evaluator completed 13 interviews with program staff to understand any changes made to the programs and any key successes and challenges. These interviews were qualitative, loosely structured, and exploratory in nature.

The Evaluators completed interviews with utility staff for each program in Avista's portfolio. The staff interviews addressed the following topics:

- The historical context of the energy efficiency programs;
- Program design and qualification requirements;
- Processes for recruiting customers into the programs;
- Data management and tracking processes and issues;
- Issues or challenges staff face in delivering the energy efficiency programs; and
- Planned or desired changes in program administration in the future.

The Evaluators spoke with six utility staff in 2022 and seven utility program staff in 2023 to better understand their role and responsibility for the various programs. In general, the purpose of these interviews was to understand program goals, customer needs, program performance in meeting customer needs, and other feedback that they have on the program delivery, process, integration of previous evaluation recommendations, and planned program changes in the near future.

3.5.2 Stakeholder Surveys and Interviews

The Evaluators completed 61 surveys and interviews with various stakeholders engaged in Avista's programs (Table 3-2). Respondents were provided a $50 incentive to complete the interview. These interviews provided an opportunity to collect additional in-depth qualitative information on stakeholders' experiences with the programs and the impact its availability has had on them. The interviews were designed to be completed within 30 minutes.

Table 3-2: Summary of Stakeholder Interviews and Surveys

Group	Contacts	Responses	Percent of Contacts
Residential trade allies	358	24	6.7%
Commercial trade allies	232	22	9.5%
Midstream distributors	8	5	62.5%
Property Managers	48 Firms, 176 Buildings	10	20.8% (Firms)
Total	**646**	**61**	**9.4%**

4 Residential Programs Process Evaluation Results

The Evaluators summarize the program-specific and measure-specific process analysis activities, results, conclusions, and recommendations for the Residential programs in the section below.

4.1 Residential Prescriptive Programs

Avista provides residential customers living in single family, manufactured, and multi-family homes with a variety of rebates and incentives that encourage the purchase of energy efficient equipment. Avista residential programs offer rebates for appliance related measures, such as smart thermostats, HVAC systems, water heaters, clothes washers and dryers, and refrigerators and freezers, as well building shell and weatherization related measures including windows, doors, duct sealing, and ceiling insulation.

4.1.1 Data Collection Activities

The process evaluation of the Residential Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed six utility staff in 2022 and seven utility program staff in 2023. Staff were involved in the administration of the Single-Family Homes Rebates Program. These interviews collected information from program staff about program design, administration, marketing, and stakeholders.
- *Program Participant Surveys.* The Evaluators conducted surveys with a series of program participants. These surveys covered a range of topics, including program awareness, participation, and satisfaction.
- *Trade Ally Interview.* The Evaluators surveyed trade allies who participated in the Residential Prescriptive Rebates programs.

4.1.2 Staff Interview

Evaluators interviewed two Avista program staff involved in the implementation and administration of the Residential Prescriptive Rebate program. Staff included the residential program manager as well as the AeroBarrier pilot program manager. Interviewees participated in two interviews: one in the summer of 2022 and one in the summer of 2023. During the interviews, staff discussed program design and implementation, as well as any changes that were made to the program between 2022 and 2023. The following summary focuses on the Residential Prescriptive Rebates programs in general, with specific summaries of the AeroBarrier pilot and new midstream program included in Sections 4.1.4 and 4.1.6, respectively.

4.1.2.1 Program Design

In 2022 the residential program followed a mostly prescriptive program model, with some measures transitioning to a midstream model in 2023. The goal of the program is to help customers achieve energy savings through various energy efficiency retrofits to their existing homes or receive incentives for purchasing and building energy efficient new construction homes. Program-specific goals are based on energy savings; there are no measure-specific or participation-level goals. The program's target audience is customers living in single-family, multi-family, and manufactured homes and contractors who install equipment in these homes. Specifics of the multi-family direct installation program are expanded upon in the next chapter in this report.

4.1.2.2 Program Administration

The Residential Prescriptive Rebates programs are self-implemented and include a team of Avista staff responsible for processing applications and answering customer inquiries. Avista uses iEnergy software to track applications and project statuses. Staff reported mixed experiences with the iEnergy platform. Approximately 70-75% of customers and trade allies submit their rebate applications through the web-based platform. However, staff have received some complaints regarding the software's customer

interface and overall user-friendliness. Staff have fixed some of the issues identified, but some customers and contractors still prefer to submit paper applications instead. Staff explained that typically the customer submits the application themselves, but in some instances, the contractor will submit the application on the customer's behalf. Staff prefer iEnergy to paper applications because the software platform streamlines and automates savings calculations in an organized structure.

In 2022, program staff extended the rebate timeframe from 90 days to 120 days to account for supply chain issues; this change continued through 2023. Between 2022 and 2023 HVAC and water heating measures shifted to a midstream model. Although incentive amounts vary between Washington and Idaho due to differing cost-effectiveness models, staff strive to keep the programs as similar as possible to reduce confusion among customers, market actors, and program staff.

4.1.2.3 Marketing and Outreach

Staff employ a variety of marketing techniques including email blasts, bill inserts, and social media advertisements. Staff had stopped contractor focused training events during the pandemic but started offering them again in 2022.

Staff explained that they have not seen increased interest in program engagement as a result of increased incentives. Therefore, they are instead exploring other outreach and marketing strategies to increase engagement moving forward.

4.1.2.4 Aero-Barrier Pilot

The Aero-Barrier pilot program was active between 2021 and June 2022. The program sought to improve the energy efficiency of building shells, with a strong focus on air sealing. Incentives were based on the homes ACH (air changes per hour) and square footage. The pilot targeted builders involved in new home construction but struggled to attract builders. Staff noted that builders did not consider the incentive lucrative enough to compel engagement. Ultimately, the pilot was discontinued due to a lack of interest as well as cost-effectiveness issues. Moving forward, staff are considering ways to increase air sealing offerings for retrofit programs but do not foresee bringing back Aero-Barrier incentives for new construction.

4.1.2.5 Residential Midstream Program

Beginning in 2023, HVAC and water heating measures were transitioned from the traditional residential rebate program to a residential midstream program. Avista's motivation for the switch to midstream delivery mechanism was to achieve high saving goals and minimize customer confusion regarding these equipment types. Staff explained that the midstream model reduces the paperwork burden for customers and allows for more market transformation by focusing efforts on equipment distributors rather than end users.

For residential measures, distributors must pass incentives through to customers. In general, despite a slow start to the program, staff have appreciated the midstream model, explaining that it is more efficient and allows for faster rebate processing. At the time of the 2023 interview, staff noted they had engaged eight distributors across both states, with plans to bring on three more distributors by end of 2023. Staff explained that the biggest pain point of the program is explaining to staff and customers why the incentive is no longer being offered directly to the customers.

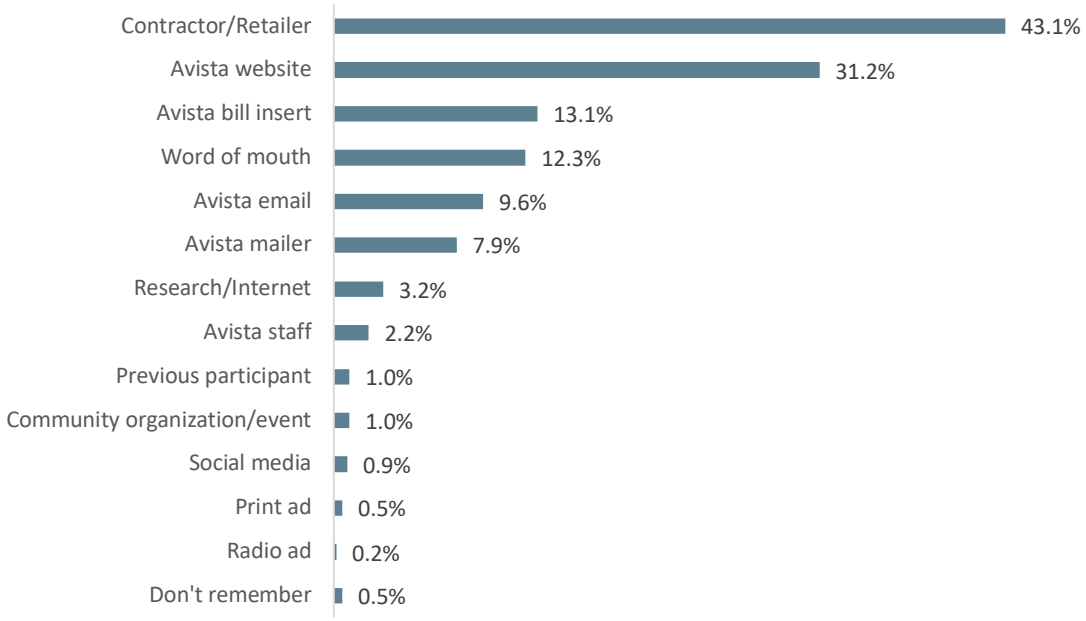
4.1.3 Appliance, Furnace, HVAC, and Water Heat Rebate Program Participant Survey Results

Evaluators conducted a survey of appliance, HVAC, and water heat rebate programs participants to gather feedback about customers' engagement with and experience of the program. Participants were contacted via email a total of three times and asked to complete a survey. In total, 1,291 participants who received rebates for energy efficient appliances in 2022 or 2023 responded to survey efforts.

4.1.3.1 Program Awareness

Respondents learned about the program through a variety of avenues, most commonly through their contractor or retailer (43.1%, n=557) and Avista's website (31.2%, n=403) (Figure 4-1).

Figure 4-1: Program Awareness (n=1,270)



About half of respondents were motivated to participate in the program to reduce their monthly utility bills (48.1%, n=619) and about one-third were motivated to help the environment (36.3%, n=460) (Figure 4-2). When deciding on what equipment to purchase, respondents relied on a variety of sources, including contractors, word of mouth, and personal research (Table 4-1).

Figure 4-2: Factors Influencing Participation (n varies)

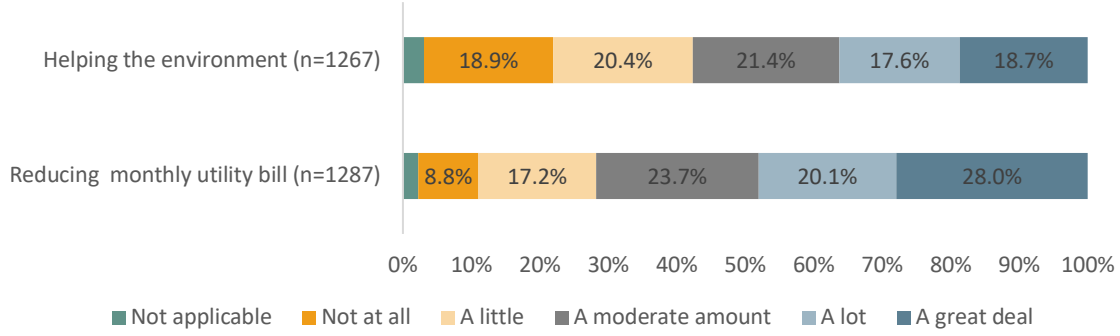
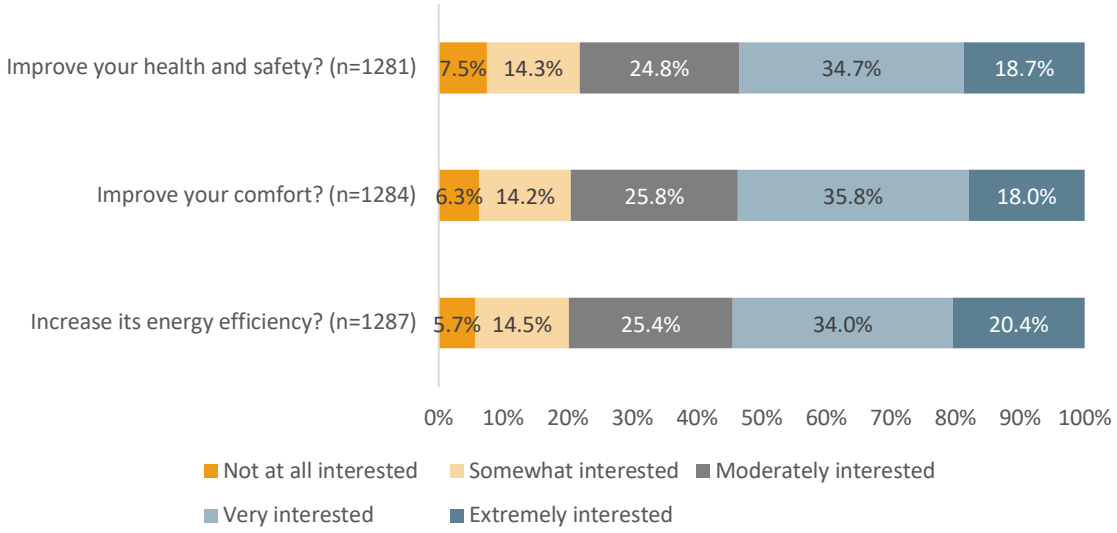


Table 4-1: Source of Information (n=1,291)

Source	%	n
Contractor	38.7%	500
Word of mouth	19.5%	252
Personal research	12.9%	166
Desired features	2.4%	31
Price	2.4%	31
Brand reliability	2.3%	30
Retailer	1.5%	20
Not sure	21.8%	281

A little more than half of respondents were very or extremely interested in additional home improvements that would improve their health and safety (53.5%, n=685), improve their comfort (53.7%, n=690), and increase their home's energy efficiency (54.5%, n=701) (Figure 4-3). More than one-quarter of respondents indicated they would be very or extremely likely to install insulation themselves if a rebate was available without having to use a contractor (28.9%, n=371).

Figure 4-3: Interest in home improvements that would… (n varies)



More than half of respondents did not know anything about Avista's Home Energy Audit Program (61.3%, n=784). Similarly, among those respondents who had not participated in the On Bill Repayment Program (n=740), the vast majority were not familiar with Avista's financing programs (81.6%, n=604).

4.1.3.2 Program Participation

Respondents received rebates for a variety of energy efficient equipment, most notably smart thermostats, clothes washers, and furnaces (Table 4-9).

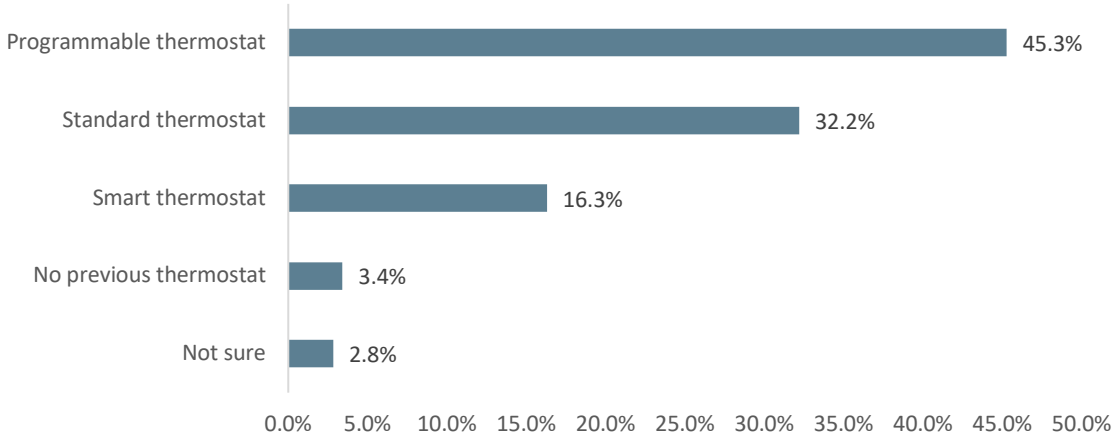
Table 4-2: Type and Number of Measures Received (n=1,291)

Measure Category	Installed
Smart Thermostat	497
Furnace	286
Clothes Washer	281
Refrigerator-Freezer Combo	217
Clothes Dryer	178
Water Heater	144
Heat Pump	90
Energy Star doors	59
Stand-Alone Freezer	38

4.1.3.2.1 Smart Thermostat

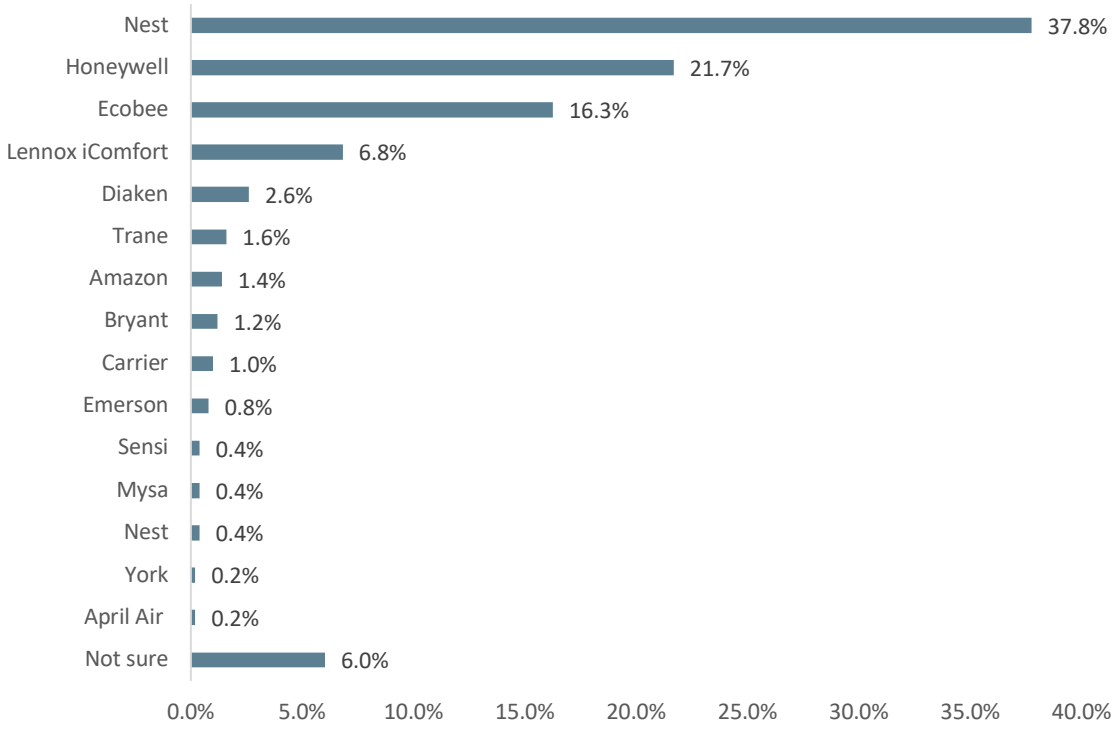
Smart thermostat rebate recipients replaced a variety of thermostat equipment (Figure 4-4), most commonly a programmable thermostat (45.3%, n=225). Among the 160 previous standard thermostat owners, 81.3% (n=130) would adjust their thermostat when they left the house or before going to bed. Two-thirds of smart thermostat rebate recipients had a contractor install their new thermostat for them (66.5%, n=336). The majority of smart thermostat recipients confirmed the smart thermostat was connected to the internet (88.2%, n=439).

Figure 4-4: Thermostat Replacement (n=497)



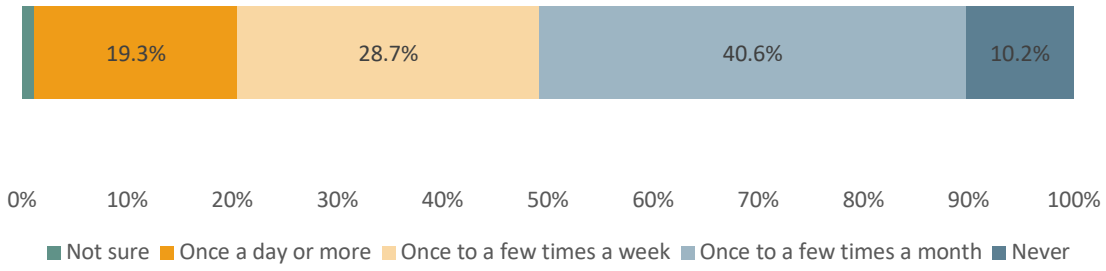
Respondents purchased smart thermostats from a variety of brands, most commonly Nest and Honeywell (Figure 4-5).

Figure 4-5: Smart Thermostat Brand (n=498)



Three-quarters of smart thermostat recipients program their new thermostat to change temperature at different times of the day (75.7%, n=377) and more than two-thirds program the thermostat to adjust the temperature automatically (69.7%, n=347). About half of respondents only adjust their thermostat settings less than a few times a month (50.8%, n=253) (Figure 4-6). More than half of respondents set their thermostat to "away mode" when they are not home (61.5%, n=306). The majority of respondents indicated that their smart thermostat controls both their heating and cooling systems (91.0%, n=453) and that their previous thermostat was working at the time of replacement (93.4%, n=435).

Figure 4-6: Frequency of Smart Thermostat Adjustments (n=498)



4.1.3.2.2 Furnace, Heat Pump, and Water Heater Specifics

In general, the most popular factor respondents considered when choosing their furnace, heat pump, and water heater was based on their contractor's recommendation (Table 4-3). Other population considerations included rebate availability, lower operating cost, and desired features.

Table 4-3: Considerations for New Equipment (n varies)

Considerations	Furnace (n=286)		Water Heater (n=144)		Heat Pump (n=90)	
	%	n	%	n	%	n
Contractor recommendation	72.4%	207	61.8%	89	52.2%	47
Rebate availability	41.6%	119	37.5%	54	7.8%	7
Lower operating cost	40.2%	115	38.9%	56	14.4%	13
Good price	37.4%	107	22.9%	33	6.7%	6
Desired features	26.2%	75	47.2%	68	16.7%	15
ENERGY STAR label	23.8%	68	26.4%	38	5.6%	5
Good for environment	23.4%	67	25.7%	37	4.4%	4
Brand	8.0%	23	7.6%	11	5.6%	5
Only option	4.5%	13	3.5%	5	10.0%	9
Right size/color	4.2%	12	9.7%	14	5.6%	5
Replacing broken equipment	1.0%	3	0.7%	1	0.0%	0

Two-thirds of furnace rebate recipients (66.1%, n=189) and just under three-quarters of water heater rebate recipients (72.2%, n=104) replaced functional equipment. Across both measure types, natural gas was the most popular fuel source for the old and new equipment (Table 4-4).

Table 4-4: Equipment Fuel Type (n varies)

Equipment Fuel Type	Furnace (n=286)				Water Heater (n=144)			
	Old		New		Old		New	
	%	n	%	n	%	n	%	n
Natural Gas	87.4%	250	94.8%	271	68.8%	99	86.8%	125
Electricity	5.2%	15	4.5%	13	23.6%	34	11.8%	17
Oil	1.4%	4	0.0%	0	0.7%	1	0.0%	0
Not sure	1.0%	3	0.7%	2	2.1%	3	1.4%	2
New construction	4.9%	14			4.9%	7		

About half of the 90 heat pump rebate recipients replaced a previous heating and cooling system (51.1%, n=46), the remaining respondents replaced a heating system only (34.4%. n=31), a cooling system only (2.2%. n=2), or were part of a new construction project (11.1%, n=10). One respondent was not sure what type of system the heat pump replaced.

Almost three-quarters of the heating related heat pump rebate recipients had not previously had a heat pump at their facility (72.7%, n=56). Among those 17 respondents who had a heating-related heat pump, just under-half were replacing a functional unit (47.01%, n=8).

4.1.3.2.3 Clothes Washer/Dryer

A little less than half of respondents had ENERGY STAR rated washers and dryers before purchasing new equipment through the Avista program (Table 4-5). Most respondents replaced working washers (64.8%, n=151) and dryers (71.2%, n=104).

Table 4-5: Washer and Dryer Type (n varies)

Type of Equipment	Washer (n=281)		Dryer (n=178)	
	%	n	%	n
ENERGY STAR rated	45.6%	128	47.8%	85
Standard efficiency	28.5%	80	25.3%	45
A different machine type	8.9%	25	9.0%	16
Not sure	9.6%	27	10.1%	18
I did not have a clothes washer/dryer	7.5%	21	7.9%	14

4.1.3.2.4 Combination Refrigerator-Freezer and Stand-Alone Freezer

The majority of combination refrigerator-freezer rebate recipients were replacing existing equipment (81.1%, n=176). Among these respondents, about half were replacing a standard efficiency combination refrigerator-freezer (49.4%, n=87) (Table 4-5). About two-thirds of the refrigeration equipment being replaced was working at the time of replacement (68.2%, n=120).

Table 4-6: Previous Refrigerator-Freezer Type (n=176)

Equipment Type	%	n
Standard efficiency	49.4%	87
ENERGY STAR rated	39.2%	69
Stand-alone refrigerator	2.3%	4
Different type of refrigerate-freezer	9.1%	16

Almost forty percent (39.5%, n=15) of stand-alone freezer rebate recipients did not have a stand-alone freezer prior to participating in the program. Among those who did (n=22), there was an almost even split between respondents who had standard efficient (n=10) and ENERGY STAR efficient (n=12) freezers. More than half of respondents with an existing stand-alone freezer were replacing working equipment (59.1%, n=13).

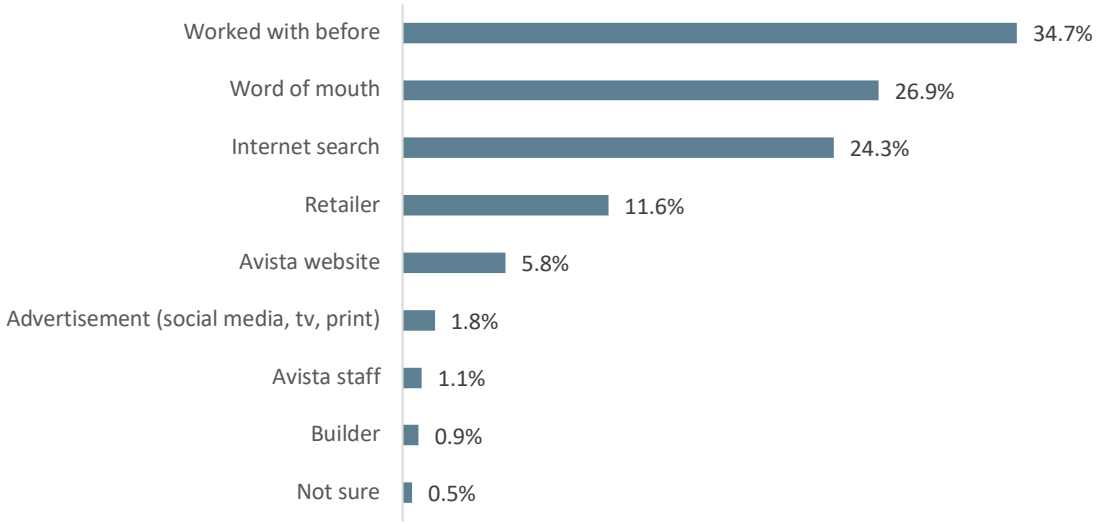
4.1.3.2.5 ENERGY STAR Doors

Among the 59 respondents who received a rebate for ENERGY STAR DOORS, a little less than half were replacing standard efficiency doors (47.5%, n=28); the remaining respondents were replacing ENRGY STAR doors (27.2%, n=16) or were not sure of the type of door they previously had (25.4%, n=15).

4.1.3.3 Contractor

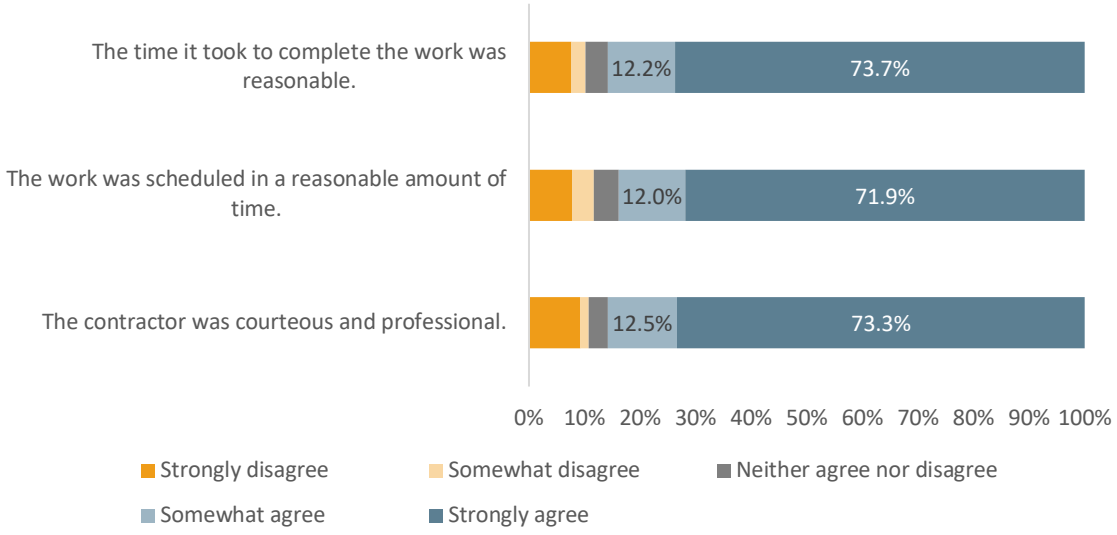
Five hundred and fifty-one respondents indicated they used a contractor to install their equipment (42.7). About one-third these respondents used a contractor they had worked with before (34.7%, n=191) while just over one-quarter of respondents found their contractor through word of mouth (26.9%, n=148) (Figure 4-7). A little more than half of respondents confirmed their contractor showed them the discount they would be receiving on their equipment (54.6%, n=301).

Figure 4-7: Contractor Awareness (n=316)



In general, respondents believed their contractor scheduled and completed the work in a reasonable amount of time and was courteous and professional (Figure 4-8).

Figure 4-8: Contractor Behaviors (n=551)



Sixteen percent of respondents (16.3%, n=90) remember their contractor providing recommendations for other energy saving equipment upgrades. Specific recommendations included insulation, windows, and heating and cooling equipment, among others (Table 4-7); seven respondents also noted that their contractors recommended regular maintenance and behavior changes.

Table 4-7: Recommended Equipment Upgrades (n=90)

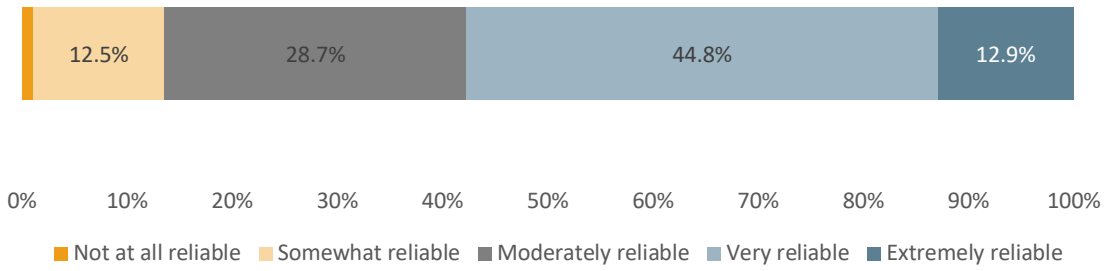
Measure	n
Insulation	14
Windows	14

Heat pump	13
Water heater	13
Furnace	12
Programmable or smart thermostat	9
Air conditioner	8
LEDs	2
Solar panels	2
Low-flow showerhead	1
Refrigerator	1
Gas range	1

4.1.3.4 Satisfaction

More than half of respondents considered Avista a very or extremely reliable source of information regarding energy efficiency (57.7%, n=745) (Figure 4-9). Twelve percent of respondents (12.2%, n=158) contacted Avista staff while participating in the program. In general, these respondents were satisfied with how long it took staff to answer their questions (88.0%, n=139) and how thoroughly staff addressed their questions (89.9%, n=142).

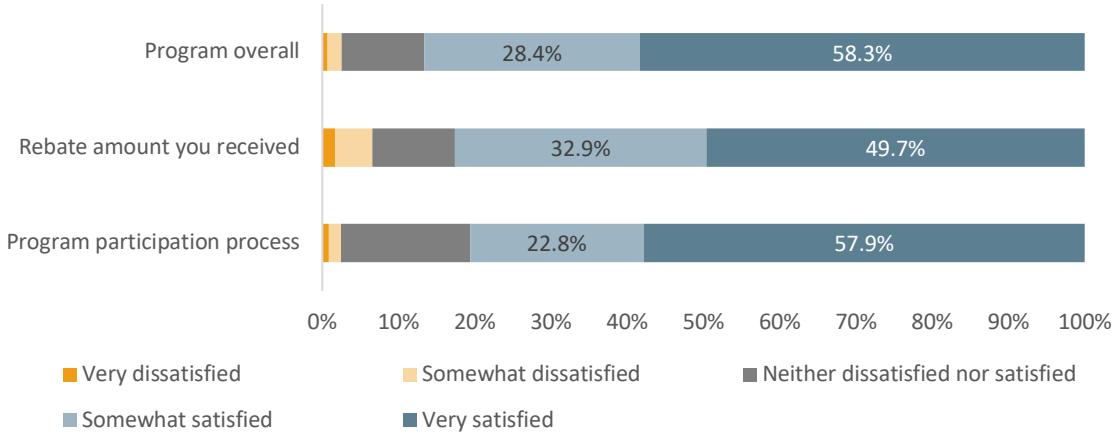
Figure 4-9: Avista as Reliable Source of Information (n=1,291)



In general, respondents were satisfied with the program overall, the amount of rebate they received, and the program participation process (Figure 4-10). One hundred and ten respondents (8.5%) expressed some level of dissatisfaction with the program. Reasons for dissatisfaction included insufficient rebate (n=59), lack of transparency regarding program requirements (n=21), negligent contractor (n=14), equipment issues (n=14) and slow processing times (n=5).

Just over half of respondents indicated they were somewhat or very likely to have participated in the program if the rebate was 75% of the value provided to them (54.4%, n=702).

Figure 4-10: Program Satisfaction (n=1291)



Three-quarters of respondents are satisfied with Avista as their service provider (74.4%, n=960) and half of respondents indicated that participation in the program increased their satisfaction with Avista (51.4%, n=663). Three-quarters of respondents indicated they were likely to recommend the rebate program to others (72.0%, n=930).

4.1.3.5 Demographics

Table 4-8 describes the demographics of survey respondents.

Table 4-8: Demographics (n=1,291, unless otherwise indicated)

Answer	%	Count
Homeownership		
Own	93.5%	1,207
Rent	2.1%	27
Own and rent to someone else	1.2%	15
I don't know	0.1%	1
Prefer not to answer	3.2%	41
Building Age (n=1222)		
Before 1950	17.9%	219
1950 to 1959	8.7%	106
1960 to 1969	6.1%	75
1970 to 1979	14.1%	172
1980 to 1989	6.3%	77
1990 to 1999	16.0%	196
2000 to 2009	16.0%	195
2010 to 2019	6.7%	82
2020 to Present	7.2%	88
I don't know	0.7%	9
Prefer not to answer	0.3%	3
Heating Fuel Type		
Natural Gas	66.3%	856
Electricity	28.1%	363
Wood	2.2%	29
Propane	2.1%	27
Pellet	0.8%	10
Prefer not to answer	0.5%	6

Oil	0.4%	5
Hydrothermal	0.2%	2
Not sure	0.2%	3
Air Conditioning		
Yes	78.3%	1,011
No	19.9%	257
I don't know	1.5%	19
Prefer not to answer	0.3%	4
Water Heater Fuel Type		
Natural Gas	55.8%	720
Electricity	39.3%	508
Not sure	2.8%	36
Propane	1.6%	21
Hydrothermal	0.1%	1
None	0.1%	1
Prefer not to answer	0.5%	7
Home Type		
Single-family house detached	88.8%	1,147
Duplex, condo, townhome	2.9%	38
Mobile or manufactured home	6.0%	77
Apartment with 2 to 4 units	0.8%	10
Apartment with 5+ units	0.3%	4
Not sure	0.3%	4
Prefer not to answer	0.9%	11
Household Size (n=1277)		
1 person	14.3%	182
2 people	50.0%	638
3 people	14.6%	186
4 people	12.4%	158
5 people	4.6%	59
6 people	1.0%	13
7 people	0.3%	4
8 or more people	0.3%	4
Prefer not to answer	2.6%	33
Age		
18 to 24	0.7%	9
25 to 34	8.6%	111
35 to 44	14.8%	191
45 to 54	14.6%	189
55 to 64	19.9%	257
65 to 75	27.1%	350
75 or older	7.6%	98
Prefer not to answer	6.7%	86
Household member is 65+ years old		
Yes	53.0%	684
Household income		
Less than $10,000	1.1%	14
$10,000 to $19,999	1.0%	13
$20,000 to $29,999	2.9%	38
$30,000 to $39,999	4.7%	60

$40,000 to $49,999	6.6%	85
$50,000 to $74,999	14.8%	191
$75,000 to $99,999	12.2%	158
$100,000 to $ 149,999	14.3%	185
$150,000 to $199,999	6.0%	77
$200,000 or more	5.6%	72
Prefer not to answer	30.8%	398
Education		
Associates degree (or similar)	0.8%	10
Four-year college degree	10.6%	137
Graduate or professional degree	29.3%	378
High school graduate	28.7%	371
Did not graduate high school	21.9%	283
Prefer not to answer	8.7%	112

4.1.4 Weatherization and Shell Measures – Participant Survey Results

The Evaluators conducted a survey with weatherization and shell measure participants to gather feedback about customers' engagement with and experience of the program. Participants were contacted via email up to three times and asked to complete a survey. In total, 648 participants who received weatherization and/or shell measures in 2022 or 2023 responded to survey efforts.

4.1.4.1 Program Participation

Respondents received a variety of different measures through the program (Table 4-9), with windows being the most common measure received by respondents.

Table 4-9: Type and Number of Measures Received (n=648)

Measure Category	Total	Percent
Window Replacement	463	71.5%
Attic Insulation	133	20.5%
Wall Insulation	43	6.6%
Floor Insulation	18	2.8%
AeroBarrier Insulation	3	0.5%

Across the different measure types, the majority of respondents planned to install the new equipment before they learned about Avista's rebate offerings (Table 4-10).

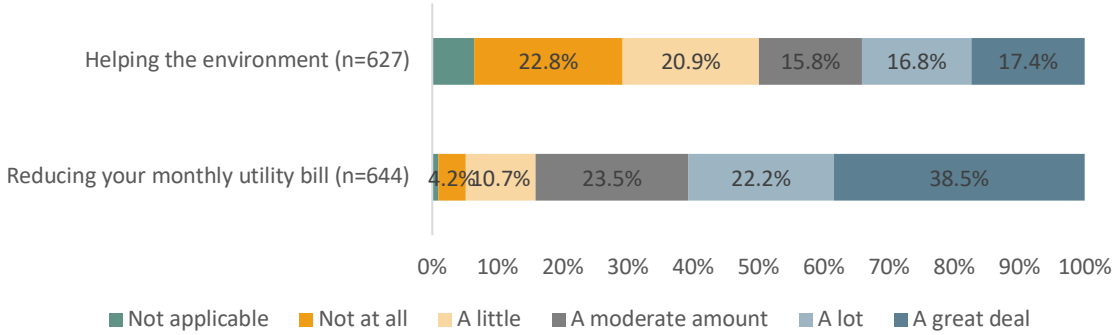
Table 4-10: Planned to Install Measures Prior to Program Enrollment (n=648)

Measure Category	Total (n)	Planned to Install	
		%	n
Window Replacement	463	79.1%	366
Attic Insulation	133	62.4%%	83
Wall Insulation	43	69.8%	30
Floor Insulation	18	66.7%	12
AeroBarrier Insulation	3	100.0%	3

When deciding on what type of energy efficient equipment to install, respondents often relied on recommendations from their contractor (53.7%, n=348), personal contact (23.5%, n=137), or the utility

(21.1%, n=137). Over half of respondents were highly motivated to participate in the program to reduce their monthly utility bills (Figure 4-11). Other reasons respondents indicated they were interested in installing energy efficient equipment included improving the home's temperature control (n=112), upgrade equipment (n=87), increase home's value and improve aesthetics (n=50), save money (n=42), reduce noise (n=14), and safety concerns (n=8).

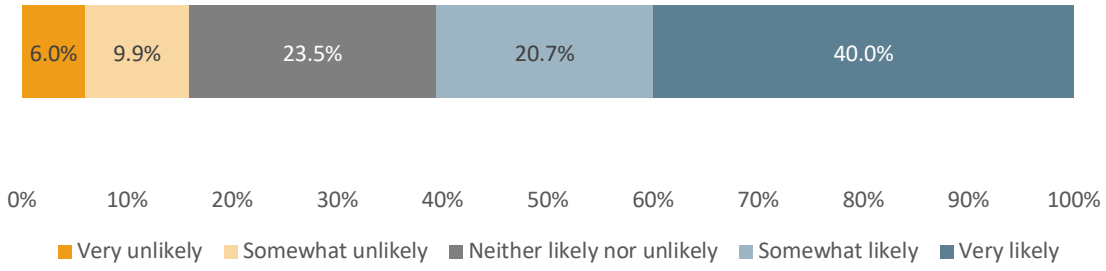
Figure 4-11: Motivations for Installing Energy Efficient Equipment (n=varies)



About one quarter of respondents (n=159, n=24.5%) contacted Avista staff regarding questions about their projects and twenty-four respondents received an in-home inspection after their project was completed (3.7%, n=24).

More than half of respondents indicated they would have made the energy efficient upgrades even if the rebate provided was 75% of what they received (Figure 4-12).

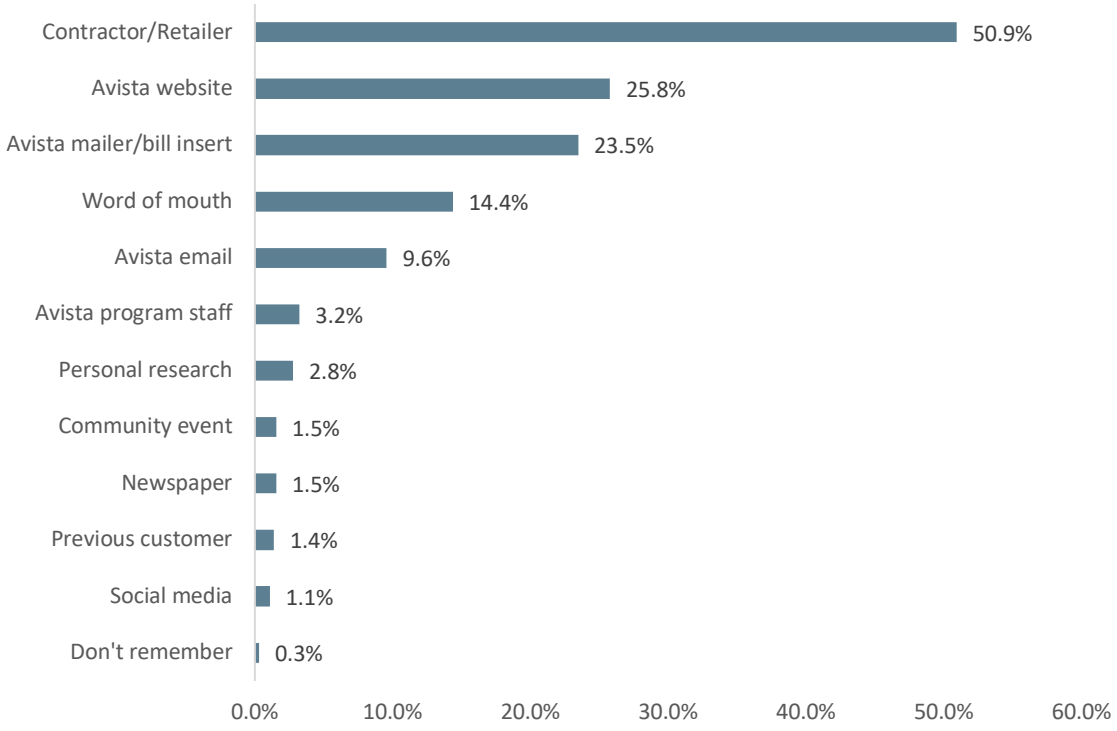
Figure 4-12: Willingness to Pay (n=648)



4.1.4.2 Program Awareness

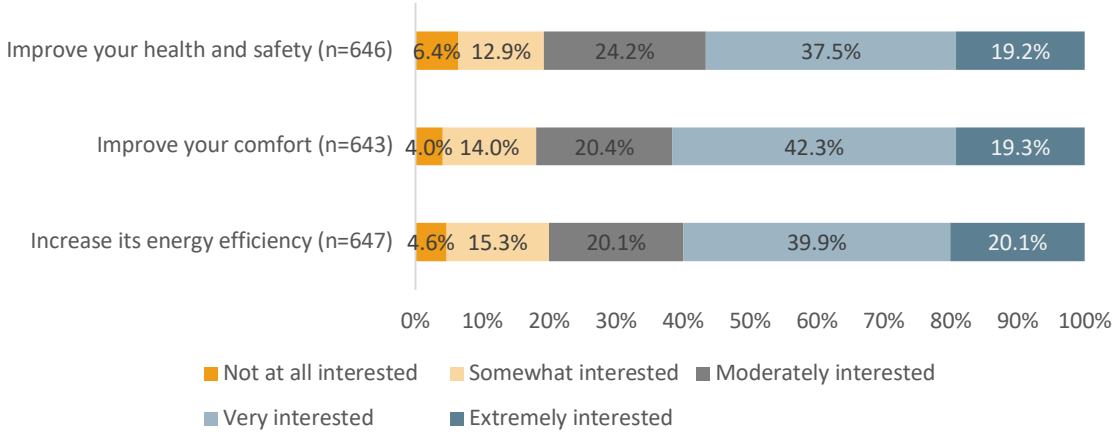
Respondents most commonly learned about the residential program through a contractor or retailer communication (Figure 4-13).

Figure 4-13: Program Awareness (n=648)



More than half of survey respondents are interested in making additional energy efficiency improvements that would improve their comfort (61.6%, n=396), increase energy efficiency (60.0%, n=388), and improve health and safety (56.7%, n=366) (Figure 4-14).

Figure 4-14: Interest in Additional EE Upgrades (n=varies)

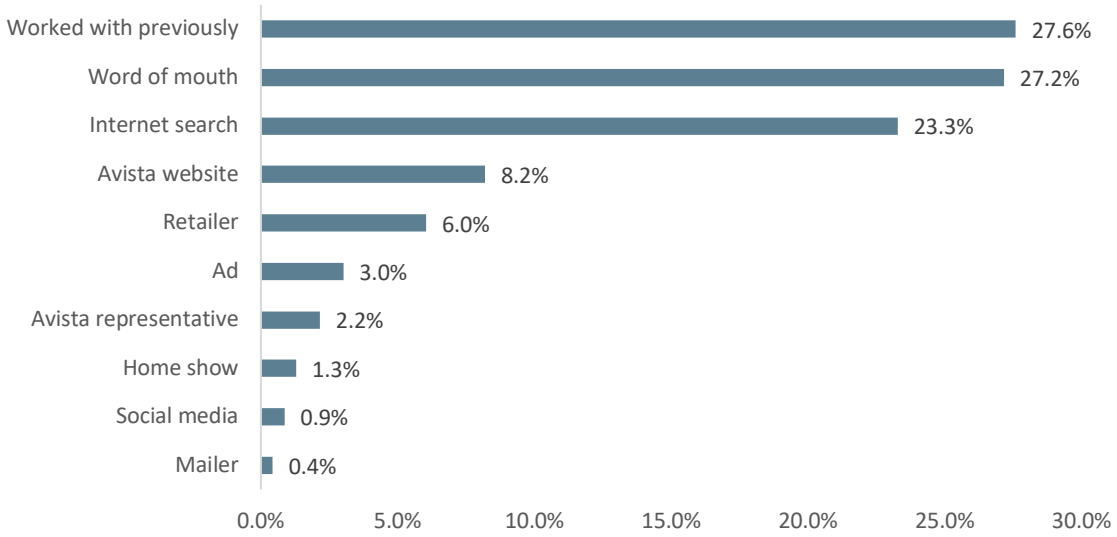


4.1.4.3 Contractor

According to tracking data, 232 respondents used a contractor for their equipment installations (35.8%). Of these respondents, about one quarter had used a contractor they had worked with before (27.6%,

n=64), while half of respondents found the contractor through word-of-mouth (27.2%, n=63) or an internet search (23.3%, n=54) (Figure 4-15).

Figure 4-15: Finding a Contractor (n=232)



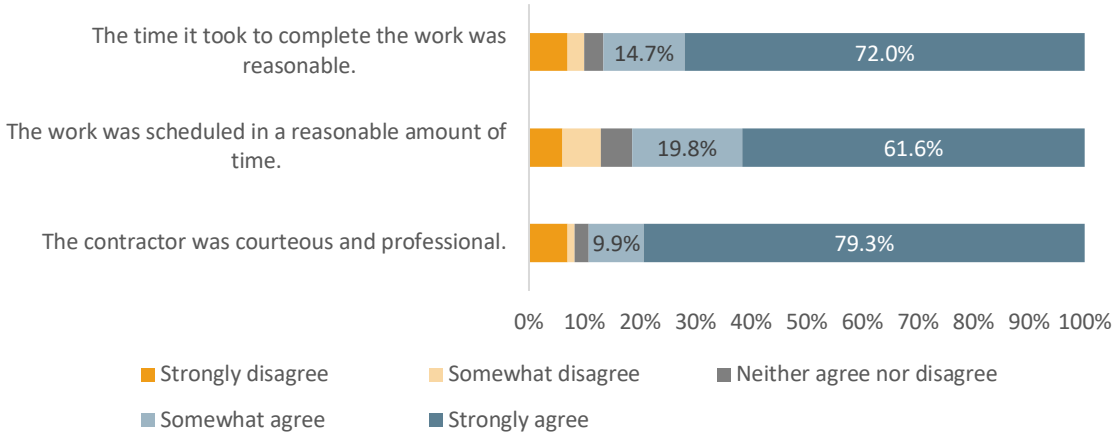
Less than half of the respondents who used a contractor indicated their contractor showed them the discount they would be receiving (41.4%, n=96). Fifteen percent of respondents indicated that their contractor made recommendations about other energy efficient equipment their home could benefit from (15.1%, n=35). The most common contractor recommendations included insulation (n=12) and windows (Figure 4-15).

Table 4-11: Contractor Recommendations (n=35)

Recommendations	n
Insulation	12
Windows	11
Doors	7
HVAC	4
Appliance	2
Solar	1
Siding	1

Most respondents were satisfied with their contractor citing their professionalism and courteousness (Figure 4-16).

Figure 4-16: Contractor Satisfaction (n=232)



4.1.4.4 Program Satisfaction

Program participants are generally satisfied with the program (Figure 4-17) and Avista as their energy service provider. Among the 77 respondents (11.9%) who expressed some dissatisfaction, low rebate amounts were the most popular reason for dissatisfaction (Table 4-12).

Figure 4-17: Program Satisfaction (n=648)

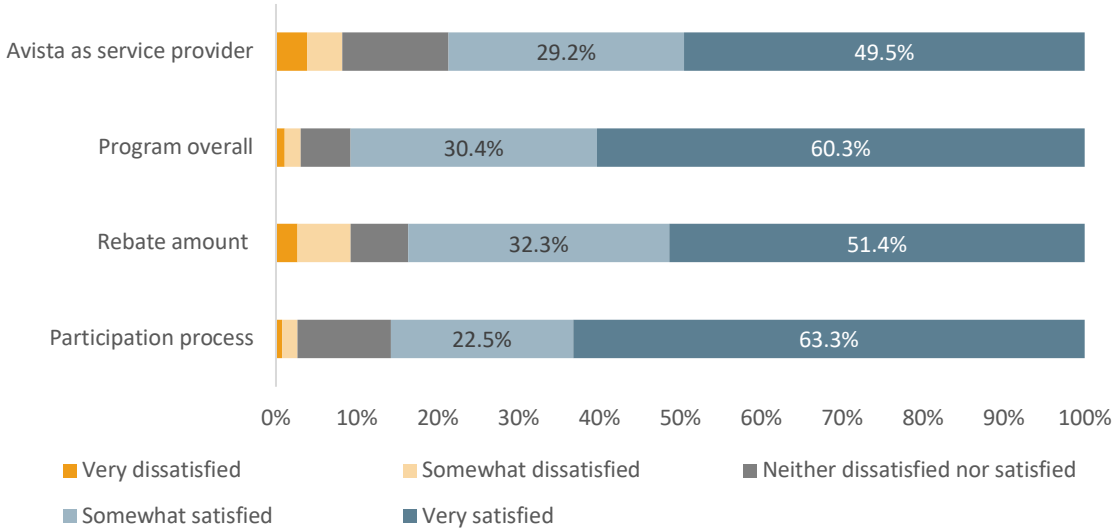


Table 4-12: Reasons for Dissatisfaction (n=77)

Response	Total	Percent
Insufficient rebate	47	61.0%
Application process	18	23.4%
Faulty equipment	8	10.4%
Program requirements	2	2.6%
Poor communication with staff	2	2.6%

More than half of survey respondents reported that participating in the residential program has

improved their satisfaction with Avista (57.9%, n=375) (Figure 4-18) and 85.5% (n=520) consider Avista a reliable source for information on saving energy (Figure 4-19). Most respondents (80.1%, n=519) are likely to recommend the residential program to others.

Figure 4-18: Program Participation's Impact on Satisfaction with Avista (n=648)

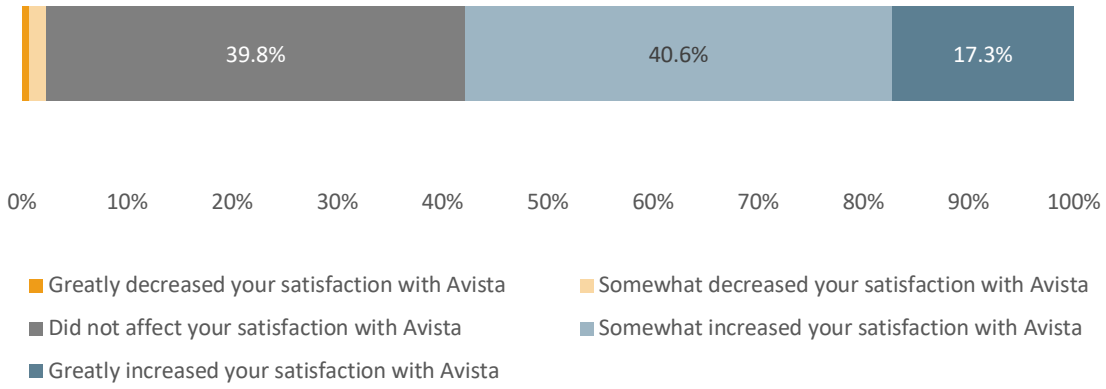
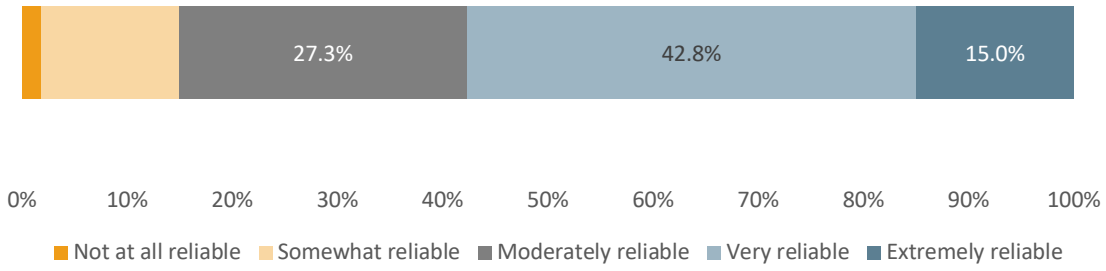


Figure 4-19: Avista as a Reliable Source of Information (n=648)



4.1.4.5 Respondent Demographics and Home Characteristics

Table 4-13 presents respondents' demographic and residence characteristics.

Table 4-13: Residence Characteristics and Respondent Demographics (n=varies)

Response	Percent
Homeownership Status (n=610)	
Own	94.0%
Own and rent to someone else	0.6%
Rent	2.6%
I don't know	0.3%
Prefer not to answer	2.5%
Housing Type (n=610)	
Single-family house detached	88.0%

Response	Percent
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	3.7%
Mobile or manufactured home	5.4%
Apartment with 2 to 4 units	1.5%
Apartment with 5+ units	0.5%
I don't know	0.2%
Prefer not to answer	0.8%
Central A/C Status (n=648)	
Yes	66.2%
Home Fuel Type (n=610)	
Natural Gas	63.7%
Electricity	28.7%
Wood	2.2%
Propane	1.9%
Oil	1.2%
Pellets	0.6%
Gas and electric	0.5%
Prefer not to answer	0.8%
Water Heater Fuel Type (n=648)	
Natural Gas	47.5%
Electricity	48.1%
Propane	1.2%
Gas and electric	0.6%
None	0.0%
I don’t know	2.0%
Prefer not to answer	0.5%
Home Size (sq ft) (n=555)	
Less than 1,000ft^2	6.7%
1,000-1,999ft^2	43.4%
2,000-2,999ft^2	30.8%
3,000-3,999ft^2	12.8%
4,000ft^2 or more	5.4%
Housing Age (n=648)	
Before 1950	23.8%
1950 to 1959	14.1%
1960 to 1969	8.5%
1970 to 1979	17.3%
1980 to 1989	9.1%
1990 to 1999	15.7%
2000 to 2009	9.3%
2010 to 2019	0.5%
2020 to Present	0.8%
I don’t know	1.1%
Number of people in Home (n=607)	
1 person	18.3%
2 people	48.7%

Response	Percent
3 people	13.0%
4 people	10.1%
5 people	3.6%
6 people	2.5%
7 people	0.9%
8 or more people	0.3%
Prefer not to answer	2.6%
Age (years) (n=610)	
18 to 24	0.5%
25 to 34	6.2%
35 to 44	14.0%
45 to 54	13.7%
55 to 64	22.8%
65 to 75	26.9%
75 or older	11.0%
Prefer not to answer	4.9%
Anyone in home 65 years or older (n=648)	
Yes	57.1%
Annual Household Income (n=648)	
Less than $10,000	0.9%
$10,000 to $19,999	2.2%
$20,000 to $29,999	3.7%
$30,000 to $39,999	6.6%
$40,000 to $49,999	5.6%
$50,000 to $74,999	17.9%
$75,000 to $99,999	11.1%
$100,000 to $149,999	15.1%
$150,000 to $199,999	6.2%
$200,000 or more	3.6%
Prefer not to answer	27.2%
Education (n=610)	
Did not graduate high school	1.2%
High school graduate	14.2%
Associates degree, vocation/ technical school, or some college	28.9%
Four-year college degree	26.1%
Graduate or professional degree	22.7%
Prefer not to answer	6.9%

4.1.5 Residential Prescriptive Programs Trade Ally Interview Results

The Evaluators conducted phone interviews with 24 residential trade allies who participated in the Residential Prescriptive programs in 2022 and 2023. A total of 358 contacts were identified and each trade ally was contacted at least one time via email or phone.

4.1.5.1.1 Background and Program Tenure

Responding trade allies represented a variety of specialties and service territories (Table 4-14).

Table 4-14: Respondent Background (n=24) (multiple selections allowed)

Background	n
Contractors/installers	23
Designers/engineers	2

Half of the responding trade allies (n=12) specialize in building shell or weatherization services, such as windows, doors, insulation, and air sealing. Other specialties included HVAC equipment (n=12), solar equipment (n=1), and lighting equipment (n=1). Fourteen of the responding trade allies serve customers in both Idaho and Washington, while six work exclusively in Washington and two work exclusively in Idaho.

Program tenure varied between the respondents. More than half of responding trade allies have engaged with the program for multiple years (n=15), while two trade allies noted this was their first year participating. Four trade allies did not know how long their companies had been participating for.

4.1.5.1.2 Engaging Customers

Respondents' target customers varied; thirteen respondents exclusively serve residential customers, while 12 serve both residential and commercial customers. More than half of respondents noted they promote the program and acquire jobs on their own and indicated they were not familiar with Avista-provided marketing materials (n=14). In general, respondents indicated they rely on word-of-mouth (n=13), digital and radio advertising (n=4), tables or booths at shows, expos, fairs, and events to engage customers (n=2), referrals (n=1), and door-to-door sales teams (n=1). Six respondents indicate they use Avista's marketing materials and four receive leads directly from Avista.

More than half of the responding trade allies (n=16) identified barriers or challenges that prohibit customers from participating in the program. Key barriers and challenges include upfront costs (n=7), don't qualify for rebates (n=6), confusion over the application process (n=2), skepticism about the program (n=1), fear of natural gas (n=1), strict eligibility requirements specifically related to window U-factor requirements and insulation R-value requirements (n=1), and customer does not own the home (n=1).

4.1.5.1.3 Application Process and Program Incentives

Ten trade allies complete and submit the rebate applications on behalf of their customers; seven trade allies indicated their customers or distributors (n=2) complete the application, while three said it varies based on customer capabilities. The remaining nine respondents did not comment on their application process. Less than half of the trade allies (n=7) identified challenges with the application process. Challenges included confusion over program design and requirements (n=3), unclear program language and terminology (n=2), customers not having computers (n=2), and portal glitches and errors (n=1).

The responding trade allies did not agree on their perspective of current incentive levels provided by Avista. Three respondents believed the incentives are generous, while three others desired higher incentives (Table 4-15); 19 respondents did not comment on the incentives.

Among the respondents working in both Idaho and Washington three did not believe the incentive levels varied considerably, while three explained incentives are higher in Washington than Idaho. One respondent explained they have more Washington customers than Idaho customers and attributed this difference to varying incentive amounts. However, all three of these respondents noted that Avista

incentive amounts are higher than those of other Idaho utilities. More than half of the responding trade allies proposed additional measures be included in the program (Table 4-15).

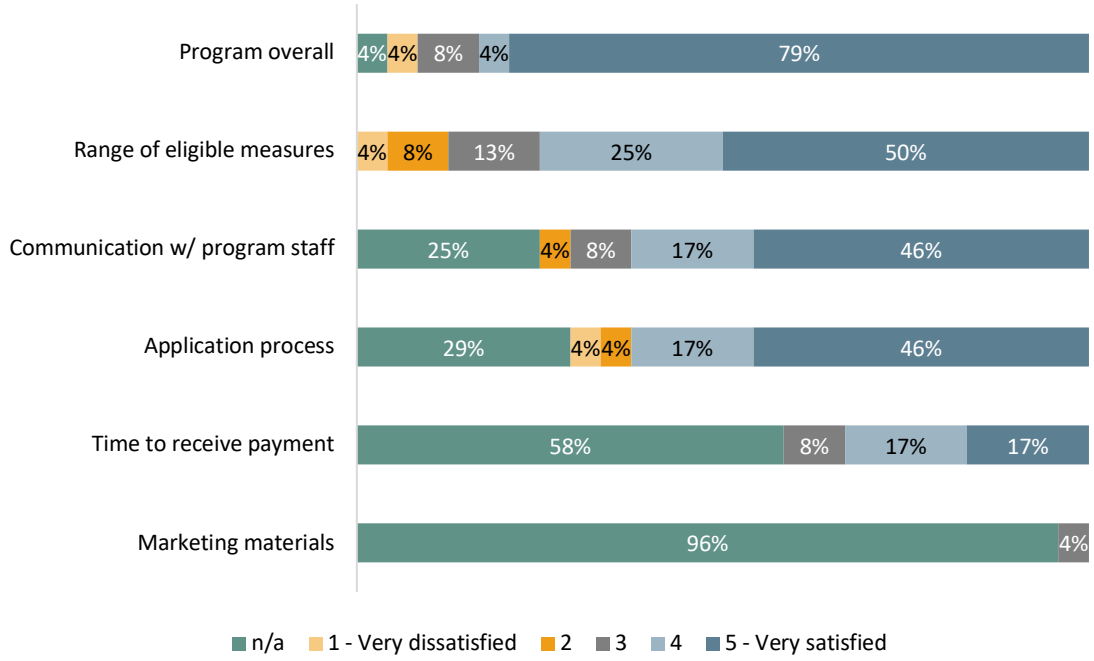
Table 4-15: Incentive Recommendations

Measures	n
Incentives too low to encourage adoption (n=3)	
A/C units	1
All incentives	1
Higher SEER-rated heat pumps	1
Proposed additions (n=16)	
AeroBarrier	1
Aero seal	1
External insulation (e.g. panel insulation)	1
External doors	1
Gas furnaces	1
Gas tankless water heaters	1
SEER 95 furnaces	1
Air purifiers	1
Ductless split system in (ID)	1
Gas incentives	1
Heat pumps (ID)	1
Vinyl	1
Expand window options	1
Expand insulation options	1

4.1.5.1.4 Program Satisfaction and Recommended Improvements

Responding trade allies were most satisfied with the program overall and least satisfied with the range of eligible measures (Figure 4-20). Some respondents commended the program for its lucrative incentives (n=3) and ease of participation (n=1).

Figure 4-20: Program Satisfaction (n=24)



The most significant challenge responding trade allies face when participating in the program is the application process (n=8); specifically navigating the website and application portal (n=3); obtaining customer account information (n=2); time required to fill out the paperwork (n=2); gathering the separate documents to submit as one file (n=1); and the new guidelines regarding midstream distributors introduced in 2023 (n=2). One trade ally elaborated on this issue, explaining that while previously they submitted rebates on behalf of their customers on a rolling basis, distributors are now responsible for processing the rebates. Because contractors often buy equipment upfront, before they have an interested customer, they now submit their rebates retroactively and thus there are delays in payment which results in accounting issues. This challenge has become so cumbersome for this trade ally that they are disengaging from the program.

Other challenges include incentive level discrepancies between Idaho and Washington (n=2), discrepancies between lump sum and itemized pricing (n=1), obtaining every tenant's signature for multi-family projects, as well as poor communication with Avista staff (n=4). Two of the four respondents who mentioned poor communication cited the new program design as the reason they now have limited communication with program staff, indicating that distributors are now their point of contact rather than Avista staff.

Eleven trade allies provided recommendations for program improvement (Table 4-16).

Table 4-16: Recommendations for Improvement (n=8)

Recommendations	n
Co-branding opportunities	4
Discontinue midstream program	2
Focus on fewer measures and increase incentive amounts rather than spreading funds across multiple measure categories	1

Scale window rebates based on price and quality	1
More transparency on program duration and available funds	1
Improved marketing materials	1
Digitizing applications	1
Standardizing incentives across states	1
Drug screening for approved contractors	1

4.1.6 Midstream Trade Ally Interview Results

The Evaluators conducted phone interviews with five participating midstream distributors. Avista's midstream program encompasses residential and commercial measures; these interviews represent responses from distributors across both sectors. Eight distributors participated in Avista's midstream program in 2023. All eight distributors were invited to participate in an interview; distributors were contacted up to three times via phone and email.

4.1.6.1.1 Respondent Background

Responding distributors sell HVAC, plumbing, mechanical equipment, and food service equipment. All five respondents supply the greater Avista service area in Idaho and Washington; one respondent also sells equipment to national and international customers. In general, the responding distributors learned about Avista's midstream program through Avista staff and their customers.

4.1.6.1.2 Customer Engagement

All five respondents sell exclusively to contractors rather than end-use customers. Two of the responding distributors explained that they only sell equipment to licensed contractors to minimize liability issues and reduce competition between the distributors and their contractor-customers, explaining that selling directly to the end-users would take jobs away from their contractors.

The distributors mentioned using a variety of marketing strategies to engage their customers in the Avista program. Strategies include an active sales team and targeted marketing materials, app-based advertisements, and word of mouth. Three of the responding distributors also utilize Avista provided marketing materials.

4.1.6.1.3 Program Satisfaction and Recommended Improvements

Due to the infancy of the program, distributors noted that it is too soon to tell what, if any, impact the program has had on their business.

Responding distributors identified program challenges and participation barriers. These challenges mostly relate to administrative challenges including determining equipment eligibility (n=2), contractor reluctance (n=2), equipment availability (n=1), and application tracking (n=1). The distributors explained that some contractors were wary of the program and the related upfront costs. Previously, contractors received rebates directly from Avista, but now the rebates are routed through the distributors and thus contractors do not receive a rebate until paperwork is processed by both the distributors and Avista.

In general, respondents were satisfied with the program. Four of the five responding distributors provided recommendations for program improvement (Table 4-17).

Table 4-17: Recommendations for Improvement

Recommendation	n
Increased engagement between Avista and contractors. Specifically, more guidance on program structure and the benefits of engagement.	3
Quarterly check-ins to track progress, ask questions, and share updates.	1
Enhance program requirements to further promote efficient equipment.	1
Customer referrals or project leads.	1

4.1.7 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.1.7.1 Conclusions

The following conclusions represent key findings from the appliance rebate and weatherization survey:

1. **Program awareness –** Contractors and retailers and the Avista website were the most popular sources of program awareness for respondents from both the appliance rebate and weatherization programs.
2. **Program motivation –** About 50-60% of survey respondents from both the appliance rebate and weatherization programs were very or moderately interested in upgrading equipment in their homes for health and safety reasons, improving comfort, and increasing energy efficiency.
3. **Popular measures –** Among survey respondents, smart thermostats (n=497) and windows (n=463) were the most popular measures received through the residential single-family homes program.
4. **Experience with contractor –** Among the respondents who confirmed their use of a contractor to install their equipment (appliance rebate=551, weatherization=232), the majority of these respondents were satisfied with the work completed by their contractor. Previous experience with the contractor or a personal referral were the most popular ways respondents found contractors across both the programs. Few respondents indicated that their contractor provided them recommendations for other energy efficient upgrades (appliance=90, weatherization=35)
5. **Satisfaction –** In general, respondents were satisfied with all aspects of the appliance rebate and weatherization programs. The most common reasons for dissatisfaction were related to insufficient rebates and a lack of transparency regarding program requirements and eligibility criteria.

The following conclusions represent key findings from the appliance, furnace, HVAC, water heat, and weatherization rebate program trade ally and distributor interviews.

6. **Program tenure –** Program tenure varied across the trade allies and midstream distributors interviewed. Some (n=15) of the interviewed trade allies had been engaged with the program for multiple years, while the midstream distributors were all new due to the infancy of the Midstream Program, which launched in the summer of 2023.
7. **Program promotion** – More than half of the weatherization and appliance rebate focused trade allies were not aware of Avista sponsored marketing materials (n=14). Across all the trade allies in both downstream and midstream models, trade allies completed the lion's share of program marketing and lead generation on their own, relying heavily on word of mouth.

8. **Program process** – Midstream distributors highlighted some issues with the website and general application flow of the midstream program, but noted that the program is new. Some appliance rebate trade allies also cited confusion over the new midstream program and how that might impact their work and program application processing moving forward.
9. **Barriers to energy efficient upgrades** – Both groups of trade allies cited upfront costs and low incentive rates as key barriers for customer engagement and program participation.

4.1.7.2 Recommendations

Based off of the above conclusions, the Evaluators suggest the following recommendations for the Residential Prescriptive Rebate programs moving forward.

1. **Promotional campaigns –** Consider increasing promotional campaigns that highlight the impact energy efficient equipment can have on customers' home safety, comfort, energy bills, and overall energy efficiency.
2. **Contractor training and cobranded marketing materials –** Contractors serve as the backbone of the residential prescriptive rebate programs, serving as the primary awareness source and marketing avenue. Consider offering contractors more training opportunities to educate them about the program, as well as providing them co-branded marketing materials to increase legitimacy and program recognition. During training, encourage contractors to help customers identify other areas of the home in need of improvement to maximize customers' benefit and lead to deeper energy retrofits.
3. **Increase training opportunities –** Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.
4. **Program requirements –** Consider enhancing website and marketing materials to make program eligible measures, eligibility requirements, and required documentation clearer and more transparent.

4.2 Multi-family Direct Install Program

The Multi-family Direct Install Program (MFDI) is administered by SBW Consulting, Inc (SBW). This program provides direct installation and audits for customers to install direct install measures, such as screw-in LEDs and water saving measures, as well as identifies additional energy efficiency opportunities customers can pursue. This program is available to customers who receive electric service from Avista and live in a five-unit or more multi-family property. The program serves Avista's low- and limited-income population, a traditionally hard-to-reach customer segment and. Originally launched in 2015 with a focus on small businesses, MFDI sunset at the end of December 2023. In this report, we have separated the MFDI process evaluation results due to large differences between the Residential Prescriptive programs and the MFDI energy savings delivery methods.

4.2.1 Data Collection Activities

The process evaluation of the MFDI program included the following data collection activities:

- *Avista and SBW Program and Implementation Staff Interviews.* The Evaluators interviewed two staff at Avista involved in the administration of the MFDI Program in 2022 and 2023. These

interviews were to collect information from program staff about program design, administration, marketing, and stakeholders.

- *Property Manager Surveys.* The Evaluators surveyed property managers representing buildings that participated in the program. These interviews covered a range of topics, including program awareness, participation, and satisfaction.

4.2.2 Staff Interview

ADM conducted in-depth interviews with program staff in 2022 and 2023. Interviewees included Avista's MFDI program manager (August 2022 and 2023) and the lead contact of the implementation contractor, SBW (September 2022 and December 2023).

4.2.2.1 Program Objectives and Design

MFDI's primary goals are to achieve savings and help customers in the multi-family market reduce their energy bills. MFDI was developed to provide additional assistance to multi-family tenants who are often difficult for utilities to reach given dynamic and transitional living patterns. Through collaborative efforts with property management firms and housing authorities, the program offers an easy and accessible way for multi-family complexes to enroll in the program and receive energy-saving measures.

Participants of the program receive a variety of high efficiency direct install measures, as well as building audits to identify opportunities for replacing inefficient common area and exterior lighting with more efficient options. Though the MFDI program tracked participation of complexes in named communities and with higher concentration of tenants that are energy burdened to assure equitable distribution of energy benefits, the program serves across market-rate and income-eligible properties. All residential buildings with five or more units are eligible to participate.

Since its inception in 2015, the MFDI program has undergone several changes and adaptations, most notably the temporary suspension of its operations in March of 2020 in response to the COVID-19 pandemic. Between March 2020 and April 2022, the program attempted alternative methods of engagement such as socially distanced events and drop-offs, with modest success. In April 2022 the program was able to fully relaunch by adopting new health and safety protocols to ensure the safety of both staff and participants in light of the COVID-19 pandemic. During the suspension and phased restart, the program maintained its commitment to serving its customers, albeit with adjustments to its operational procedures.

4.2.2.2 Program Administration and Staffing

The MFDI program had the same program manager and implementer (SBW) from inception to sunset. As the primary implementation contractor, SBW is responsible for project recruitment and installation. SBW contracted with five different lighting subcontractors, located in Spokane and a few other locations for rural reach associated with the supplemental lighting component. Throughout 2022-2023, program staff reported staffing challenges which impacted program performance (one key staff extended absence for medical leave and loss of subcontractors due to the COVID-19 disruption).

4.2.2.3 Marketing and Outreach

In 2022-2023, the MFDI program relied on phone outreach based on Avista lists to fill project pipelines. Program staff reported the program had high participation rates throughout 2018 and 2019, but by the end of 2023 the program was "on the diminishing curve of opportunity," even though the market had

not yet reached saturation. Staff attributed recruitment challenges to post pandemic changes in staffing practices (property managers, facility or maintenance staff going remote) at multi-family complexes which increased the rate of flake-out, no show, last-minute cancellation, or unwillingness to show up on site. In response, the program increased attempts of staff visits at complexes to follow up on calls with limited success. Program staff reported finding property/facility managers who are interested and can make themselves available for walk-through and installation was one of the main challenges for the MFDI program.

4.2.2.4 Implementation and Delivery

After obtaining an approval from a property owner, the program provides advanced notice to building's tenants and an option to opt out. SBW installation staff is accompanied by buildings property or facility managers to go into willing tenant units to conduct simple direct installation of energy efficiency measures (screw-in LEDs, aerator, showerhead, and leaving behind materials). For the supplemental lighting component, SBW installation staff conducts an audit of the facility during the direct install visit. SBW's lighting subcontractors then go into those buildings with high saving potential to complete a full audit. Upon SBW's approval, these subcontractors proceed with installation, free for the property owners. SBW tracks a detailed database of measures installed, and reports to Avista each month with extracted progress summary and invoice. Avista reported that these implementation and delivery processes are working well and praised the work of SBW.

Program staff mentioned that MFDI experienced a supply chain challenge, especially noting significant price increases of lighting fixtures and some other equipment during the evaluation years.

4.2.3 Property Manager Survey Results

Since the program did not track the tenants, whose units were treated by the program, the Evaluators surveyed contacts of property management firms of 10 randomly selected unique multi-family buildings that participated in Avista's MFDI program in programs years 2022 and 2023. The Evaluators conducted the survey by email and phone. Between 2022 and 2023, the program treated a total of 176 multi-family buildings which were represented by 48 property management firms.

4.2.3.1 Awareness and Motivation

Most property manager contacts (n=7) indicated they first learned about the program opportunity directly from program staff (Avista or SBW) and most of them said program staff were the most influential source of information to their participation decision. A few contacts also reported that they heard about the program from their contractors (n=2) and through other word-of-month (n=2).

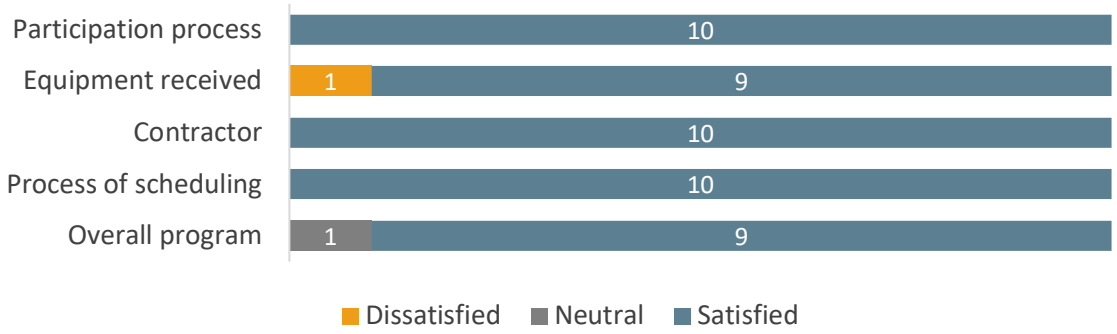
While the majority of these contacts reported bill reduction and environmental benefits greatly contributed to their participation decisions (70% and 90% said "a lot"- "a great deal"), more than half of these property managers also mentioned they were motivated by other practical benefits such as tenants' satisfaction, increased security, values of upgrades, and convenience of program participation.

4.2.3.2 Program Satisfaction

In general, responding property managers were satisfied with the MFDI program (Figure 4-21). All but one of the 10 contacts indicated they were satisfied with the program overall. The one dissatisfied property manager indicated dissatisfaction with the quality of the equipment installed, saying they

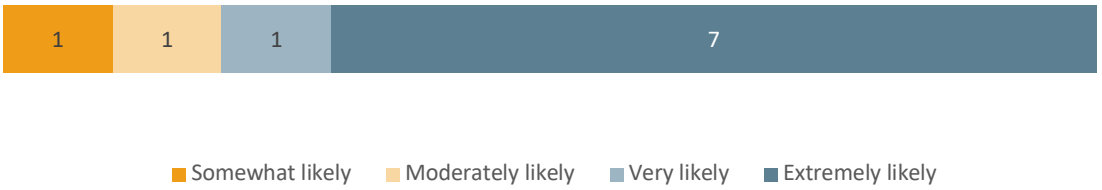
received some complaints from their tenants about the quality of the light bulbs and faucet aerators the program installed.

Figure 4-21: Program Satisfaction (n=10)



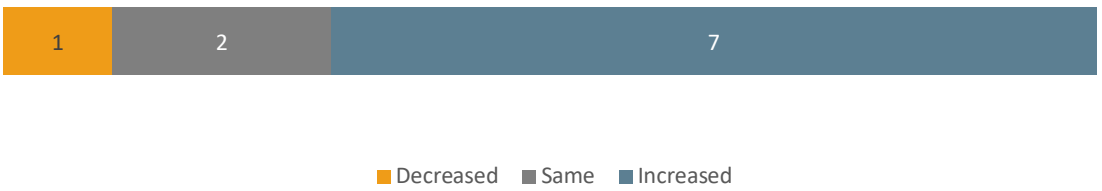
As a result of their high satisfaction with the program, a majority of the property managers (8 of 10) said they are 'very' or 'extremely' to recommend the Avista program to othes.

Figure 4-22: Likelihood to Recommend Avista Program (n=10)



Additionally, most surveyed property managers (7 of 10) noted that participation in the program increased their satisfaction with Avista.

Figure 4-23. Change in Satisfaction with Avista (n=10)



4.2.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations.

4.2.4.1 Conclusions

The following conclusions represent key findings from the Multi Family Direct Install program survey:

1. **Program Suspension –** The challenges caused by the COVID-19 pandemic forced the program staff to suspend the program in March of 2020. The program was then relaunched in April of 2022 (several months in during the 2022-2023 evaluation year). Despite this challenge, the program implementer, SBW, continued to operate the program with adjustments to its operational procedures.
2. **Program Satisfaction –** The property managers of the participating multi-family buildings expressed high satisfaction with the program. The program started with a high rate of participation (an average of 3,000 measures installed per month), but participation had greatly declined by the end of 2023 (an average of 1,000 measure installs per month). The program staff assessed the market is on the diminishing curve of opportunity.

4.2.4.2 Recommendations

Based off of the above conclusions, the Evaluators suggest the following recommendations:

1. **Customer Recruitment –** If Avista funds a similar program targeting multi-family buildings in the future, recruitment of property managers who are willing to cooperate and provide time – as experienced by the program particularly during the post-pandemic period – is anticipated to be a major hurdle. The program should develop a thoughtful outreach and marketing approach that leverages motivation and interest to most building owners and property managers (tenants' satisfaction, increased home security and home comfort, values of upgrades, and convenience of program participation) in addition to the bill reduction benefits designed for tenants.

4.3 Low-Income Program

The Low-Income Program delivers energy efficiency measures to low-income residential customers in Avista's Washington and Idaho service territory via a partnership with eight Community Action Agencies ("CAP agencies") and one tribal weatherization organization. The CAP agencies qualify customers based on income and several home characteristics and then in-house or contracted crews install approved program measures. In addition to Avista funds, the agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures. The Evaluators report process-level findings for the Low-Income Program separately from the Residential and MFDI Programs due to large differences in program operations, goals, and target community.

4.3.1 Data Collection Activities

The process evaluation of the Low-Income Program included the following data collection activities:

- *Staff Interviews*. The Evaluators conducted in-depth interviews with program staff in August 2022 and 2023. Interviewees included Avista's Low-Income program managers and representatives from six of the Community Action Partnership (CAP) agencies that implement the program. Interviews occurred in November-December 2022 and October-November 2023.
- *Customer Surveys.* The Evaluators surveyed customers who participated in the program during 2022-2023. Surveys covered a range of topics, including program awareness, participation, and satisfaction.

4.3.2 Staff Interview

This section summarizes the Evaluators findings from the Low-Income program manager in-depth interviews.

4.3.2.1 Program Design

The Low-Income program was designed to help fund pre-existing weatherization programs operated by Community Action Partnership (CAP) agencies. It leverages the infrastructure CAP agencies already have for income qualifying participants and implementing weatherization projects. CAP agencies have a list of pre-approved measures they can implement for reimbursement. Washington state also has its own list of pre-approved measures. Avista expands on these lists by offering additional measures that are pre-approved for reimbursement funding through Avista with a goal of delivering additional energy savings and reducing energy burdens for its low-income customers.

The program allows CAP agencies to take a holistic approach to energy efficiency upgrades, including making health and safety improvements to homes, as up to 30% of a project's budget can go towards health and safety repairs. Most CAP agencies praised Avista for allowing funds to be used flexibly and appreciated their expansive measure list.

Program staff and CAP agencies addressed several challenges with the current program model:

- The program struggles with lower rates of energy savings as the estimated savings often do not materialize due to the low energy usage starting point, typical of low-income customers. This baseline also leads to lower cost-effectiveness than desired, making significant energy savings challenging to achieve.
- Many CAP agencies mentioned a desire to waive or incorporate flexible income requirements in order to expand the program's reach, however, doing so would mean forgoing federal funding, which has implications for the program's funding model.
- Reaching rental customers through the program is challenging as renters worry their property managers might use upgrades to increase rent, thus resulting in more benefits for the landlords than the tenants.

4.3.2.2 Program Administration and Staffing

The Low-Income program experienced a staff transition between 2022 and 2023 when the longstanding program manager retired. The staff indicated that this program manager transition went smoothly.

Avista works with eight Community Action Agencies (“CAP agencies”) and one tribal weatherization organization who implement the programs in their designated counties or tribal communities in Washington and Idaho. CAP agencies organize their staff similarly; they have in-house administrative staff and weatherization crew members, as well as auditors and inspectors (who are often members of their crew). CAP agencies also subcontract for HVAC, electrical, and plumbing work for other specialty areas that exceed their technical capacity.

CAP agencies highlighted a variety of staffing challenges that impact their programs. Most CAP agencies shared their struggles with recruiting and retaining qualified crew members, especially among CAP agencies that serve in rural areas. This issue is often related to their lack of workforce development resource (cost of travel, mileage reimbursement, and per diem, etc.). In response to this issue, Avista started a new initiative in 2023 in which they contracted the Building Performance Center to travel to

rural areas and provide training. CAP agencies in rural areas also consistently cited challenges findings subcontractors who are willing to work with them due to prevailing wage documentation requirements.

Interviewed CAP agencies expressed high satisfaction with Avista, citing positive personal relationships with Avista staff and responsiveness to their concerns and challenges.

4.3.2.3 Marketing and Outreach

Interviewed CAP agencies reported that most of their energy bill assistance customers are asked if they are interested in weatherization services as well and that this cross-program promotion is their top referral pathway.

CAP agencies cited additional outreach methods including flyers, newspaper ads, outreach through food banks, and door-to-door outreach in targeted neighborhoods. Most agencies explained that they do not need to do much marketing or outreach as they have long wait lists from the bill assistance referral system.

4.3.2.4 Implementation and Delivery

CAP agencies handle most of the day-to-day implementation, while Avista supports through measure approvals, rebates and incentives, and data tracking support.

CAP agencies handle the application process and verify applicants' income eligibility. Agencies send their auditor to assess customer's home to identify weatherization repair needs. Auditors determine the home's weatherization and repair needs and then create a scope of work, pulling from federal, state, and Avista-approved measures. CAP agencies complete the weatherization work using a mix of in-house crews and subcontractors. In-house crews often handle insulation, air sealing, and basic HVAC while contractors are brought in for specialized work such as electrical or plumbing. Upon completion of the project, an inspector conducts a final inspection quality check.

CAP agencies collect required documentation and report project completions to Avista for reimbursement. Avista also provides some CAP agencies access to their iEnergy tracking system to streamline this process.

CAP agencies and Avista staff identified a variety of implementation challenges including deferrals, supply chain and inflation, wait times, and service territory boundaries (Table 4-18).

Table 4-18: Implementation Challenges

Challenge	Description
Deferrals	CAP agencies often have to walk away from potential projects due to necessary pre-weatherization repairs (roof repair is among the most commonly mentioned repairs) because the federal, state, or Avista funds currently do not support these pre-weatherization repairs. One CAP agency mentioned they defer about 50% of homes assessed due to this problem. In response to this recurring issue, Avista staff shared that a deferral maintenance pilot program is in development that is designed to assist homes needing pre-weatherization repairs by setting aside funds that is specifically intended to address this issue.

Supply chain and inflation	General issues impacting the construction industry are also affecting CAP agencies and their ability to stretch dollars to serve more customers. One CAP agency cited 20-30% cost increase for equipment and material compared to a few years ago.
Wait times	The long wait times are a persistent challenge for most interviewed CAP agencies for delivering timely weatherization assistance to customers in need. One agency estimated the wait time was at a minimum of three years and noted 95% of them are income-qualified.
Service territory	A few CAP agencies expressed that they want to understand Avista's service territory more accurately and easily to help with their outreach and project planning and thought a detailed map that shows its electric and gas service areas would be useful.

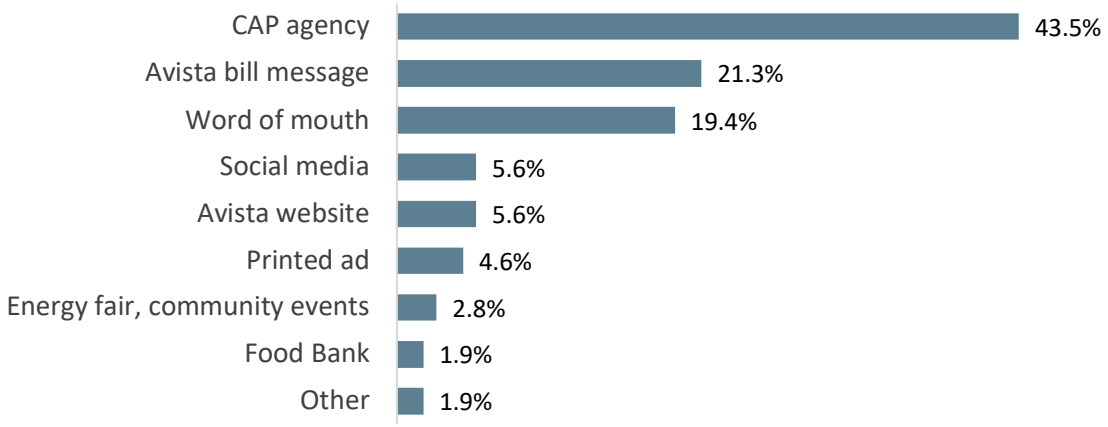
4.3.3 Program Participant Survey Results

The Evaluators surveyed 108 unique customers that participated in Avista's Low-Income program in October 2023 and in March 2024 using an email survey approach. Customers with a valid email were sent the survey via an email invitation. The Evaluators completed 29 surveys from participants in PY2022 and 79 surveys from participants in PY2023.

4.3.3.1 Program Information Sources

Respondents learned about the low-income program through a variety of sources including directly from the CAP agencies, Avista's bill messages, and word of mouth (Figure 4-24).

Figure 4-24: Information Source about the program (n=108)



4.3.3.2 Participation Motivation

Respondents indicated they consider a number of factors when deciding to engage with the program. More than 70% of respondents consider health and safety, savings on energy bill, improving the energy efficiency of their home, and improving their comfort as very or extremely important reason for participating in the program (Figure 4-25). Fewer respondents (42%) mentioned environmental benefits

and other benefits like the opportunity to update their home, replace failed equipment, reduce, and address needs for disabilities.

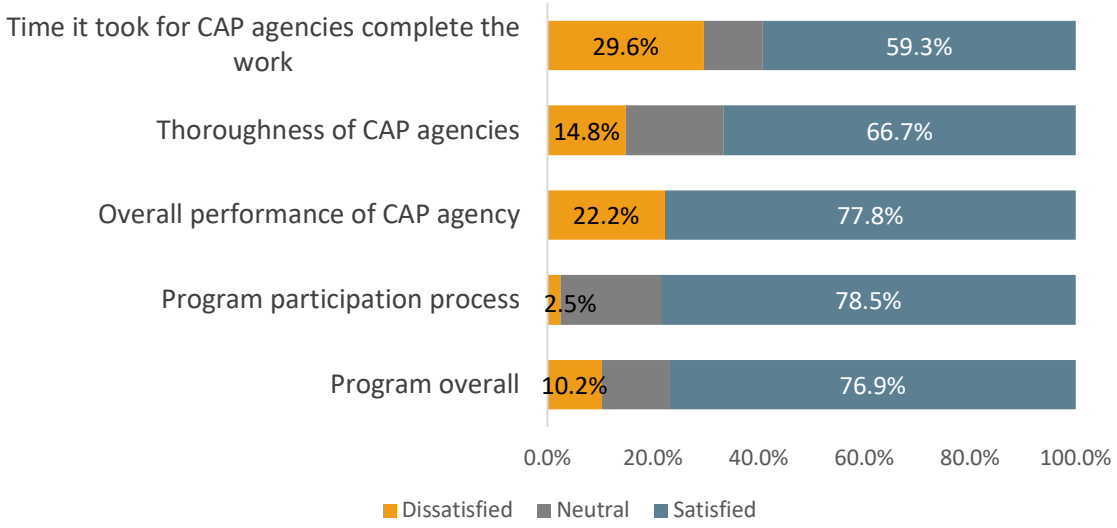
Figure 4-25: 'Very'-'Extremely' Important Reasons for Participation (n=108)

4.3.3.3 Program Satisfaction

Most surveyed program participants (76.9%) reported they were satisfied with the program overall, but 10.2% expressed dissatisfaction (Figure 4-26). Reasons for dissatisfaction included poor quality of work, such as inadequate installation of windows, furnaces, fans, and weather-stripping materials, failed equipment upgrades, discomfort in their home following the upgrades, long wait times, as well as energy bill increases. Very few participants (2.5%) expressed dissatisfaction with the program participation process.

More than three-quarters of respondents (77.8%) were satisfied with the overall performance of the CAP agency. Among the respondents who expressed dissatisfaction with the CAP agencies, most were dissatisfied with the time it took to complete the work.

Figure 4-26: Program Satisfaction (n=108)



The majority of respondents indicated they were likely to recommend the program to others (Figure 4-27). Moreover, about two-thirds of the respondents (64.8%) said their participation in the program increased their satisfaction with Avista (Figure 4-28).

Figure 4-27: Likelihood to Recommend Avista Program (n=108)

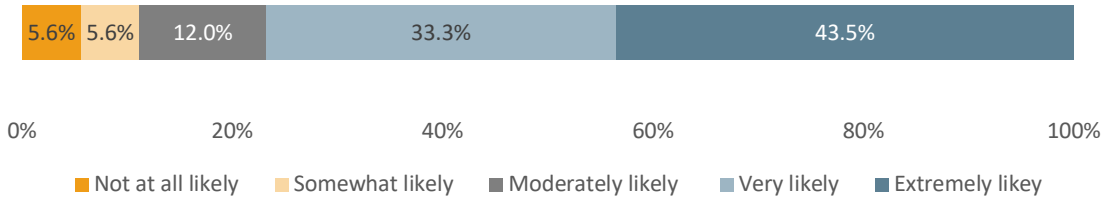
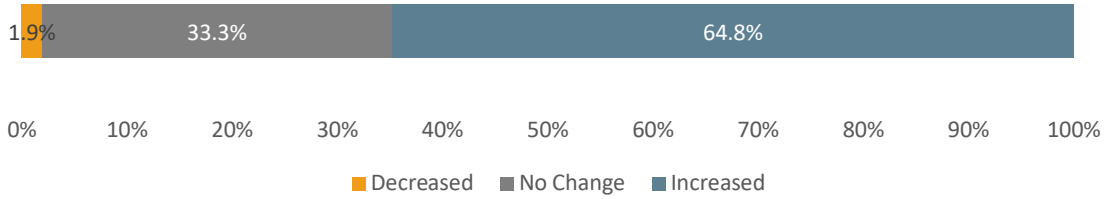


Figure 4-28: Change in Satisfaction with Avista (n=108)



4.3.3.4 Respondent Demographics and Home Characteristics

In this section, the Evaluators present the demographic and home characteristic results from the responding Low-Income Program customers. Table 4-19 presents respondents' demographic and residence characteristics.

Table 4-19: Residence Characteristics and Respondent Demographics (n=varies)

Response	Percent
Homeownership Status (n=108)	
Own	86.1%
Rent	10.2%
Own and rent to someone else	0.0%
I don't know	0.0%
Prefer not to answer	3.7%
Housing Type (n=108)	
Single-family house detached	56.5%
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	0.9%
Mobile or manufactured home	39.8%
Apartment with 2 to 4 units	0.0%
Apartment with 5+ units	0.0%
Other, please specify	2.8%
I don't know	0.0%

Response	Percent
Central A/C Status (n=108)	
Yes	49.1%
Home Fuel Type (n=108)	
Electricity	33.3%
Natural Gas	62.0%
Propane	0.0%
Other, please specify	4.6%
I don't heat my home	0.0%
I don't know	0.0%
Prefer not to answer	0.0%
Water Heater Fuel Type (n=108)	
Natural Gas	40.7%
Electricity	53.7%
Propane	0.0%
Other, please specify	0.9%
None	0.0%
I don't know	4.6%
Prefer not to answer	0.0%
Home Size (sq ft) (n=70)	
Less than 1,000ft^2	30.3%
1,000-1,999ft^2	51.5%
2,000-2,999ft^2	15.2%
3,000-3,999ft^2	0%
4,000ft^2 or more	3.0%
Housing Age (n=108)	
Before 1950	35.5%
1950 to 1959	12.9%
1960 to 1969	5.4%
1970 to 1979	28.0%
1980 to 1989	7.5%
1990 to 1999	2.2%
2000 to 2009	4.3%
2010 to 2019	0.0%
2020 to Present	0.0%
I don't know	4.3%
Number of people in Home (n=108)	
1 person	32.4%
2 people	30.6%
3 people	15.7%
4 people	10.2%
5 people	4.6%
6 people	1.9%
7 people	0.9%
8 or more people	3.7%
Prefer not to answer	0.0%
Age (years) (n=108)	

Response	Percent
18 to 24	0.0%
25 to 34	7.4%
35 to 44	19.4%
45 to 54	15.7%
55 to 64	13.9%
65 to 75	27.8%
75 or older	13.0%
Prefer not to answer	2.8%
Anyone in home 65 years or older (n=108)	
Yes	54.6%
Annual Household Income (n=108)	
Less than $10,000	8.3%
$10,000 to $19,999	24.1%
$20,000 to $29,999	25.0%
$30,000 to $39,999	14.8%
$40,000 to $49,999	8.3%
$50,000 to $74,999	5.6%
$75,000 to $99,999	0.9%
$100,000 to $149,999	0.9%
$150,000 to $199,999	0.0%
$200,000 or more	0.0%
Prefer not to answer	12.0%
Education (n=108)	
Did not graduate high school	0.9%
High school graduate	26.9%
Associates degree, vocation/ technical school, or some college	48.1%
Four-year college degree	13.0%
Graduate or professional degree	6.5%
Prefer not to answer	4.6%

4.3.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.3.4.1 Conclusions

The following conclusions represent key findings from the Low-Income program survey:

1. **Program Implementation** – The Low-Income Program continues to effectively leverage existing CAP agency weatherization program infrastructure. Program integration has allowed the CAP agencies to take a holistic approach to deep energy efficiency upgrades and expand the measures available to customers.
2. **Program Satisfaction** – Most survey respondents expressed satisfaction with the program overall and reported increased satisfaction with Avista as a result of program participation. Despite mostly high satisfaction rates, some respondents expressed dissatisfaction with the quality of work performed by the CAP agencies.

3. **Program Challenges –** CAP agencies struggle to recruit and retain qualified crew members and subcontractors that meet prevailing wage requirements. Moreover, many income-qualified customers remain underserved due to a lack of funding committed to addressing expensive pre-weatherization health and safety repairs and long application wait times.

4.3.4.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for the Low-Income program moving forward.

1. **Support staff training and trade ally development** – A lack of trained crew members and willing subcontractors in which to partner has reduced CAP agencies' ability to complete projects in a timely fashion and has resulted in a long wait list for the program. Avista should consider sponsoring more Building Performance Center training opportunities for more CAP agencies. Additionally, staff should consider developing and providing vetted lists of qualified trade ally contractors that are willing to work with CAP agencies in their areas. Expanding the trade ally network, may also reduce the travel burden for existing trade allies, as CAP agencies are only able to reimburse travel if five or more projects are scheduled.
2. **Establish funding that supports pre-weatherization repairs** – Continue to develop a deferral maintenance program that assists homes in need of pre-weatherization repairs. Once this deferral maintenance program is rolled out, staff should monitor its usage and determine the level of funding needed in the long term.
3. **Investigate dissatisfied customers due to work quality** – Consider working with CAP agencies to investigate projects of customers who expressed dissatisfaction with the quality of work and equipment installations conducted by the CAP agencies and their subcontractors.

4.4 Home Energy Audit Program

The Residential Home Energy Audit program (HEA) offers customers a comprehensive in-home energy evaluation at no cost to customers. Certified third-party contractors conduct audits that identify areas of concern and make personalized recommendations to improve customer homes' overall efficiency, comfort, and health. Table 4-20 summarizes HEA program activities in 2022 and 2023.

Table 4-20: Summary of HEA projects

State	2022	2023
WA	97	376
ID	24	87
Total	**121**	**463**

4.4.1 Data Collection Activities

The process evaluation of the HEA program included the following data collection activities:

- *Staff Interviews*. The Evaluators conducted in-depth interviews with program staff in August 2022 and 2023.
- *Customer Surveys.* The Evaluators surveyed customers who participated in the program during 2022-2023. Surveys covered a range of topics, including program awareness, participation, and satisfaction.

4.4.2 Staff Interview

This section summarizes the findings from the HEA program in-depth staff interviews.

4.4.2.1 Program Design

The HEA program is designed to educate and generate interest in energy efficiency in general and, more specifically, in Avista's portfolio of residential energy efficiency and renewable-energy programs. Following a successful pilot effort in 2019, Avista received approval to expand the HEA pilot to full program status in both Washington and Idaho in early 2020. Avista, however, had to suspend the program's launch due to the COVID-19 pandemic. Although Avista conducted some virtual audits in the peak of the pandemic, the majority of interested customers opted to wait for an in-person audit. Following the peak of the pandemic, the program experienced an increase in HEA requests in late 2022.

4.4.2.2 Program Administration and Staffing

Avista contracts with a third-party energy auditor in Spokane with a background in professional home inspections. This auditor employs a few additional crew members to help with the program; they are also considering contracting with another company based in the southern region of the states to better meet program needs. Program staff explained that following a lull in program interest during the pandemic, there was an influx of requests in late 2022 resulting in a backlog of customers. At the time of the staff interview in August 2023, program staff reported that managing this backlog had been one of the program's biggest challenges, noting that customer wait times can range from five to six months.

4.4.2.3 Marketing and Outreach

Program staff reported that the aforementioned influx of HEA applications occurred without any advertisements aside from an update on the Avista website in 2022. The staff speculated that the surge of applications related to the time of year when heating bills increase, and customers were looking for solutions. Program staff said they are not planning any advertisements or outreach campaigns until the program resolves the pending application backlog.

4.4.2.4 Implementation and Delivery

Program staff streamlined the program process in 2022 by administering an web-based program application form. Once an interested customer completes the online form, a job is created and Avista staff can confirm their qualifications, obtain the necessary customer data (including two years of billing data), and set up a customer job using the "Snugg Pro" reporting system. Once the job is created in Snugg Pro, the auditor receives the application, reaches out to the customer, and conducts the audit. During the audit, the auditor inspects the customer's entire home – from crawl space to attic including appliances, mechanical systems, air leak detection with an infrared scan, and health and safety inspection – and, with customer's approval, installs direct install equipment like LED lightbulbs and water saving measures. Following the audit, the auditor details what occurred into the Snugg Pro system, including photos taken and findings and recommendations provided. The system then produces a report which is sent to both Avista and the customer.

Program staff estimated this process – from the time of online application submission to an audit visit – takes approximately two weeks without a backlog.

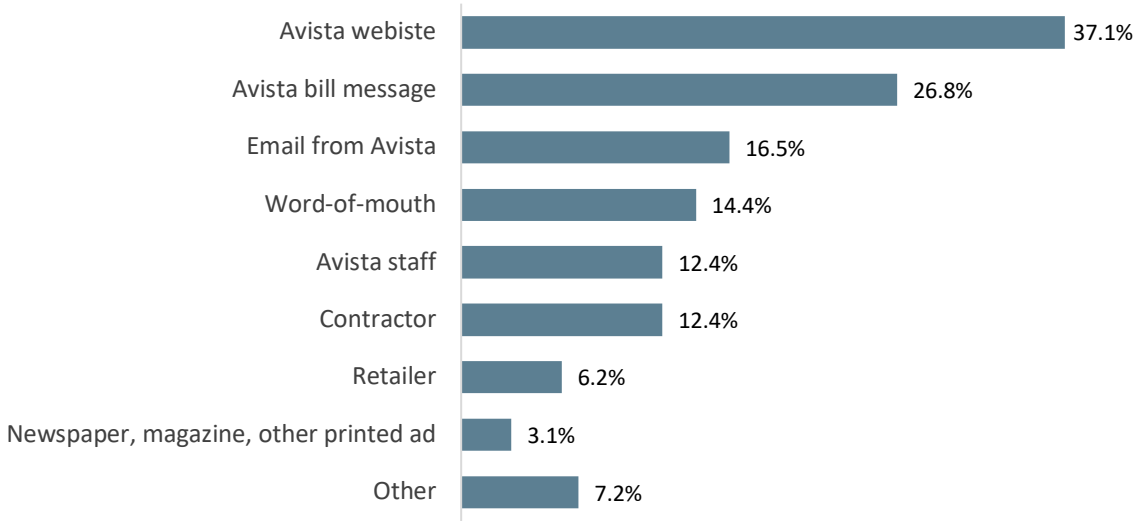
4.4.3 Program Participant Survey Results

Evaluators surveyed 97 unique customers that participated in Avista's HEA program in 2022-2023. Participants were invited to complete a survey via email; contacts received one initial invitation and two reminder emails.

4.4.3.1 Awareness and Motivation

The most popular avenue for program awareness was the Avista website, follow by a bill message (Figure 4-29).

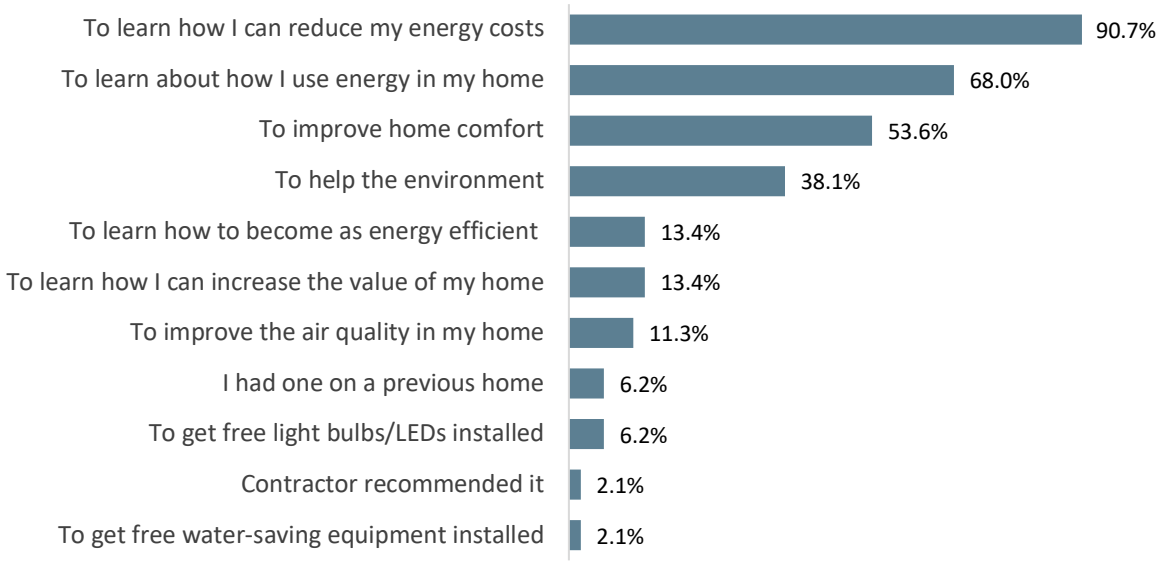
Figure 4-29: Information Source about Avista Programs (n=97, multiple responses allowed)



Across survey respondents who did not participate in the Home Energy Audit program (n=21102), more than half did not know anything about the program (60.3%, n=1,267).

Respondents cited a variety of reasons that impacted their decision to request a Home Energy Audit, most notably a desire to reduce energy costs, to understand their home energy usage, to improve comfort, and to help the environment (Figure 4-30).

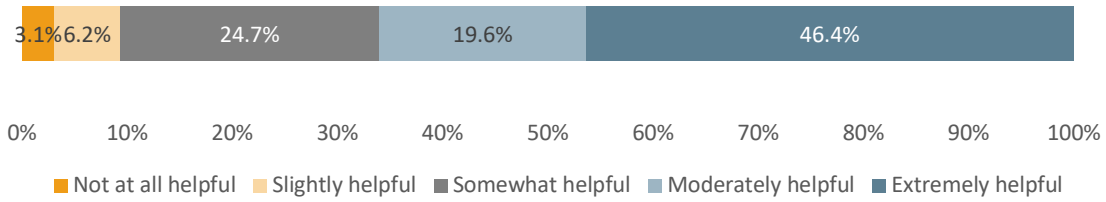
Figure 4-30: Important Reasons to get HEA (n=97)



4.4.3.2 Efficacy of HEA

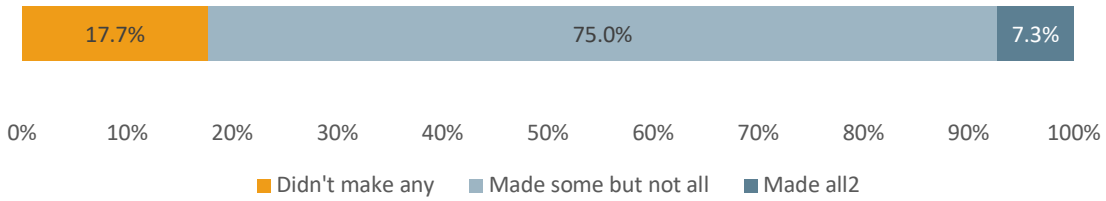
The majority of respondents (90.7%) reported the information they received from the audit was at least 'somewhat' helpful, with almost half (46.4%) rating it 'extremely' helpful. (Figure 4-31).

Figure 4-31: Helpfulness of HEA Recommendations (n=97)



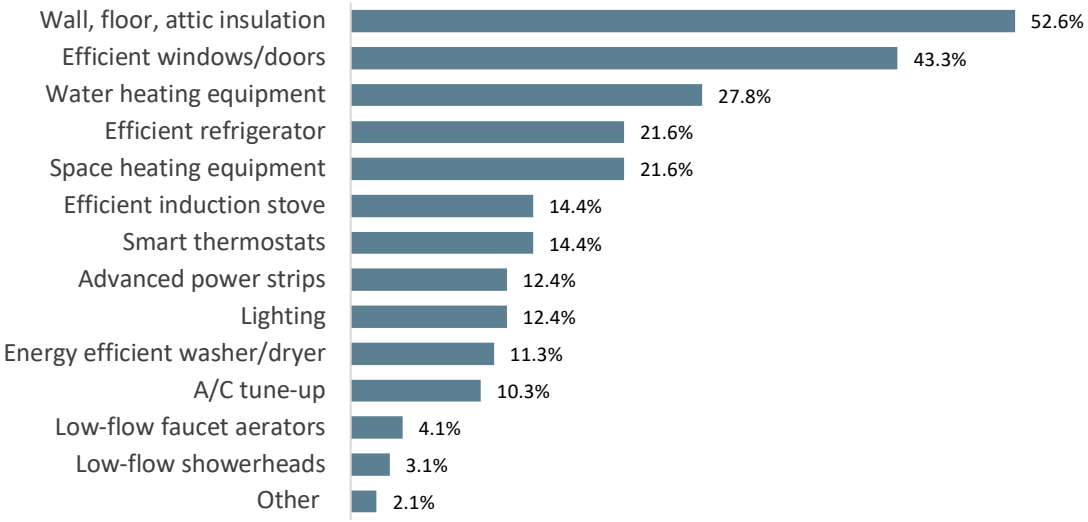
Since engaging in the program, 82.3% of respondents reported that they acted on at least some of the audit recommendations (Figure 4-32). Moreover, more than half of the respondents reported they have plans to make improvements based on the recommendations in the future. Notably, 23% of the surveyed HEA participants reported they have participated in other Avista energy efficiency programs since receiving HEA. Half of these respondents (50%) said HEA recommendations were 'somewhat' to 'extremely' influential in their decisions to do so.

Figure 4-32: Recommended Improvements Made Since HEA (n=97)



Among the recommended improvements, respondents reported they are most interested in but have not yet moved forward with were building shell measures such as insulation and efficient windows and efficient doors (Figure 4-33). Respondents explained that cost (68%), current equipment still being operational (16%), not knowing what to do (12%), and a lack of time (12%) were the biggest barriers to making improvements.

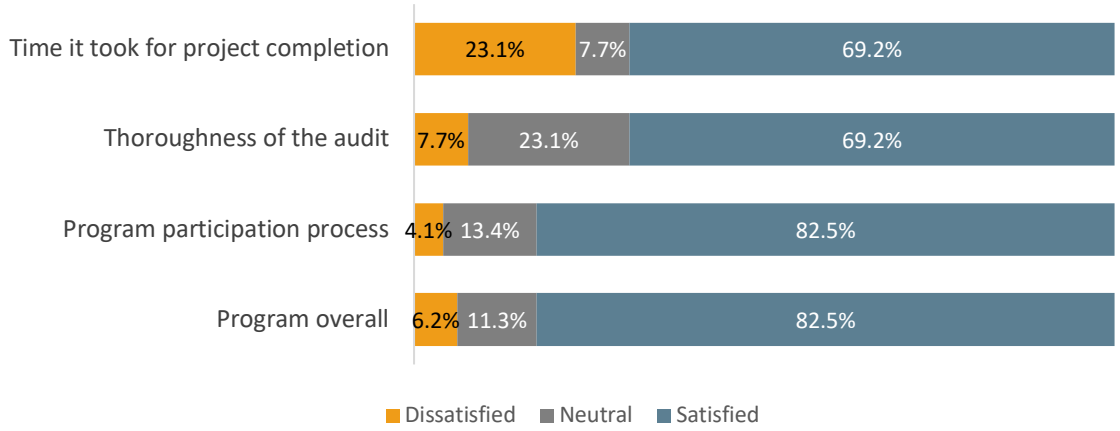
Figure 4-33: Most Interested Improvements Left Undone (n=97)



4.4.3.3 Program Satisfaction

A majority of the surveyed HEA participants reported they were satisfied with the participation process and overall experience with HEA (Figure 4-34). Among respondents who expressed dissatisfaction, the time it took to complete the project was the biggest complaint, followed by the thoroughness of the audit.

Figure 4-34: Program Satisfaction (n=97)



Respondents suggested a variety of recommendations for program improvement (Table 4-21).

Table 4-21: Recommendation for HEA Program Improvement

Recommendation
Provide a list of recommended contractors for recommended improvements. Several participants mentioned that offering vetted contractors that perform each of the recommended improvements would be even more actionable and would provide great value.
Reduce waiting times and improve scheduling. As expressed by the dissatisfied participants with the time it took for project completion, this is another area mentioned frequently. One participant said, “it took 7 months to get done after applying”.
Increase awareness and advertising of the program. These mentions are in response to their positive experience with HEA. Some participants wished that they had learned about HEA offering earlier.
Provide more information beyond just cost savings. Some participants thought that the improvement recommendations focused on cost benefits, but they wished they learned more about non-energy benefits by making recommended improvements including contribution to carbon footprints.

More than three quarters of respondents (77.3%) indicated they were ‘very’ or ‘extremely’ likely to recommend the HEA program to others (Figure 4-35). Additionally, more than two-thirds of the HEA participants (67.0%) said their participation in the HEA program increased their satisfaction with Avista as their service provider.

Figure 4-35: Likelihood to Recommend Avista Programs (n=97)

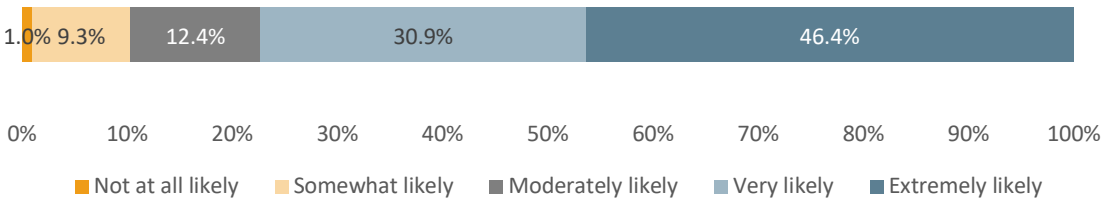
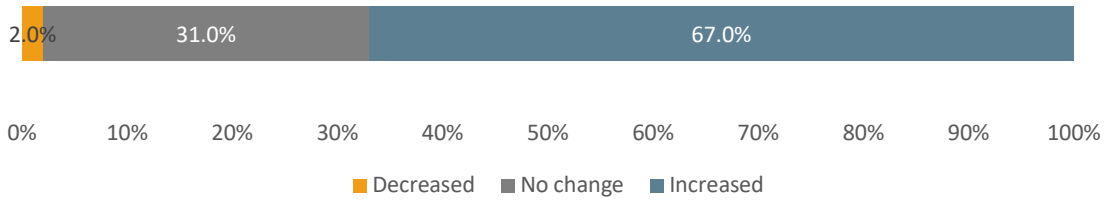


Figure 4-36: Change in Satisfaction with Avista (n=97)



4.4.3.4 Respondent Demographics and Home Characteristics

The Evaluators summarize the HEA program respondent demographics and home characteristics in this section of the report. Table 4-22 presents respondents' demographic and residence characteristics.

Table 4-22: Residence Characteristics and Respondent Demographics (n=varies)

Response	%
Homeownership Status (n=97)	
Own	97.9%
Rent	0.0%
Own and rent to someone else	1.0%
I don't know	0.0%
Prefer not to answer	1.0%
Housing Type (n=97)	
Single-family house detached	90.7%
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	2.1%
Mobile or manufactured home	4.1%
Apartment with 2 to 4 units	0.0%
Apartment with 5+ units	1.0%
Other, please specify	2.1%
I don't know	0.0%
Central A/C Status (n=97)	
Yes	77.3%
Home Fuel Type (n=97)	
Electricity	19.6%
Natural Gas	73.2%
Propane	2.1%
Other, please specify	4.1%
I don't heat my home	0.0%
I don't know	1.0%
Prefer not to answer	0.0%
Total	19.6%
Water Heater Fuel Type (n=97)	
Natural Gas	40.7%
Electricity	53.7%
Propane	0.0%
Other, please specify	0.9%

Response	%
None	0.0%
I don't know	4.6%
Prefer not to answer	0.0%
Home Size (sq ft) (n=86)	
Less than 1,000ft^2	3.5%
1,000-1,999ft^2	44.2%
2,000-2,999ft^2	30.2%
3,000-3,999ft^2	16.3%
4,000ft^2 or more	5.8%
Housing Age (n=96)	
Before 1950	29.2%
1950 to 1959	10.4%
1960 to 1969	3.1%
1970 to 1979	18.8%
1980 to 1989	8.3%
1990 to 1999	15.6%
2000 to 2009	9.4%
2010 to 2019	3.1%
2020 to Present	1.0%
I don't know	1.0%
Number of people in Home (n=96)	
1 person	22.9%
2 people	41.7%
3 people	12.5%
4 people	9.4%
5 people	7.3%
6 people	1.0%
7 people	2.1%
8 or more people	0.0%
Prefer not to answer	3.1%
Age (years) (n=97)	
18 to 24	1.0%
25 to 34	12.4%
35 to 44	16.5%
45 to 54	8.2%
55 to 64	15.5%
65 to 75	34.0%
75 or older	8.2%
Prefer not to answer	4.1%
Anyone in home 65 years or older (n=97)	
Yes	53.6%
Annual Household Income (n=97)	
Less than $10,000	0.0%
$10,000 to $19,999	2.1%
$20,000 to $29,999	3.1%
$30,000 to $39,999	5.2%
$40,000 to $49,999	10.3%

Response	%
$50,000 to $74,999	17.5%
$75,000 to $99,999	11.3%
$100,000 to $149,999	15.5%
$150,000 to $199,999	7.2%
$200,000 or more	3.1%
Prefer not to answer	24.7%
Education (n=97)	
Did not graduate high school	0.0%
High school graduate	7.2%
Associates degree, vocation/ technical school, or some college	16.5%
Four-year college degree	28.9%
Graduate or professional degree	41.2%
Prefer not to answer	6.2%

4.4.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.4.4.1 Conclusions

The following conclusions represent key findings from the Home Energy Audit program survey:

1. **Program Engagement –** Despite a program pause during 2020-2021 due to the COVID-19 pandemic, the program has experienced significant attention and customer interest. Between 2022 and 2023, home audits nearly quadrupled, increasing from 121 in PY2022 to 463 in PY2023. This increase in program popularity has resulted in a lengthy waitlist with customers having to wait 5-6 months to receive an audit.
2. **Program Impact –** Survey respondents suggested that as result of the program, they are more interested in energy saving behaviors and in making energy efficient equipment improvements. Some respondents noted that they engaged in other Avista energy efficiency programs following their home energy audit, indicating that the HEA program is fueling interest in other offerings.
3. **Program Experience** – In general, survey respondents were satisfied with the HEA program. The area with the most dissatisfaction was the amount of time to receive the audit.

4.4.4.2 Recommendations

Based on of the above conclusions, the Evaluators suggest the following recommendations for the Home Energy Audit program moving forward.

1. **Address the backlog issue** – Program staff should continue to prioritize resolving the pending application backlog to reduce wait times and improve customer satisfaction. Recommendations include hiring additional auditors or streamlining the auditing process to lessen burdens on participating customers.
2. **Provide a list of recommended contractors** – Consider providing a list of vetted contractors to customers to help them make the recommended improvements more actionable for homeowners interested in completing the recommended energy efficiency upgrades.

3. **Other programs follow-on activities** – Increase coordination with other the Avista energy efficiency programs to increase the rates of actions taken on the recommended improvements. Specifically, program staff should share participant information with other programs' staff and suggest they follow up directly to assist with the auditor recommendations specific to the audited household.
4. **Track the HEA referral process**– Although it is still too early to analyze the effect of the HEA program in terms of subsequent participation in other Avista programs, as more than half of the survey respondents noted they are still planning to implement the audit recommendations, Avista should develop a system to easily track HEA program participants' participation in other programs.

4.5 On Bill Repayment Program

The On-Bill Repayment (OBR) Program offers homeowners and small business customers in Washington access to financing options for qualified energy-efficiency upgrades; this program is not currently available in Idaho. Beginning in October 2021, Avista started offering OBR through a third-party lending partner, the Puget Sound Cooperative Credit Union (PSCCU). OBR offers zero-down and low-rate loans for energy-efficient projects that can be more easily tracked and paid back through their monthly utility bill. OBR is not intended for customers who qualify for Avista's Low-Income Weatherization program and who can therefore be served directly through the partnering community action agencies.

Table 4-23 summarizes OBR program activities in 2022 and 2023.

Table 4-23: Summary of OBR Projects

Measure Type	2022 (n=75)	2023 (n=108)
HVAC	56	60
Insulation	9	23
Windows & doors	12	19
Water heater	2	0
Appliance	1	0

4.5.1 Data Collection Activities

The process evaluation of the On Bill Repayment Program included the following data collection activities:

- *Staff Interviews*. The Evaluators conducted in-depth interviews with program staff in August 2022 and 2023.
- *Customer Surveys*. The Evaluators surveyed customers who participated in the program during 2022-2023. Surveys covered a range of topics, including program awareness, participation, and satisfaction.

4.5.2 Staff Interview

In this section, the Evaluators summarize the findings from the OBR program staff in-depth interviews.

4.5.2.1 Program Design

The main goal of the On Bill Repayment (OBR) program is to provide additional support and encouragement for customers to choose energy-efficient options by participating in Avista's portfolio of residential energy efficiency and renewable-energy programs. OBR is not designed to generate its own

savings, but savings are claimed by native programs. The program was constructed in response to a Washington Utilities and Transportation Commission order.

Customers qualify for OBR financing for a wide range of energy-saving measures such as HVAC, windows and doors, insulation, lighting, appliances; loans last up to 180 months and can be as high as $30,000 for residential customers and $75,000 for small business customers. Program staff underscored an ongoing concern regarding federal interest rate; they explained high interest rates have made it difficult for the program to buy down interest rates, and thus the APR has increased precipitously since program inception, topping out at 5% at the time of the interview in August 2023 and 7.5% in March 2024.

4.5.2.2 Program Administration and Staffing

Avista contracts with a third-party lending partner, Puget Sound Cooperative Credit Union (PSCCU), for loan management. This partnership is supported by the Clean Energy Fund grant from the Washington State Department of Commerce and is part of a broader effort to maintain low interest rates for participants. Program staff reported high satisfaction with this partnership.

4.5.2.3 Marketing and Outreach

At the onset of the program in October 2021, Avista advertised OBR opportunity through bill inserts and newsletters. Avista also promoted the program through its trade ally network via sweepstake incentives for successful loan applications. Program staff reported that these campaigns proved successful, and OBR is gaining traction.

4.5.2.4 Implementation and Delivery

Program staff indicated that the OBR process has been straightforward, citing a lack of implementation challenges so far. Interested customers apply for loans via a PSCCU online form. PSCCU then reviews and approves the application and distributes the loan balance to the contractor upon project completion. The OBR loan payment then appears on the customer bills within 30-60 days.

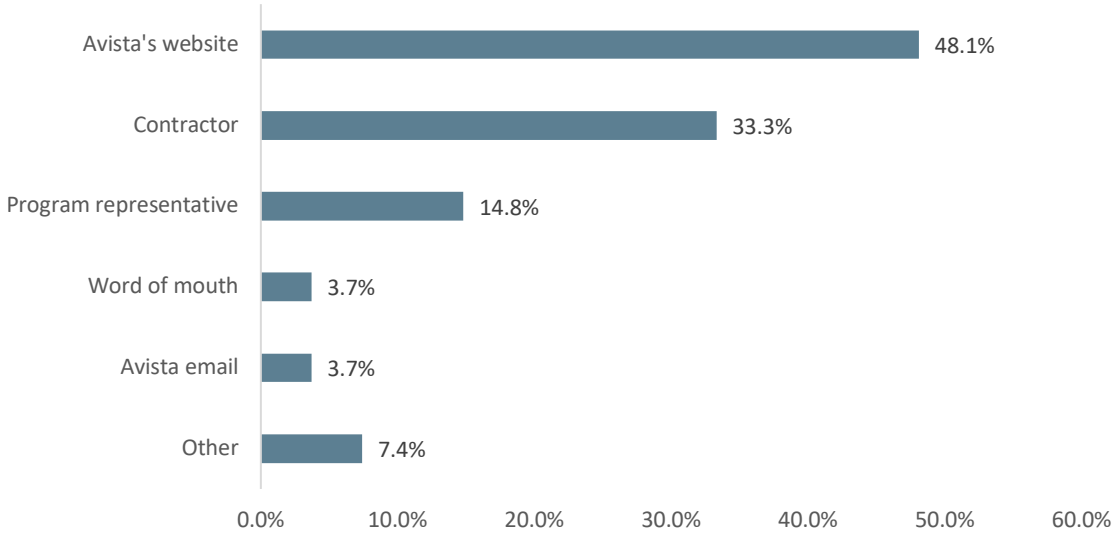
4.5.3 Program Participant Survey Results

Evaluators contacted all available OBR participants and received responses from 27 unique customers who participated in Avista's OBR program in 2022-2023. Participants were invited to complete a survey via email; contacts received one initial invitation and up to two reminder emails.

4.5.3.1 Awareness

Most surveyed OBR participants (48%) reported that they first learned about OBR opportunity from sources of Avista – including its website, emails from Avista, or Avista program staff. A third of the participants (33%) said they heard about it from their contractors.

Figure 4-37: Information Source about OBR (n=27)

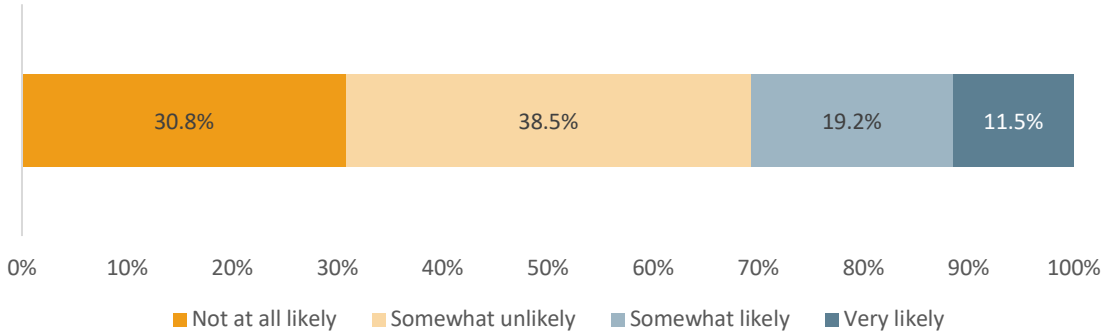


Across survey respondents who did not participate in the On Bill Repayment program (n=1,410), the vast majority did not know anything about the program (81.8%, n=1,154)

4.5.3.2 Efficacy of OBR

More than two-thirds of the respondents (69.4%) reported it was unlikely ('not at all' – 'somewhat') that they would have moved forward with the purchase or installation of the energy saving equipment without the OBR assistance (Figure 4-38). Moreover, 85% of the participants said that due to OBR, they purchased or installed the equipment sooner than they would have if OBR was not offered. All of these respondents estimated they would have delayed the purchase or installation by at least one year.

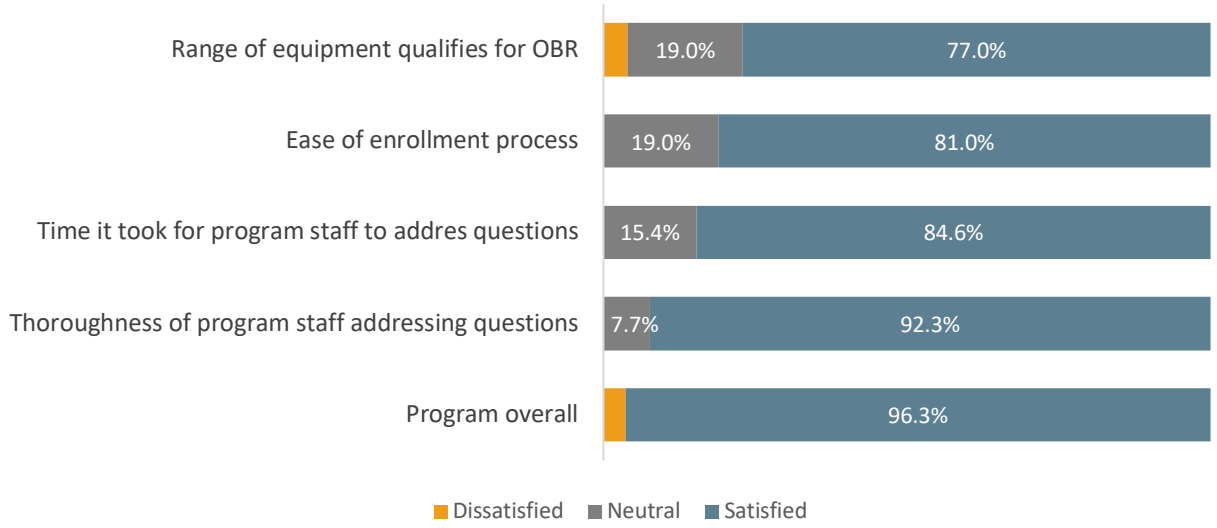
Figure 4-38: Likelihood of Installing or Purchasing without OBR (n=27)



4.5.3.3 Program Satisfaction

The vast majority of respondents (96.3%) expressed satisfaction with the OBR program overall (Figure 4-39). A notable portion of the participants felt neutral about the range of equipment that qualified for OBR (19.0%) and the ease of enrollment process (19.0%).

Figure 4-39: Program Satisfaction (n=27)



Respondents suggested a variety of recommendations for program improvement (Table 4-24).

Table 4-24: Recommendation for HEA Program Improvement

Recommendation
Some respondents who had issues with enrollment or qualification wished that the program could have helped homes with delivered fuel heating or low credit scores.
Respondents mentioned that their contractors did not understand the OBR financing they had arranged and encountered issues with payments.
One respondent wished that Avista's website for online billing could be improved by separating repayment portion from the total billed so that they can more easily understand actual energy cost.

Almost three quarters of the surveyed OBR participants reported that were 'very' or 'extremely' likely to recommend the OBR program to others (Figure 4-40). Additionally, three-quarters of the respondents noted that their participation in the OBR program increased their satisfaction with Avista (Figure 4-41).

Figure 4-40: Likelihood to Recommend Avista Program (n=27)

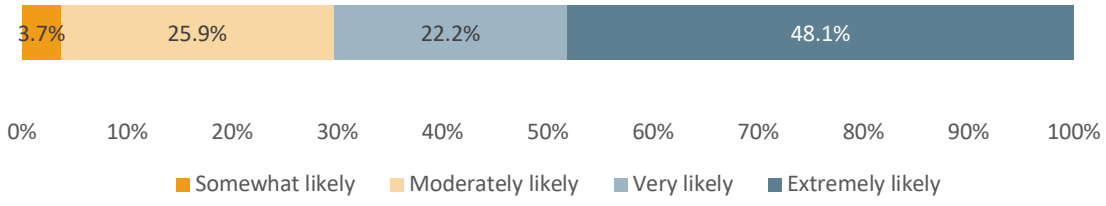
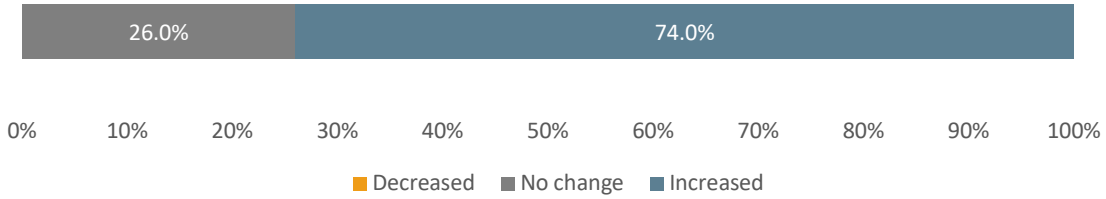


Figure 4-41: Change in Satisfaction with Avista (n=27)



4.5.3.4 Respondent Demographics and Home Characteristics

Table 4-25 presents respondents' demographic and residence characteristics.

Table 4-25: Residence Characteristics and Respondent Demographics (n=varies)

Response	Percent
Homeownership Status (n=27)	
Own	96.3%
Rent	0.0%
Own and rent to someone else	3.7%
I don't know	0.0%
Prefer not to answer	0.0%
Housing Type (n=27)	
Single-family house detached	92.6%
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	3.7%
Mobile or manufactured home	3.7%
Apartment with 2 to 4 units	0.0%
Apartment with 5+ units	0.0%
Other, please specify	0.0%
I don't know	0.0%
Central A/C Status (n=27)	
Yes	70.4%
Home Fuel Type (n=27)	
Electricity	25.9%
Natural Gas	63.0%
Propane	0.0%
Other, please specify	11.1%
I don't heat my home	0.0%
I don't know	0.0%
Prefer not to answer	0.0%
Total	25.9%
Water Heater Fuel Type (n=27)	
Natural Gas	48.1%
Electricity	48.1%
Propane	0.0%
Other, please specify	3.7%
None	0.0%
I don't know	0.0%
Prefer not to answer	0.0%

Response	Percent
Home Size (sq ft) (n=25)	
Less than 1,000ft^2	0%
1,000-1,999ft^2	48.0%
2,000-2,999ft^2	28.0%
3,000-3,999ft^2	20.0%
4,000ft^2 or more	4.0%
Housing Age (n=27)	
Before 1950	29.6%
1950 to 1959	29.6%
1960 to 1969	3.7%
1970 to 1979	7.4%
1980 to 1989	3.7%
1990 to 1999	11.1%
2000 to 2009	11.1%
2010 to 2019	0.0%
2020 to Present	0.0%
I don't know	0.0%
Number of people in Home (n=27)	
1 person	7.4%
2 people	44.4%
3 people	25.9%
4 people	14.8%
5 people	0.0%
6 people	3.7%
7 people	0.0%
8 or more people	0.0%
Prefer not to answer	3.7%
Age (years) (n=27)	
18 to 24	0.0%
25 to 34	11.1%
35 to 44	11.1%
45 to 54	25.9%
55 to 64	29.6%
65 to 75	18.5%
75 or older	3.7%
Prefer not to answer	0.0%
Anyone in home 65 years or older (n=27)	
Yes	22.2%
Annual Household Income (n=27)	
Less than $10,000	0.0%
$10,000 to $19,999	0.0%
$20,000 to $29,999	3.7%
$30,000 to $39,999	7.4%
$40,000 to $49,999	3.7%
$50,000 to $74,999	14.8%
$75,000 to $99,999	14.8%
$100,000 to $149,999	33.3%
$150,000 to $199,999	3.7%
$200,000 or more	3.7%

Response	Percent
Prefer not to answer	14.8%
Education (n=27)	
Did not graduate high school	0.0%
High school graduate	0.0%
Associates degree, vocation/ technical school, or some college	40.7%
Four-year college degree	33.3%
Graduate or professional degree	22.2%
Prefer not to answer	3.7%

4.5.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.5.4.1 Conclusions

The following conclusions represent key findings from the On Bill Repayment program survey:

1. **Marketing** – The OBR program has gained traction through effective marketing campaigns targeted at customers and trade allies.
2. **Increases Energy Efficient Equipment Purchases** – Most OBR survey respondents (69%) reported that they were unlikely to have purchased the energy efficient equipment without the OBR program assistance, and 85% of respondents indicated that the financing helped them make these improvements sooner.
3. **Program Satisfaction** – Survey respondents were generally satisfied with the OBR program and likely to recommend it to others.

4.5.4.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for On Bill Repayment program moving forward.

1. **Education and training of contractors** – Provide more education and training to contractors about the OBR financing process to minimize payment confusion and improve the customer experience.
2. **Online billing information** – Enhance Avista's online billing website to clearly separate the OBR repayment portion from the total billed amount, allowing customers to better understand their actual energy costs as well as remaining financed amounts.
3. **Increased promotion** – Continue to promote the OBR program through various channels, such as bill inserts, newsletters, and trade ally networks, to maintain and increase customer awareness and participation.

4.6 Always On Home Energy Report Pilot Program

The Always On Home Energy Report Pilot (Always On Pilot) seeks to provide customers with more precise information about the types of equipment in their home that are using the most energy and provides suggestions on how to reduce that energy load.

4.6.1 Data Collection Activities

The process evaluation of the Always On Pilot Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed two staff at Avista involved in the administration of the Always On Pilot. These interviews were to collect information from program staff about program design, administration, marketing, and stakeholders.
- *Program Participant Surveys.* The Evaluators conducted surveys with a series of program participants. These surveys covered a range of topics, including program awareness, participation, and satisfaction.

4.6.2 Staff Interview

The Evaluators summarize the findings from the staff in-depth interviews in this section.

4.6.2.1 Program Design

The Always On pilot program launched in July 2022 and encourages residential households to reduce energy usage contributing to the "always-on" load. This "always-on" load, or "idle" load is the portion of daily household energy usage consumed from household devices that have been turned off or are in standby mode, but still drawing power. Desktop and laptop computers, cable modems, video game consoles, and microwaves are some examples of equipment contributing to always-on load. This portion of household load can amount to 20 to 30 percent of a customer's bill. This portion of household energy usage can easily be reduced with low- or no-cost behavioral changes, such as turning off computers when not in use.

The Residential Always-On Load Behavioral Pilot Program makes use of territory-wide AMI deployment by integrating AMI data with machine learning algorithms to identify the always-on load in each household. Avista has identified the top third of residential customers with always-on load and has created three potential groups: two treatment arms and one control group. For the first treatment group, Avista uses this AMI and algorithm information to send communications to customers including personalized information regarding always-on usage, associated costs, tips to reduce the load, and anticipated cost savings each month. For the second treatment group, Avista also delivered an incentive for reducing their always-on load compared to their baseline; however, starting in PY2023, this incentive was removed from the program design. This variation in treatment within similar groups of households will allow cost effectiveness for each treatment type as well as incremental energy savings.

This pilot program was implemented in the second quarter of 2022 and targeted the top third (nearly 25,000 customers) of residential always-on loads.

4.6.2.2 Program Administration

The pilot enrolled 50,000 treatment participants and 25,000 control participants. Treatment participants were split into two groups: group one received monthly emails with energy saving tips and group two received the same monthly emails along with a participation incentive. Staff explained that this pilot represented the first internally implemented behavioral program and cited multiple implementation challenges related to data tracking and data quality.

Despite these challenges as well as low saving results in 2022, the pilot continued in 2023, but with a simplified design. Instead of two treatment groups and one control group, the 2023 version of the pilot

had one treatment and one control group; all treatment participants in 2023 received the same messaging and incentives were removed.

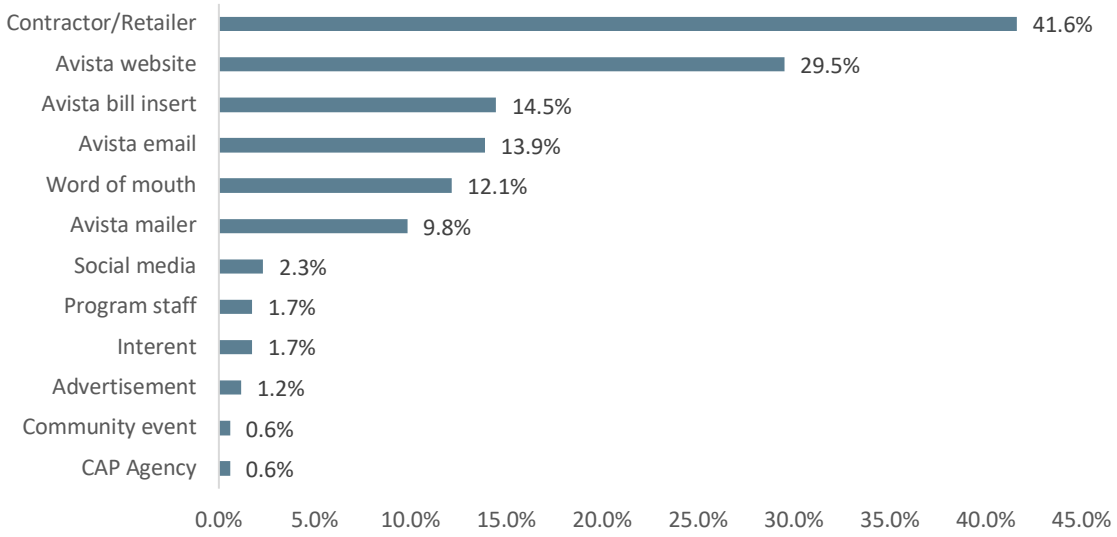
4.6.3 Program Participant Survey Results

The Evaluators conducted a survey of Always On Home Energy Report Pilot program participants to gather feedback about customers' engagement with and experience of the program. Participants were contacted via email up to three times and asked to complete a survey. In total, 173 participants who participated in the Always On Home Energy Report Pilot program in 2022 or 2023 responded to survey efforts.

4.6.3.1 Program Awareness

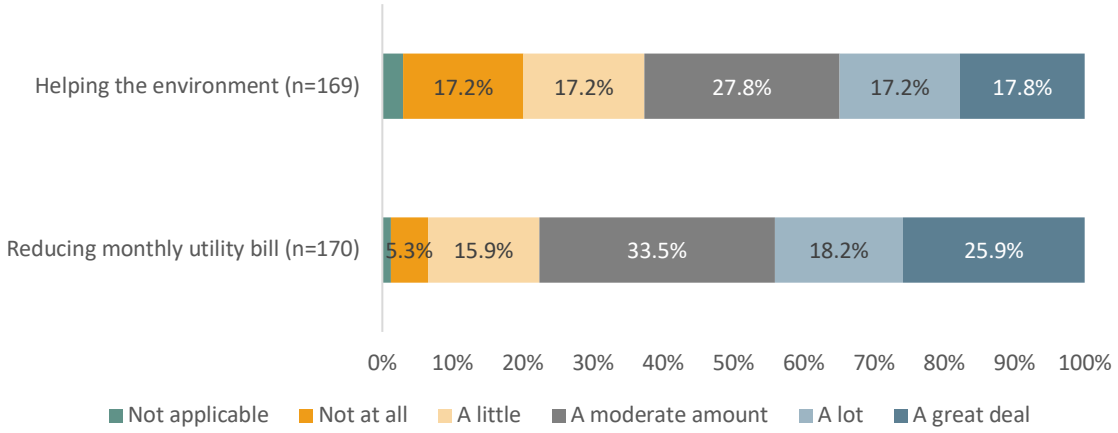
Respondents learned about Avista's energy efficiency offerings through a variety of avenues, most commonly a contractor or retailer (41.6%, n=72) (Figure 4-42).

Figure 4-42: Program Awareness (n=173)



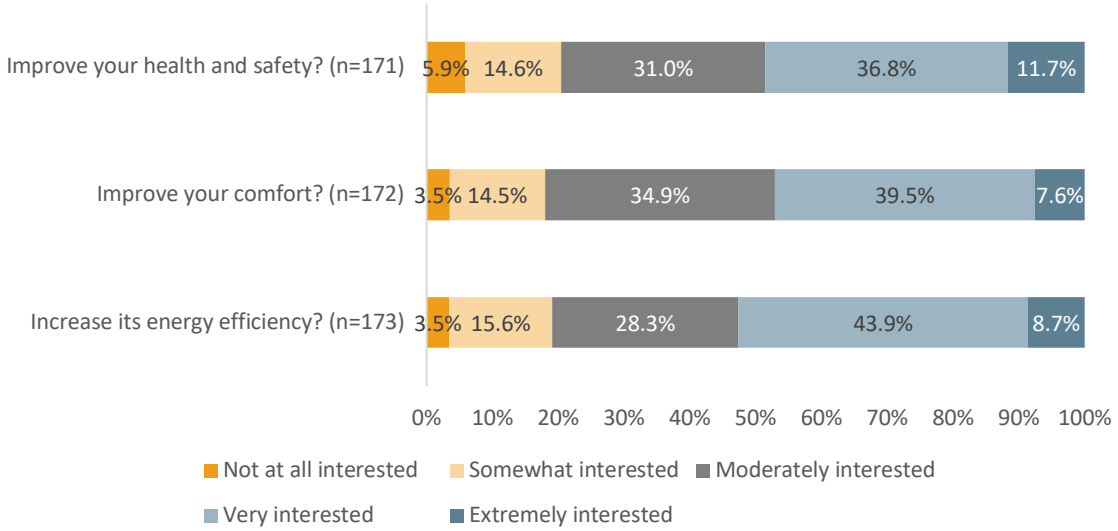
More than one-third of respondents were motivated to participate in the program to reduce their monthly utility bills (44.1%, n=75) and help the environment (34.9%, n=59) (Figure 4-43).

Figure 4-43: Factors Influencing Participation (n=varies)



About half of respondents were very or extremely interested in additional home improvements that would improve their health and safety (48.5%, n=83), improve their comfort (47.1%, n=81), and increase their home's energy efficiency (52.6%, n=91) (Figure 4-44).

Figure 4-44: Interest in home improvements that would… (n=varies)



4.6.3.2 Program Participation

More than half of respondents remembered receiving an email alert from the Always On Pilot (61.3%, n=106). The majority of these respondents noted that when they receive the email they skim through the content (71.7%, n=76); just under one-fifth of respondents read the whole email (18.9%, n=20) (Figure 4-45). Among the 100 respondents who read at least part of the email alert, more than one-third reacted by unplugging their appliances when they are not in use (37.0%, n=37) and 16.0% (n=16) visited Avista's website to learn more about "always on" load (Table 4-26). Among the 16 respondents who visited Avista's website, all but two respondents found the tips in the website to be at least somewhat helpful (n=14).

Figure 4-45: Response to Email Alert (n=106)

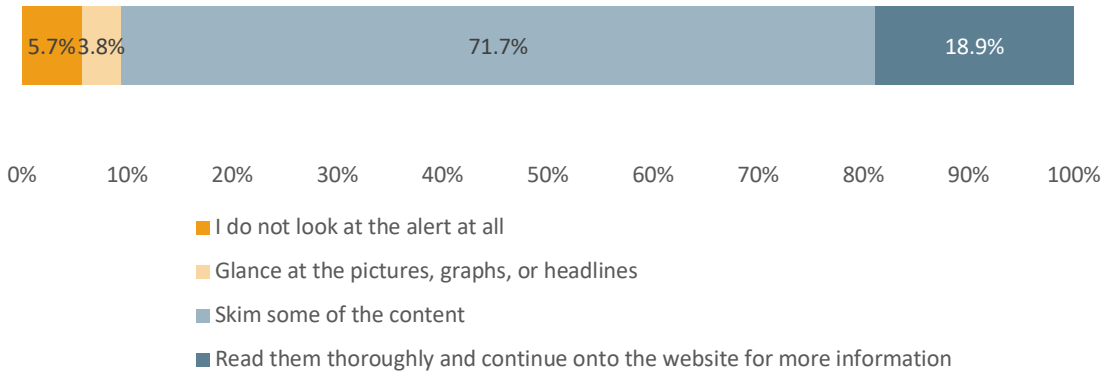


Table 4-26: Post Email Behaviors (n=100)

Behaviors	%	n
Started unplugging appliances when they are not in use	37.0%	37
Save one or more emails for reference	22.0%	22
Discuss one or more emails with others	19.0%	19
Visited Avista website to learn about "always on" load	16.0%	16
Installed advanced power strips	9.0%	9
None of the above	28.0%	28

Respondents indicated that they are interested in learning about other energy usage and reduction tips for a variety of equipment types including water heating, space heating, and space cooling (Table 4-27). Just over two-thirds of respondents would like to receive the same number of updates through the Always On Pilot (68.2%, n=118); 18.5% (n=32) requested more updates and 13.3% (n=23) requested fewer updates.

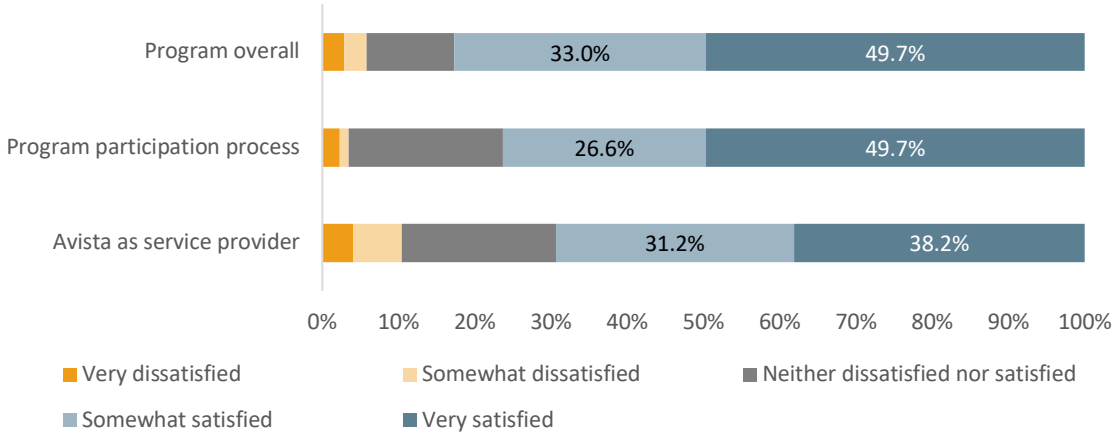
Table 4-27: Interested in learning about energy usage of specific equipment (n=173)

Equipment	%	n
Water Heating	39.3%	68
Space Heating	28.3%	49
Space Cooling	26.6%	46
Lighting	22.0%	38
Laundry	20.2%	35
Cooking	14.5%	25

4.6.3.3 Program Satisfaction

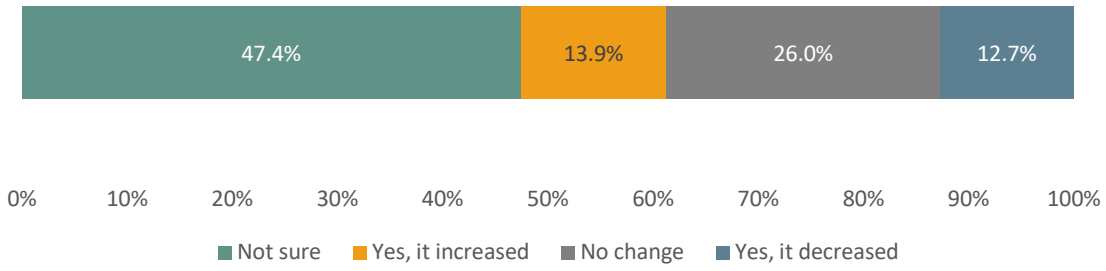
Most respondents were satisfied with the program and Avista as their service provider (Figure 4-46). The majority of respondents considered Avista at least moderately reliable source of information about energy efficient products (82.1%, n=142).

Figure 4-46: Program Satisfaction (n=173)



Perceived changes in respondents' utility bill amounts varied (Figure 4-47), with 12.7% (n=22) of respondents noting their bill decreased, 26.0% (n=45) indicating their bill stayed the same, and 13.9% (n=24) of respondents explaining that their bill had increased.

Figure 4-47: Changes in Utility Bill (n=173)



Respondents provided recommendations for portfolio-wide improvements, including providing financial incentives for more products and providing larger financial incentives (Figure 4-48)

Figure 4-48: Recommendations (n=173)

Recommendations	%	n
Provide financial incentives for additional products	54.9%	95
Provide larger financial incentives	53.2%	92
Share more personalized information about your energy use	31.8%	55
More contractor information	1.7%	3
Reduce utility rates	0.6%	1
Not sure	16.8%	29

4.6.3.4 Demographics

Table 4-8 describes the demographics of survey respondents.

Table 4-28: Demographics (n=173, unless otherwise indicated)

Answer	%	Count
Homeownership		
Own	96.0%	166
Rent	1.7%	3
Own and rent to someone else	1.7%	3
I don't know	0.0%	0
Prefer not to answer	0.6%	1
Building Age (n=169)		
Before 1950	18.9%	32
1950 to 1959	13.6%	23
1960 to 1969	7.1%	12
1970 to 1979	12.4%	21
1980 to 1989	9.5%	16
1990 to 1999	14.2%	24
2000 to 2009	17.2%	29
2010 to 2019	4.7%	8
2020 to Present	0.0%	0
I don't know	1.8%	3
Prefer not to answer	0.6%	1
Heating Fuel Type		
Electricity	24.9%	43
Natural Gas	74.0%	128
Wood	1.2%	2
Oil	0.6%	1
Pellet	0.6%	1
Air Conditioning		
Yes	78.0%	135
No	20.2%	35
I don't know	1.7%	3
Water Heater Fuel Type		
Natural Gas	60.1%	104
Electricity	38.7%	67
Propane	1.2%	2
Not sure	1.7%	3
Home Type		
Single-family house detached	93.6%	162
Duplex, condominium, townhouse	1.2%	2
Mobile or manufactured home	3.5%	6
Apartment with 2 to 4 units	0.6%	1
Apartment with 5+ units	0.6%	1
Not sure	0.6%	1
Household Size (n=172)		
1 person	9.9%	17
2 people	50.0%	86
3 people	16.3%	28
4 people	13.4%	23
5 people	7.6%	13
6 people	2.3%	4
7 people	0.6%	1

8 or more people	0.0%	0
Prefer not to answer	0.0%	0
Age		
18 to 24	0.0%	0
25 to 34	3.5%	6
35 to 44	17.9%	31
45 to 54	17.9%	31
55 to 64	22.0%	38
65 to 75	23.1%	40
75 or older	12.1%	21
Prefer not to answer	3.5%	6
Household member is 65+ years old		
Yes	42.8%	74
Household income		
Less than $10,000	0.6%	1
$10,000 to $19,999	1.2%	2
$20,000 to $29,999	2.9%	5
$30,000 to $39,999	1.7%	3
$40,000 to $49,999	5.8%	10
$50,000 to $74,999	15.6%	27
$75,000 to $99,999	10.4%	18
$100,000 to $149,999	16.8%	29
$150,000 to $199,999	9.3%	16
$200,000 or more	6.9%	12
Prefer not to answer	28.9%	50
Education		
Did not graduate high school	0.6%	1
High school graduate	11.0%	19
Associates degree, vocation/ technical school, or some college	32.4%	56
Four-year college degree	27.8%	48
Graduate or professional degree	23.7%	41
Prefer not to answer	4.6%	8

4.6.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.6.4.1 Conclusions

The following conclusions represent key findings from the Always On Pilot survey:

1. **Program motivation –**About half of respondents were very or extremely interested in additional home improvements that would improve their health and safety, improve their comfort, and increase their home's overall energy efficiency.
2. **Program participation –** More than half of respondents remembered receiving an email alert from the Always On Program (61.3%, n=106). The majority of these respondents noted that when they receive the email they at least skim through the content (90.6%, n=96). Most respondents are satisfied with the number of updates provided through the program (68.2%, n=118).

3. **Website engagement –** Among the 100 respondents who read at least part of the email alert, more 16.0% (n=16) visited Avista's website to learn more about "always on" load. Of these, all but two found the tips Avista provides on the website to be at least somewhat helpful (n=14).
4. **Desired information –** Respondents indicated that they are interested in learning about other energy usage and reduction tips for a variety of equipment types including water heating, space heating, and space cooling.
5. **Change in bill –** Perceived changes in respondents' utility bill amounts varied. About one-quarter explained their bill remained the same (26.0%, n=45) while 12.7% (n=22) noted their bill decreased and 13.9% (n=24) indicated their bill increased; 47.4% (n=82) could not speak to changes in their bill.

4.6.4.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for the Always On Pilot program moving forward.

1. **Expand content provided in alerts –** Consider including other energy saving tips and recommendations in the email alerts and website, aside from information regarding always on load. Topic areas of interest include information regarding energy efficient equipment as well as other behavior changes customers can make to reduce their energy usage.

4.7 Residential Programs Non-Participants

The Evaluators delivered surveys to a sample of residential non-participants in order to assess barriers to entry, current satisfaction with Avista as a utility provider, and additional insights.

4.7.1 Data Collection Activities

The Evaluators conducted a survey of customers who did not participate in Avista's residential incentive programs to gather feedback on customer knowledge of Avista's offerings, as well as their energy saving behaviors.

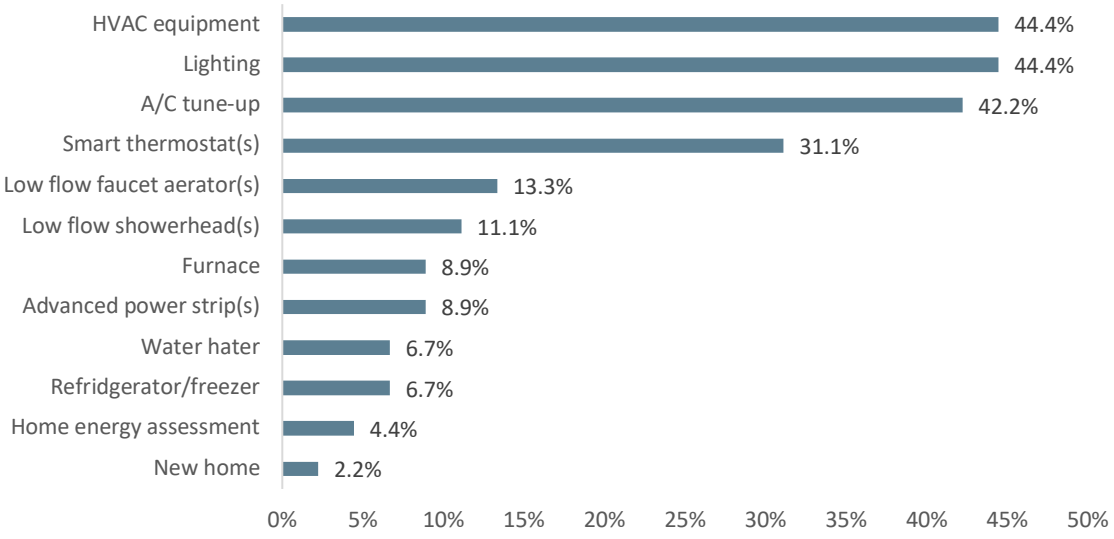
4.7.2 Non-Participant Survey Results

Tracking data included 1,278 customers with an email address. Customers were contacted via email up to three times and invited to complete the survey. One hundred and forty participants responded to the survey.

4.7.2.1 Program Awareness and Engagement

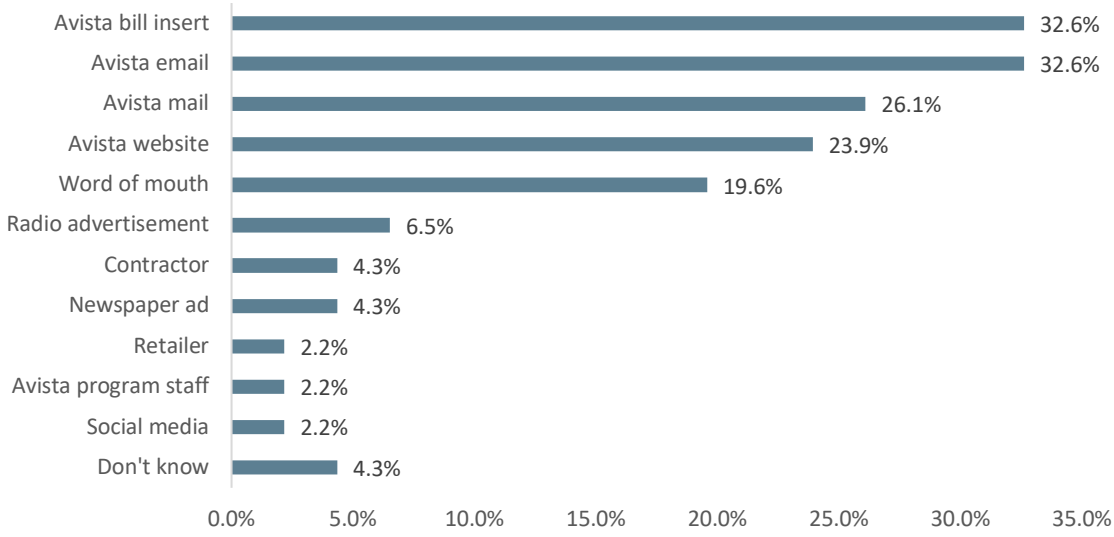
About half of the 140 respondents had not received a home energy assessment, equipment tune up, or replaced equipment in the past three years (48.6%, n=68); 19.3% were not sure if they had received any of those services. Across the 45 respondents (32.1%) who had had an assessment, tune up, or purchased new equipment, HVAC equipment (44.4%, n=20), lighting equipment (44.4%, n=20), and A/C tune ups (42.2%, n=19) were the most popular purchases and services (Figure 4-49).

Figure 4-49: Purchased Equipment (n=145)



More than two-thirds of respondents had never heard of Avista's residential energy efficiency programs (67.1%, m=94). Among those respondents who were aware of Avista programs (32.9%, n=46), messages on utilities bill (32.6%, n=15) or Avista emails (32.6%, n=15) were the most common program awareness sources (Figure 4-50).

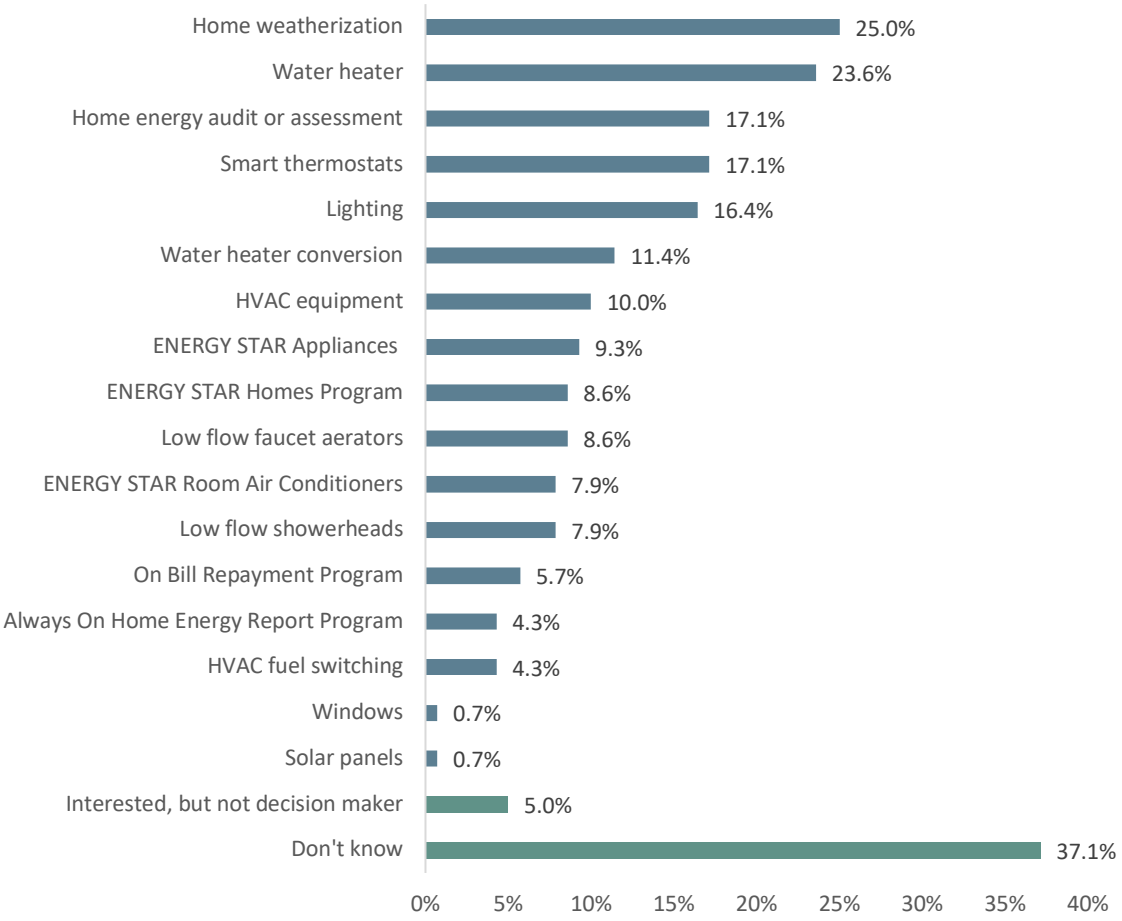
Figure 4-50: Program Awareness (n=46)



Among the 46 respondents who were aware of Avista's programs, about two-thirds were aware of the incentives to replace inefficient equipment (63.0%, n=29); fewer respondents were aware of heating and cooling specific programs (45.7%, n=21), home energy audits (32.6%, n=15), and new construction incentives (23.9%, n=11).

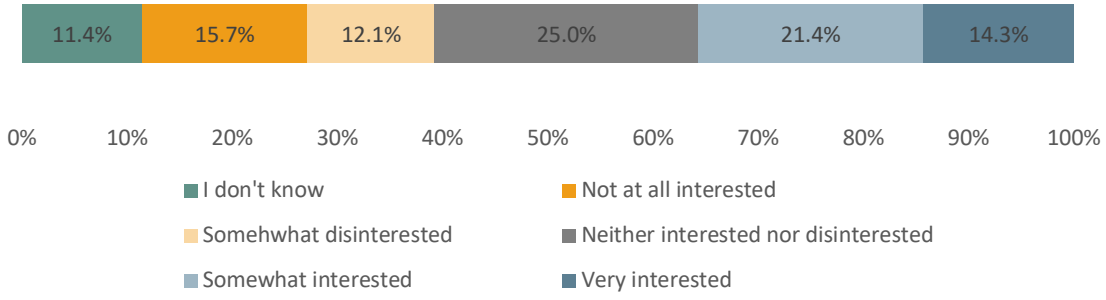
Respondents were most interested in learning more about the weatherization program (25.0%, n=35) and water heater incentives (23.6%, n=33).

Figure 4-51: Interest in Avista Programs (n=140)



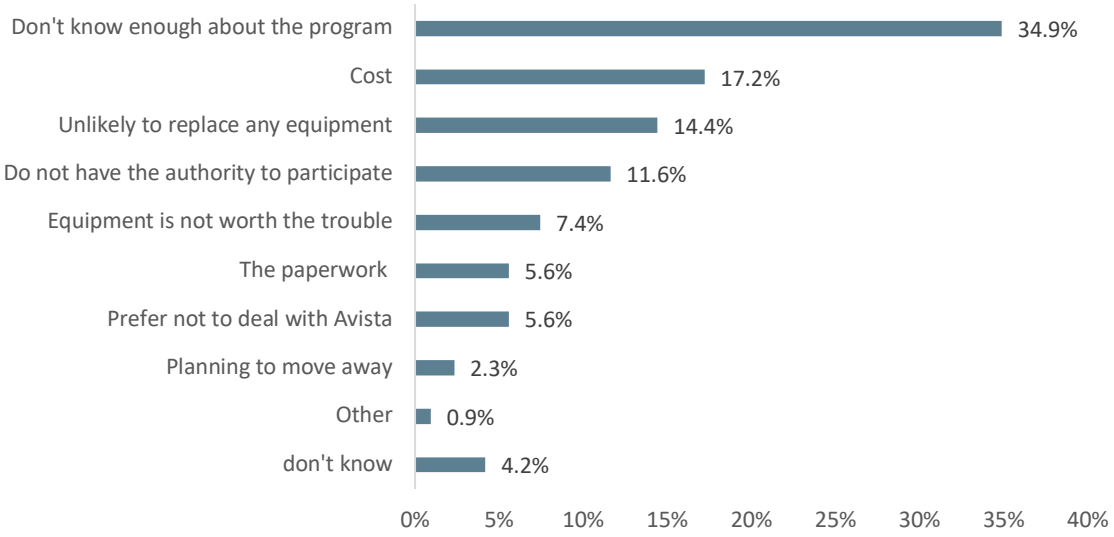
More than one-third of respondents were somewhat are very interested in participating in Avista programs (35.7%, n=50) (Figure 4-52).

Figure 4-52: Interest in participating in Avista programs (n=140)



Respondents cited a lack of information about the programs and cost as the most common reasons for not participating in Avista's energy efficient offerings (Figure 4-53). Most respondents (67.9%, n=102) had some authority to make improvements to their building.

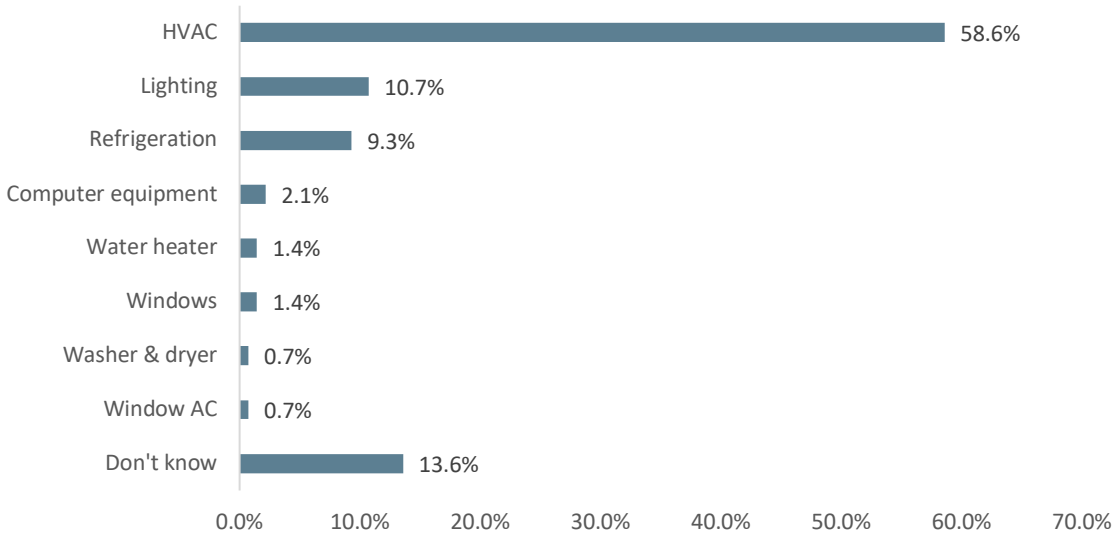
Figure 4-53: Factors preventing participation (n=140)



4.7.2.2 Home Equipment

Two thirds of respondents indicated that their HVAC equipment were their homes' biggest energy consumers (65.9%, n=81) (Figure 4-54).

Figure 4-54: Perceived energy consumption by product type (n=140)



Seventy-one percent of respondents had air conditioning (n=100) and more than half of these respondents had central A/C (60.0%, n=60); half of the A/C systems were less than 10 years old (51.8%, n=71). More than half of respondents had gas furnaces (57.1%, n=80); heating systems ranged in age, with a little less than half being less than ten years old (46.9%, n=60). Half of respondents had their HVAC system serviced in the last three years (50.0%, n=70).

More than half of respondents used programmable thermostats (39.3%, n=55) or smart thermostats (19.3%, n=27). More than half of respondents use LED bulbs in their homes (53.6%, n=75).

4.7.2.3 Demographics

Table 4-29 demonstrates respondents' demographic characteristics.

Table 4-29: Demographics (n=140, unless otherwise indicated)

Answer	%	Count
Home ownership status		
Own	63.6%	89
Rent	32.9%	46
Own and rent to someone else	1.4%	2
Prefer not to answer	0.7%	1
Don't know	1.4%	2
Building age (n=91)		
1980 to 1989	5.5%	5
1960 to 1969	6.6%	6
2000 to 2009	6.6%	6
1950 to 1959	8.8%	8
1970 to 1979	9.9%	9
2020 to Present	9.9%	9
Before 1950	15.4%	14
1990 to 1999	15.4%	14
2010 to 2019	19.8%	18
Don't know	2.2%	2
Heating Type		
Natural Gas	56.4%	79
Electricity	35.0%	49
Pellet/wood stove	3.6%	5
Propane	1.4%	2
Both Gas & Electric	1.4%	2
Oil	0.7%	1
Don't know	1.4%	2
Building type		
Single-family house detached	65.0%	91
Apartment with 5+ units	12.1%	17
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	9.3%	13
Mobile or manufactured home	6.4%	9
Apartment with 2 to 4 units	5.0%	7
Prefer not to answer	0.7%	1
Don't know	1.4%	2
Household Size		
1 person	23.6%	33
2 people	33.6%	47
3 people	10.7%	15

4 people	14.3%	20
5 people	5.7%	8
6 people	3.6%	5
7 people	1.4%	2
8 or more people	2.1%	3
Prefer not to answer	5.0%	7
Age		
18 to 24	3.6%	5
25 to 34	15.7%	22
35 to 44	20.7%	29
45 to 54	22.1%	31
55 to 64	15.7%	22
65 to 75	12.1%	17
75 or older	6.4%	9
Prefer not to answer	3.6%	5

4.7.3 Conclusions and Recommendations

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improving the Residential programs moving forward.

4.7.3.1 Conclusions

The following conclusions represent key findings from the residential non-participant survey:

1. **Program Awareness –** Most of the non-participant respondents were not aware of Avista's energy efficiency rebates and program (67.1%, n=94). Among those respondents who were aware of Avista programs (32.9%, n=46), messages on utilities bill and utility emails were the most common sources of program awareness. Additionally, respondents who were aware of Avista's programs were most familiar with the appliance rebates program and less similar with home energy audit offering and new construction rebates.
2. **Energy efficiency familiarity –** Just under one-third of non-participant respondents had received a home energy assessment, purchased new equipment, or had an equipment tune up in the past three years (32.1%, n=45).
3. **Interest in Avista programming** -- More than one-third of respondents were somewhat or very interested in participating in Avista programs. Respondents were most interested in learning more about the weatherization program (25.0%, n=35) and water heater incentives (23.6%, n=33).

4.7.3.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for residential programming moving forward.

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment, nor offered home energy audits. Staff should consider increasing marketing efforts to better promote the programs and reach a

larger audience. Increased focus should be placed on the weatherization and appliance, furnace, HVAC, and water heating rebate offerings as respondents expressed the most interest in those offerings.

2. **Expand energy efficient tips circulation –** Consider expanding the pool of people who receive tips on how to save energy through various behavioral changes, or expand on behavioral additional energy conservation habits on Avista website. Introducing customers to the concept of energy efficiency may increase future buy-in for equipment purchases and tune ups.

5 Non-Residential Programs Process Evaluation Results

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the non-residential sector in the section below.

5.1 Commercial Prescriptive Rebate Programs

Avista offers a variety of rebates for commercial customers interested in upgrading equipment. Commercial equipment rebates range from lighting measures to HVAC equipment, insulation, food service equipment, and more specialized equipment like grocery store appliances and variable frequency drivers. The following summary includes information pertaining to commercial lighting, appliances, small business direct install, and site-specific programs. Midstream program details are outlined in the next section (Section 1).

5.1.1 Data Collection Activities

The process evaluation of the Commercial prescriptive rebate programs included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed four staff at Avista involved in the administration of the Commercial prescriptive rebate programs. These interviews collected information from program staff about program design, administration, marketing, and stakeholders.
- *Program Participant Surveys.* The Evaluators conducted surveys with a series of program participants. These surveys covered a range of topics, including program awareness, participation, and satisfaction.
- *Trade Ally Interviews.* The Evaluators surveyed trade allies who participated in the Commercial prescriptive rebate programs.

5.1.2 Staff Interview

The Evaluators interviewed four Avista program staff involved in the commercial prescriptive rebate programs. The following summary includes information pertaining to commercial lighting, appliances, small business direct install, and site specific. Midstream program details are outlined in Section 5.1.6.

5.1.2.1 Prescriptive Lighting and Small Business Direct Install

Non-residential lighting measures display the largest energy savings in the commercial portfolio. Lighting measures are available to customers via prescriptive, site-specific, and small business direct install pathways. The prescriptive pathway follows a generalized incentive structure and process, site specific

projects are tailored to individual buildings and customer needs, and small business projects are geared towards small business owners. The lighting pathway covers a variety of lighting measures including lamps and lighting controls. Staff noted that prescriptive lighting measures are more popular in Idaho than Washington.

In response to low participation rates among small businesses, Avista has increased promotional efforts for the Small Business Direct Install (SBDI) program. The SBDI program is implemented by a third-party implementer who contacts approximately 23 local contractors to go into small business and install a variety of direct install measures. Measures are offered to business owners for free and focus primarily on lighting-related equipment. Although the SBDI program has moved some customers away from the prescriptive lighting program, staff noted that it helps fill a programmatic gap and attract previously underserved business owners.

Both the prescriptive lighting and SBDI programs utilize the same trade ally network while the Site-Specific program typically connects with in-house contractors who work directly for the businesses participating in the pathway. Although program marketing is mostly driven by trade allies, Avista account managers also promote the programs to their contacts and Avista advertises the programs via social media.

5.1.2.2 Site-Specific Program

The Site-Specific Program provides calculated incentives to support the installation of qualifying energy efficiency equipment at commercial/industrial sites. These projects typically have a higher degree of complexity than the traditional prescriptive offerings and rely on custom calculations of savings and incentive levels. Examples of these projects include process improvements, upgrades to specialized equipment used in manufacturing, lighting installations that rely on specialized controls, and other measures designed around the customer's specific needs.

Avista's Site-Specific Program is a major component in its non-residential electric offerings. The program approach strives for a flexible response to energy efficiency projects that have demonstrable kWh savings within program criteria. The majority of site-specific kWh savings are composed of custom lighting projects and custom HVAC, envelope, and industrial process load projects that do not fit the prescriptive path. The Site-Specific Program is available to all commercial/industrial retail electric customers, and typically brings in the largest portion of savings to the overall energy efficiency portfolio.

5.1.2.3 Commercial Appliances

In addition to lighting measures, Avista offers rebates for a variety of other measures like variable frequency drivers, HVAC equipment, food service, grocer equipment, and insulation. Between 2022 and 2023 HVAC equipment and food service measures moved to a midstream program, which is further outlined in Section 5.1.6. Most appliance rebate applications are submitted online via iEnergy. Most program outreach is done by trade allies and Avista account managers; Avista staff also market the program online.

Beginning in 2022, compressed air measures moved to a pay-for-performance model, which rebated customers based on energy saved, rather than a flat rate for the equipment purchase. Additionally, staff added a new commercial thermostat measure and clothes washer measure in Washington only (these measures are not offered in Idaho due to cost effectiveness results).

5.1.3 Prescriptive Lighting, Appliances, and Small Business Direct Install Participant Survey Results

The Evaluators conducted a survey to assess Avista's non-residential rebate program. Survey questions focused on participants' awareness of, participation in, and satisfaction with Avista's non-residential prescriptive lighting, appliance rebate, and small business direct install offerings. Participants were contacted via email up to three times and asked to complete a survey. In total, 266 participants who received measures through the non-residential rebate program in 2022 or 2023 responded to survey efforts.

5.1.3.1 Program Awareness

Almost half of the 266 respondents learned about the program via contractors, equipment vendors or energy consultants (48.9%, n=130) (Figure 5-1). Half of the respondents were aware of the program for at least two years (49.6%, n=132). A little more than one-third of respondents were aware that additional rebates exist for non-residential customers (36.5%, n=97). Among these respondents, about half of the respondents were aware of gas-HVAC system rebates and prescriptive lighting related rebates (
Figure 5-2).

Figure 5-1: Program Awareness (n=266)

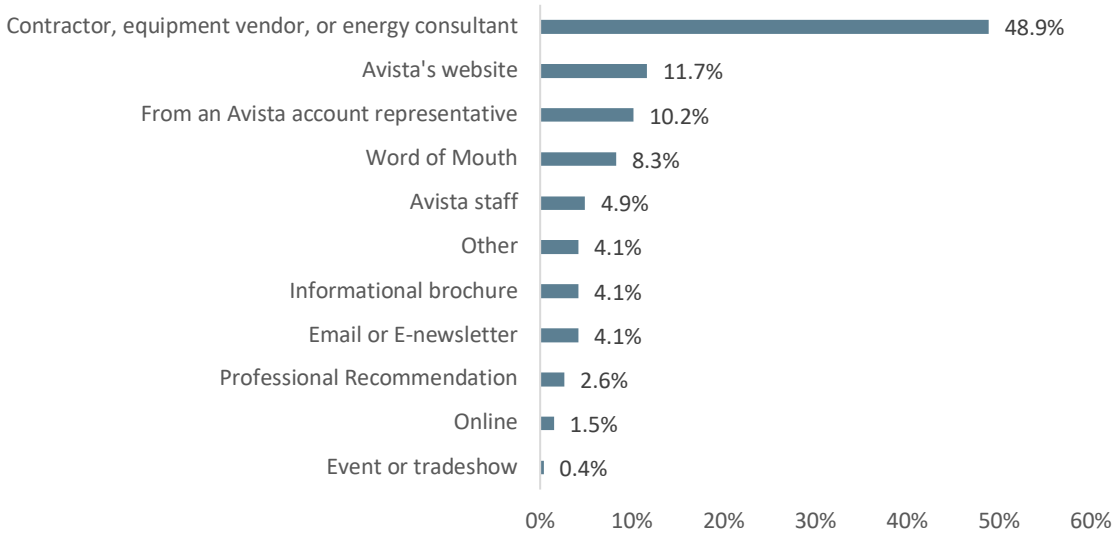
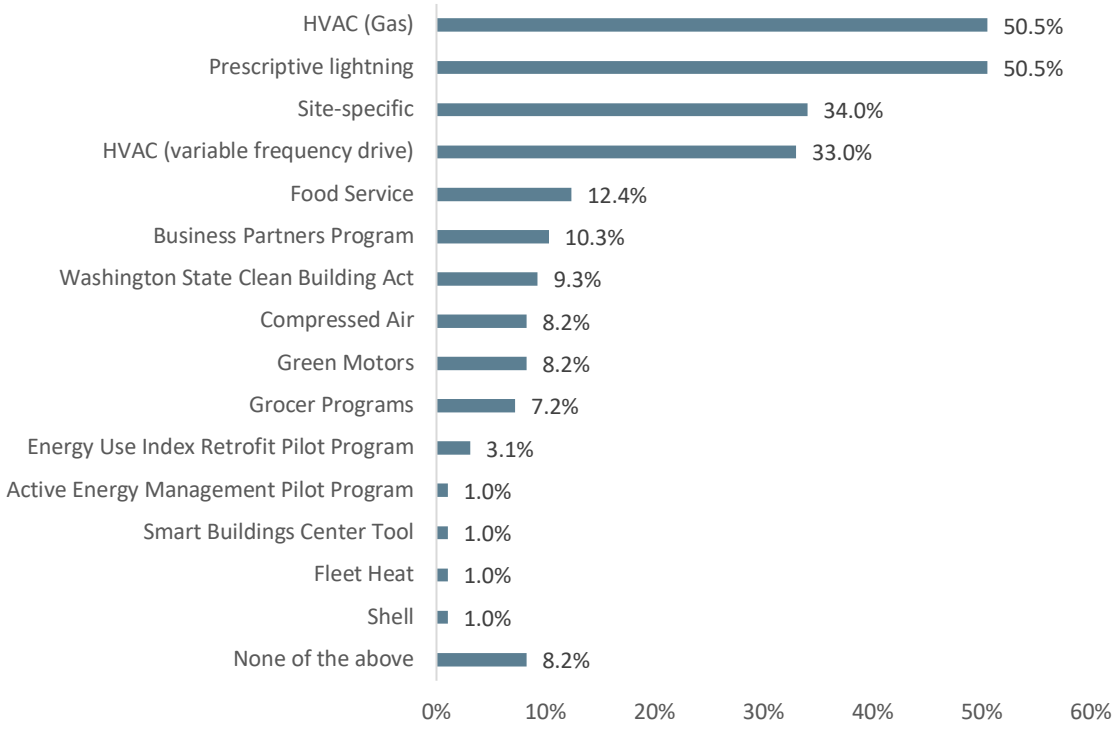
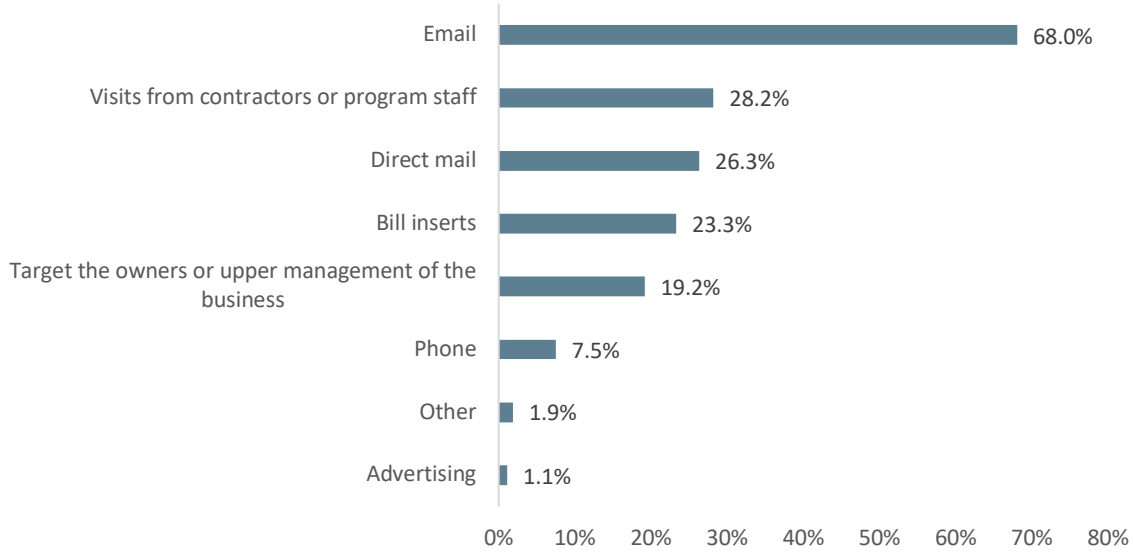


Figure 5-2: Rebate Awareness, by type (n=97)



More than two-thirds of respondents indicated that email was the most effective way to promote rebates to non-residential customers (68.0%, n=180) (Figure 5-3).

Figure 5-3: Contacting firms (n=266)



5.1.3.2 Energy Efficient Equipment Purchasing Behaviors

When replacing equipment, firms tended to focus on reducing costs (75.6%, n=201) and improving performance (65.8%, n=175) (Figure 5-4). The majority of respondents explained that their firms choose to purchase energy efficient equipment instead of standard equipment to save money on utility bills (89.5%, n=238) (Figure 5-5).

Figure 5-4: Motivators for Upgrading Equipment (n=266)

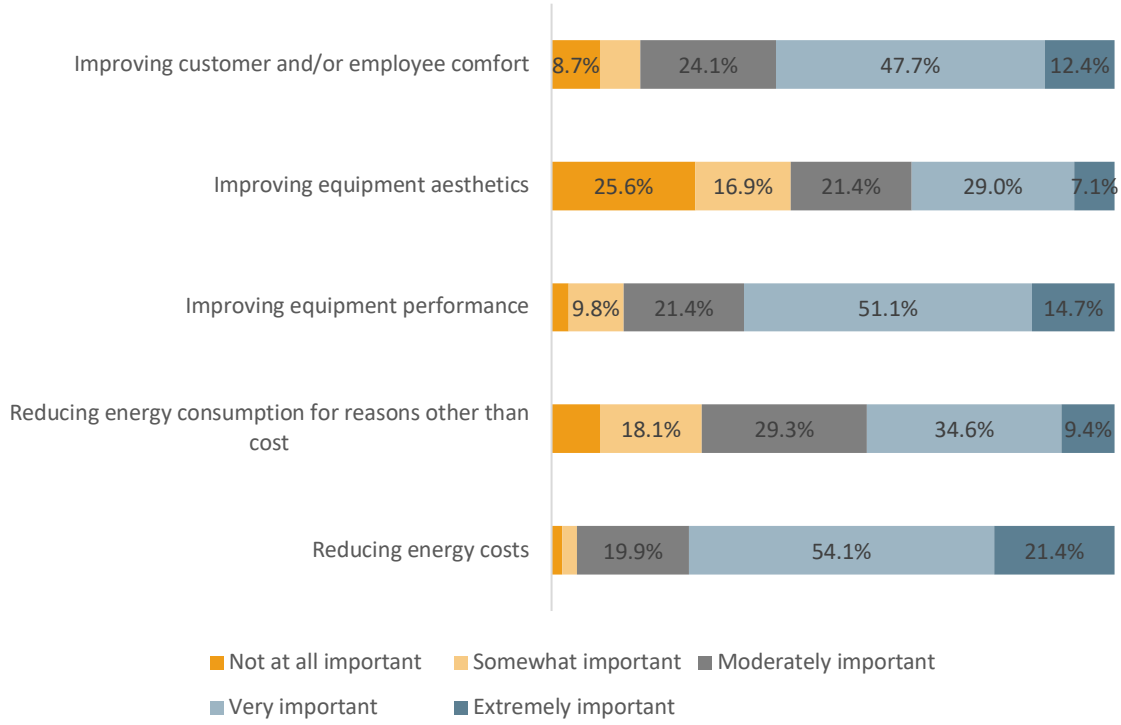
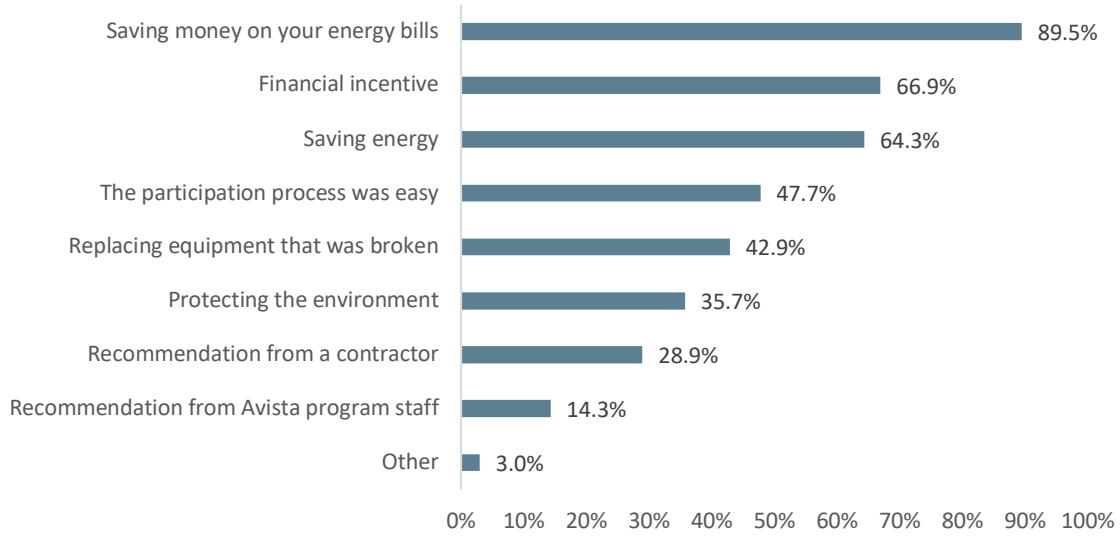


Figure 5-5: Reasoning to purchase energy efficient equipment over standard equipment (n=266)



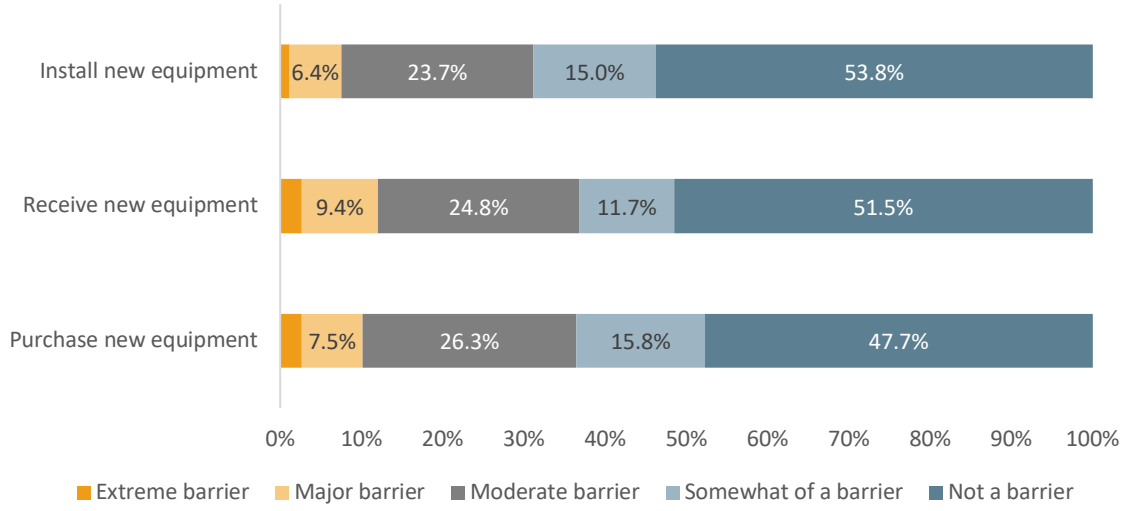
The majority of respondents indicated they faced challenges when trying to install energy efficient equipment (89.5%, n=238). The most common challenges included high initial costs and lack of rebate awareness (Table 5-1).

Table 5-1: Barriers to Purchasing Energy Efficient Equipment (n=238)

Equipment	%	n
High initial cost	56.3%	134
Lack of rebate awareness	46.6%	111
Understanding areas for improvement	31.5%	75
Funding competition	23.9%	57
Long payback period or return on investment	23.5%	56
Do not own the building(s)	20.2%	48
Lack of staff	19.3%	46
Lack of corporate support	2.1%	5
Difficulty finding a contractor	1.7%	4
I don't know	2.9%	7

About half of respondents explained that supply chain issues had not caused major barriers when purchasing, receiving, or installing new energy efficient equipment (Figure 5-6)

Figure 5-6: Supply chain barriers (n=266)



5.1.3.3 Program Participation

Respondents received rebates for a variety of measures, most notably lighting (Table 5-2). Aside from a small proportion of lighting rebate recipients (n=11), all respondents indicated the equipment they received rebates for was still installed and operational. Most lighting (92.7%, n=190) and food service (83.3%, n=5) rebate recipients replaced existing equipment.

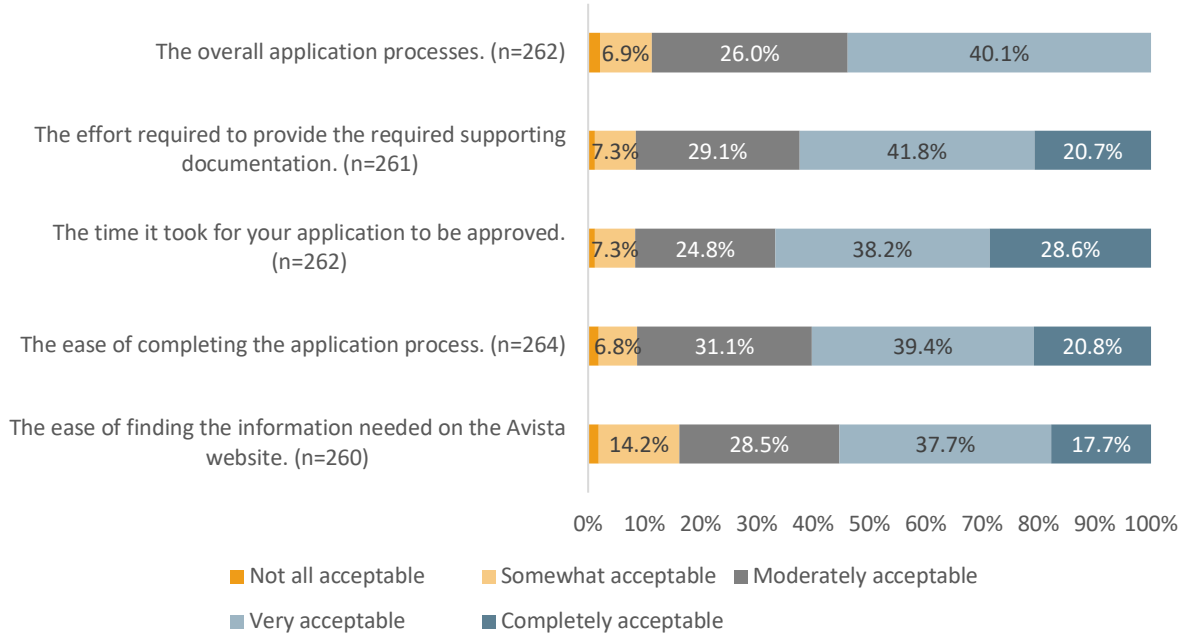
*Table 5-2: Status of Rebated Equipment (n varies)**

Rebated Equipment	Installed		Uninstalled	Don't know
	All	Some		
Lighting (n=205)	194	10	0	1
Furnace (n=16)	16	0	0	0
Insulation (n=12)	12	0	0	0
Food service equipment (n=6)	6	0	0	0
Variable Frequency Drive (n=2)	2	0	0	0
*Does not include 29 small business direct install recipients				

Before participating in the commercial rebate program, more than half of respondents had previously installed energy efficient products (54.9%, n=146). Less than one-quarter of respondents had concerns about the program before deciding to participate (21.4%, n=57). Among those respondents who expressed concerns, financial considerations (n=19) and skepticism about the program's legitimacy (n=17) were the most common hesitations.

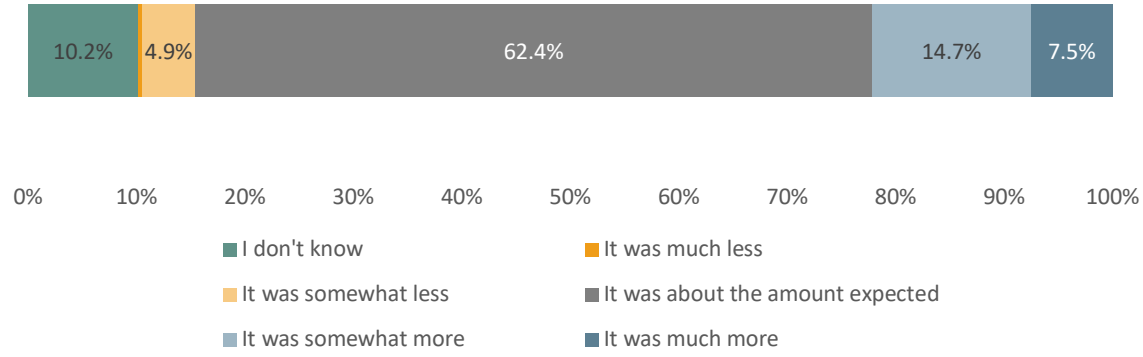
Most respondents found the application clear and easy to complete (78.9%, n=210). In general, applications were completed by the contractor or equipment vendor (53.8%, n=143) or the respondent themselves (35.0%, n=93). More than half of respondents found all aspects of the application process to be acceptable (Figure 5-7). The most problematic aspect of the application process was the ease with which applicants were able to find the information they needed on the Avista website, with 16.2% indicating this process was less than moderately acceptable (n=42).

Figure 5-7: Acceptability of Application Process (n=varies)



More than half of respondents confirmed that the rebate amount was what they expected (62.4%, n=166) and 22.2% (n=59) indicated it was more than they expected (Figure 5-8). Most respondents received their rebate about a month after project completion and (61.7%, n=164) and more than two-thirds of respondents were satisfied with the time it took them to receive the rebate (69.6%, n=185).

Figure 5-8: Rebate Amount (n=266)

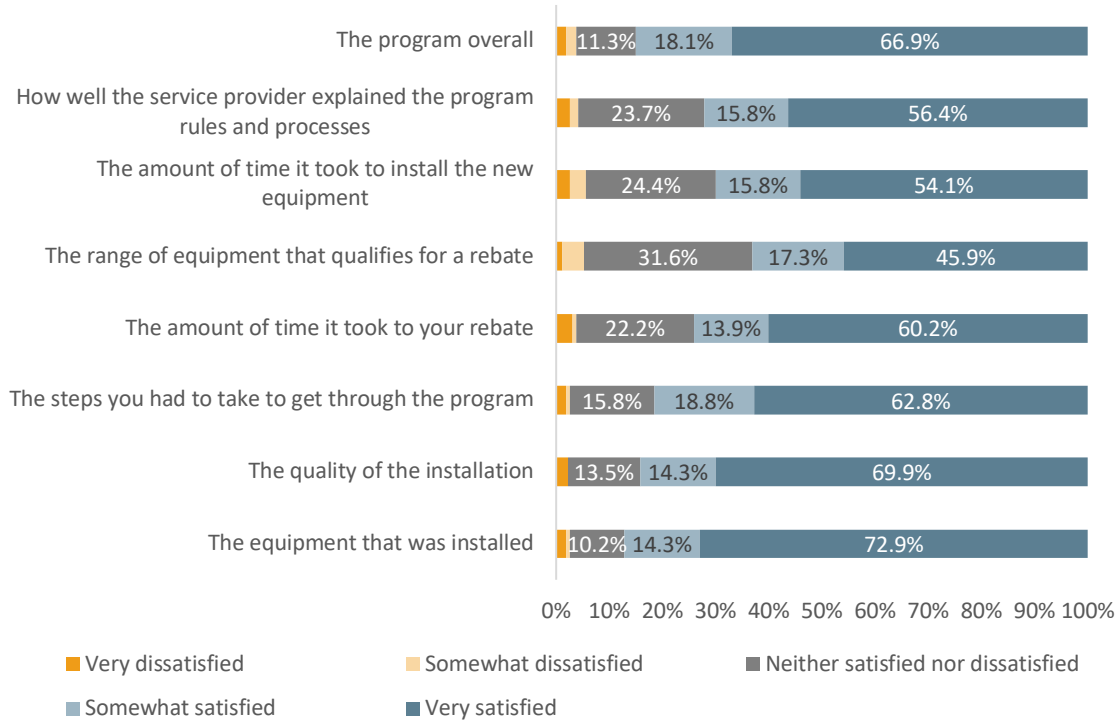


More than one-quarter of respondents confirmed that Avista program staff inspected their project after completion (27.3%, n=73).

5.1.3.4 Satisfaction

Respondents tended to be satisfied with all aspects of the program; the areas with the most dissatisfaction included the range of equipment that qualifies for rebates (5.3%, n=10) and the time it took to install equipment (5.6%, n=14) (Figure 5-9).

Figure 5-9: Program Satisfaction (n=266)



The majority of respondent were satisfied with Avista as their service provider (85.0%, n=226) (Figure 5-10) and participating in the program increased more than half of respondents' satisfaction with Avista (67.3%, n=179) (
Figure 5-11). The majority of respondents indicated they were likely to recommend the program to others (84.2%, n=143).

Figure 5-10: Satisfaction with Avista (n=266)

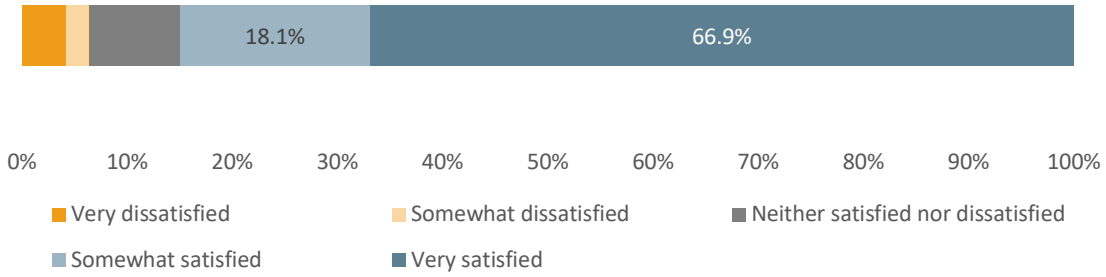
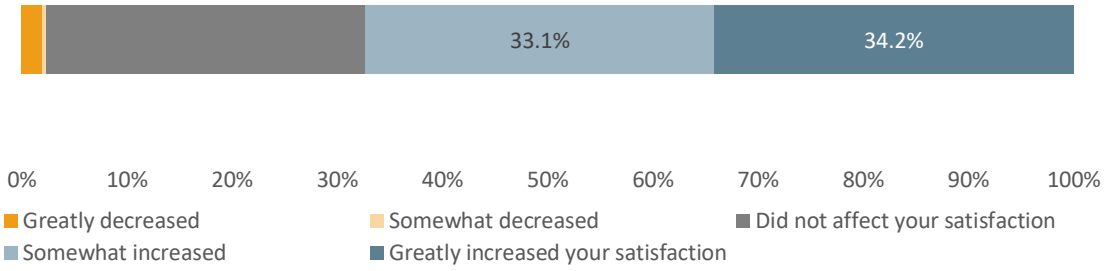


Figure 5-11: Change in satisfaction after program participation (n=266)



5.1.3.5 Firmographics

Table 5-3 describes the firmographic composition of respondents' businesses and Table 5-4 describes firms' policies regarding energy efficiency and energy savings.

Table 5-3: Firmographics (n=266)

Answer	%	Count
Facility Type		
Your company's only location	54.5%	145
One of several locations owned by your company	28.2%	75
Headquarters with other locations	10.2%	27
I don't know	7.1%	19
Facility ownership		
Own and occupy	62.0%	165
We own and rent to someone else	10.2%	27
Rent	20.7%	55
I don't know	3.4%	9

Prefer not to answer	3.8%	10
Respondent role		
Proprietor/Owner	33.1%	92
Board member	15.4%	11
Facilities Manager	12.8%	34
Manager	12.4%	33
President/ CEO	12.0%	32
Other financial/administrative position	5.6%	27
Other facilities management/maintenance position	5.3%	14
Energy Manager	1.9%	10
Chief Financial Officer	1.5%	7

Table 5-4: Company energy efficiency related policies (n=266)

Does company have…	Yes	No	I don't know
…defined roles for monitoring and/ or managing energy usage?	54.1%	41.0%	4.9%
…defined energy savings goals?	56.0%	36.1%	7.9%
…specific policy requiring that energy efficiency be considered when purchasing equipment?	66.9%	24.4%	8.7%
…carbon reduction goals?	73.3%	15.8%	10.9%

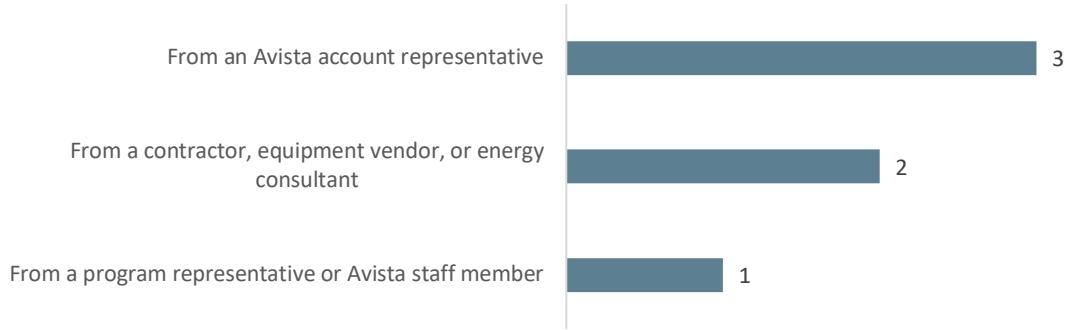
5.1.4 Site-Specific Participant Survey Results

Evaluators conducted a survey to assess Avista's non-residential site-specific program. Survey questions focused on participants' awareness of, participation in, and satisfaction with Avista's non-residential site-specific program. Participants were contacted via email three times and asked to complete a survey. In total, six participants who received measures through the site-specific program in 2022 or 2023 responded to survey efforts.

5.1.4.1 Program Awareness

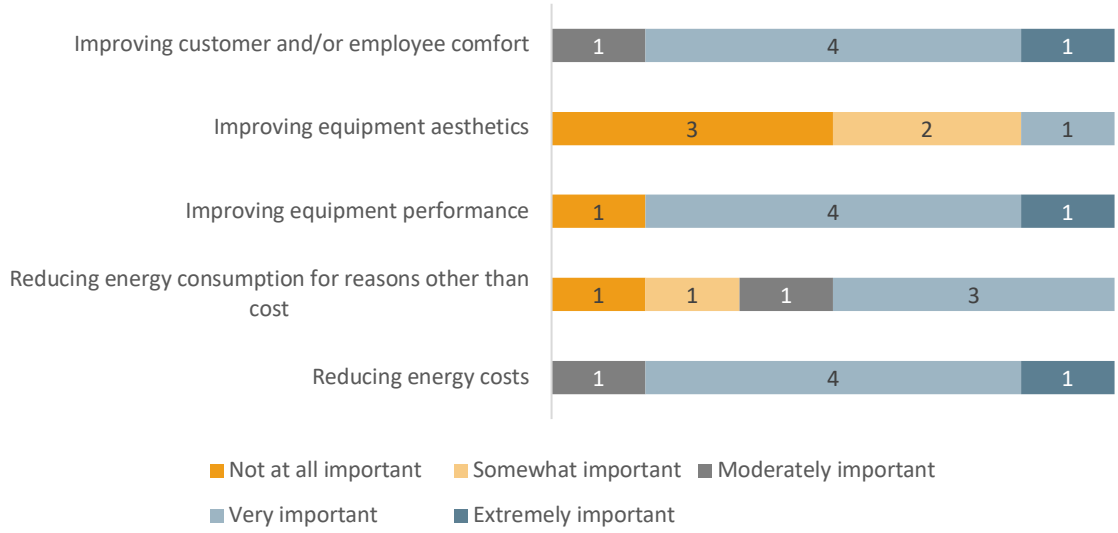
Respondents learned about the program through Avista account representatives, contractors, vendors, or energy consultants, and/or Avista staff (Figure 5-12). Five respondents had been aware of Avista's energy efficient offerings for at least two years; in addition to the site-specific program, respondents were aware of prescriptive lighting program (n=2), the compressed air offering (n=2), and the variable frequency drive offering (n=1).

Figure 5-12: Program Awareness (n=6)



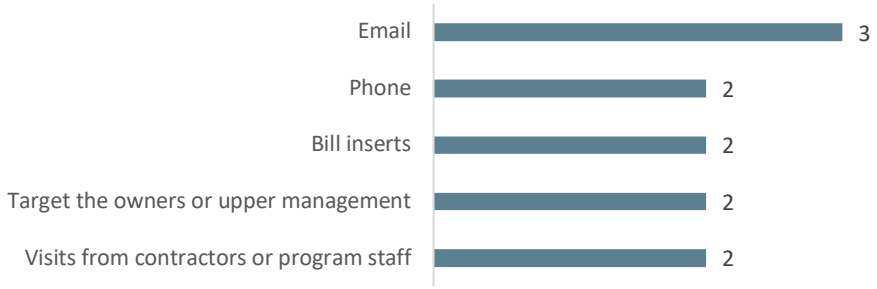
When replacing equipment, respondents noted that reducing their company's energy costs (n=5) and improving customer and employee comfort (n=5) were important motivating factors (Figure 5-13).

Figure 5-13: Motivation to Participate (n=6)



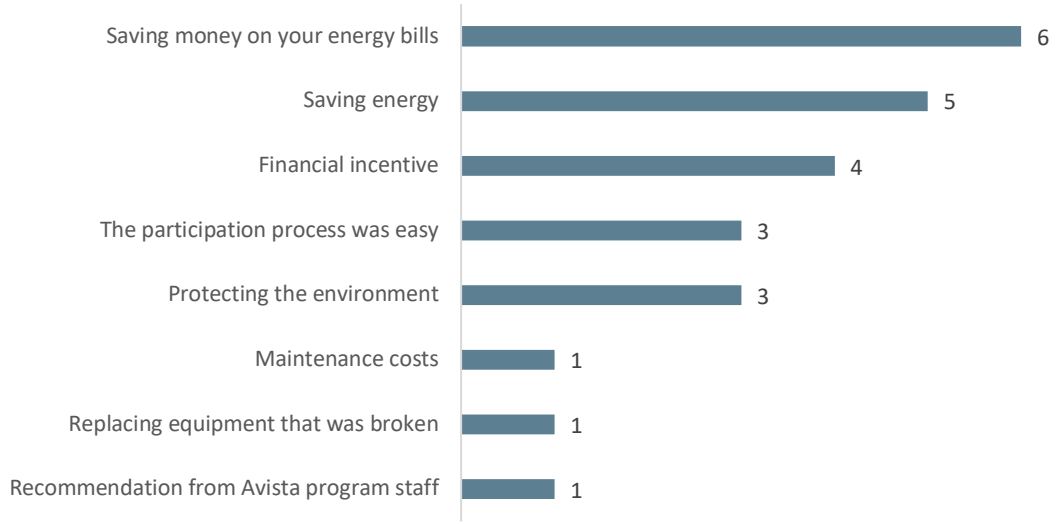
Half of the respondents noted that they prefer utilities connect with them via email regarding new rebates and energy saving opportunities (Figure 5-14).

Figure 5-14: Communication channels (n=6)



Saving money on energy bills and saving energy more generally were respondents' top two motivating factors for installing energy efficient equipment at their facilities (Figure 5-15).

Figure 5-15: Motivations to Participate (n=6)



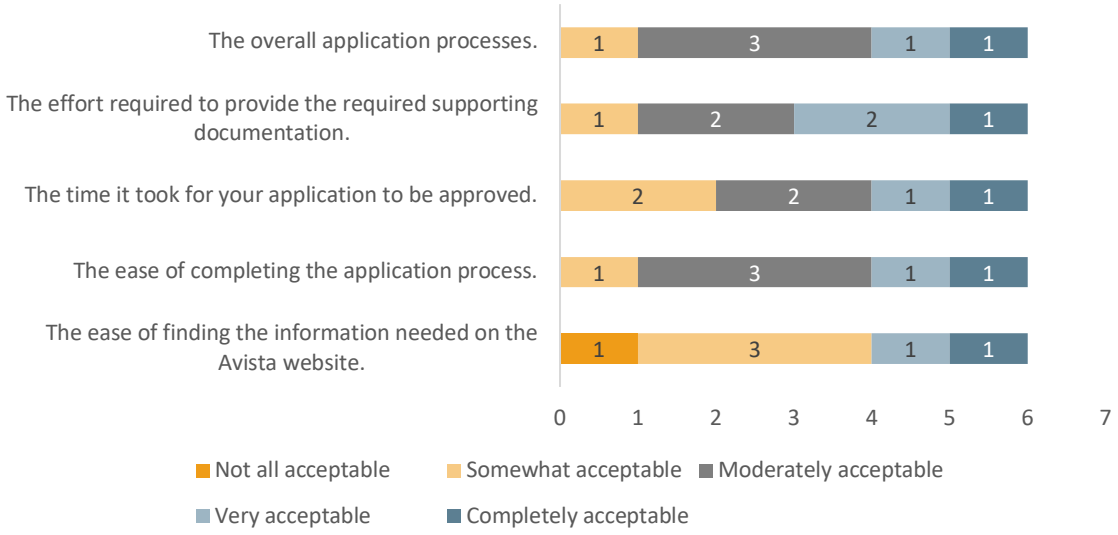
5.1.4.2 Program Participation

Half of the respondents indicated that participation in the site-specific program marked the first time they purchased energy efficient equipment for their facility (n=3). Respondents noted that prior to participation, equipment cost was a concern, but that the rebates helped fill the gap (n=2).

Five of the respondents confirmed an Avista representative came to inspect the project upon completion. These respondents indicated the inspector was very courteous, professional, efficient, and knowledgeable regarding the program (n=5).

Experiences with the program application process was mixed (Figure 5-16). Respondents noted that the information provided on Avista's website was insufficient, application processing times were long, and the process was not always easy. Half of the respondents sought assistance when completing the application to overcome some of these burdens (n=3).

Figure 5-16: Satisfaction with Application Process (n=6)

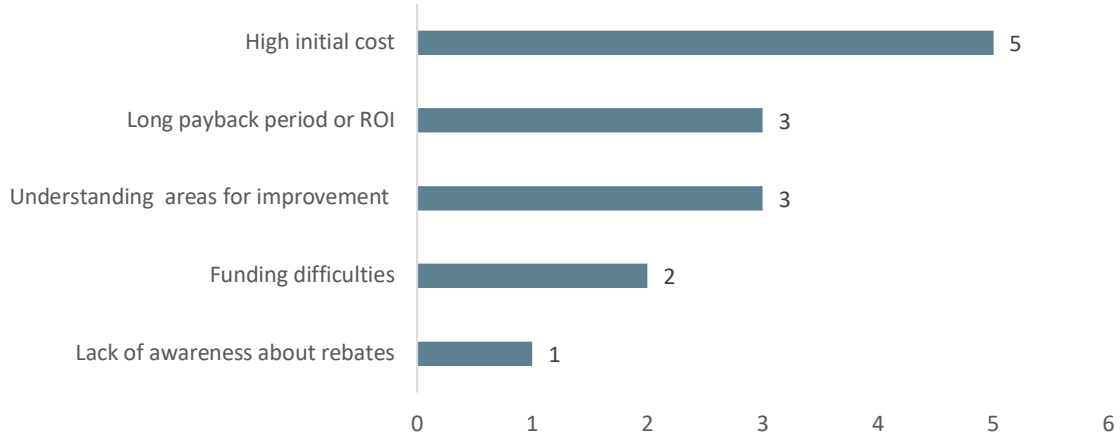


Once applications were processed, program participation experience improved. Five of the respondents confirmed that the rebate amount was what they expected (n=5), and one respondent noted it was larger than they expected (n=1). For most of the respondents the rebate arrived two to four weeks after project completion; the two respondents who waited more than six weeks for their rebate expressed dissatisfaction with the delay.

Respondents cited a variety of program participation barriers including the high initial costs (n=5) and long payback periods (n=3) associated with energy efficient equipment, as well as a general difficulty understanding equipment was most in need of an upgrade (n=3) (Figure 5-17). Three respondents noted that supply chain issues created issues when purchasing new equipment for the planned facility upgrades.

All but one respondent communicated with Avista staff during the program. Half of the respondents noted that staff answered questions in a thorough and timely fashion (n=3).

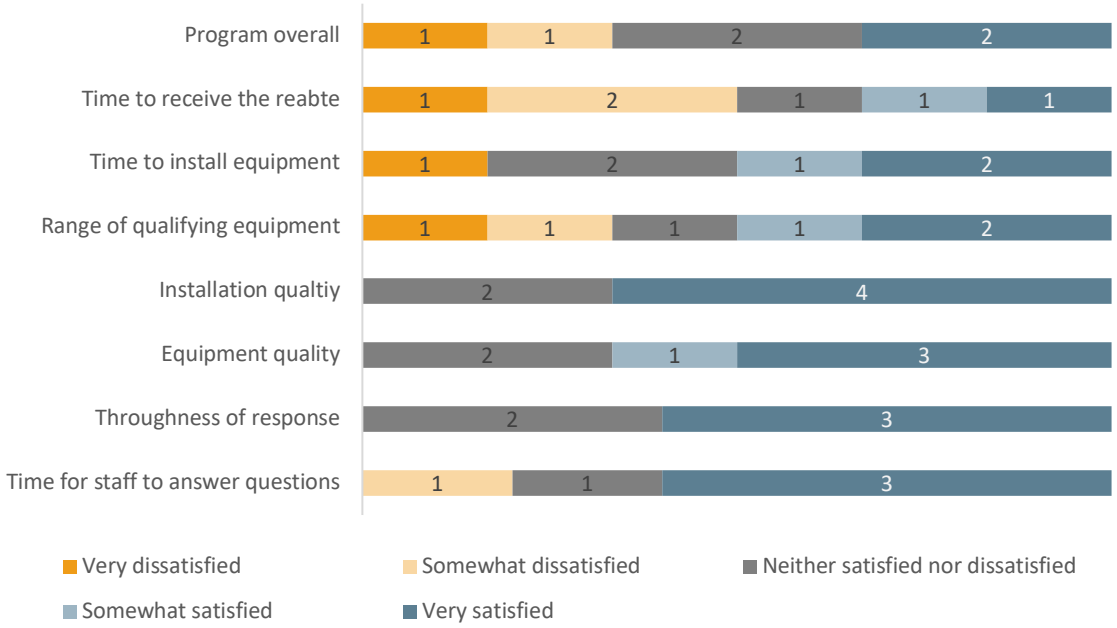
Figure 5-17: Participation Challenges (n=6)



5.1.4.3 Satisfaction

Program satisfaction varied across the six respondents. Respondents expressed higher satisfaction with the quality of the installation (n=4) and equipment quality (n=4), and lower satisfaction with the time it took to receive the rebate (n=3), followed by the range of qualifying equipment (n=2) and program overall (n=2).

Figure 5-18: Program Satisfaction (n=6)



All respondents were either very (n=5) or soemwhat (n=1) satisfied with Avista as thier service provider (n=5). Four of the respondents explained that participation in the site specific program increased their satisfaction with Avista and five respondents indicated they were likely to recommedn the program to others.

5.1.4.4 Firmographics

Table 5-5 describes the firmographic composition of respondents' businesses and Table describes firms' policies regarding energy efficiency and energy savings.

Table 5-5: Firmographics (n=6)

Answer	%	Count
Facility type		
Your company's only location	50.0%	3
One of several locations owned by your company	33.3%	2
The headquarter location of a company with several locations	16.7%	1
Facility ownership		
We own and occupy the facility	83.3%	5
We own the facility and rent it to someone else	16.7%	1
Respondent role		
Facilities Manager	16.7%	1
Other facilities management/ maintenance position	16.7%	1
Chief Financial Officer	16.7%	1

Engineer	16.7%	1
President/ CEO	16.7%	1
Manager	16.7%	1

Table 5-6: Company energy efficiency related policies (n=6)

Does company have…	Yes	No	I don't know
…defined roles for monitoring and/ or managing energy usage?	6	0	0
…defined energy savings goals?	3	3	0
…specific policy requiring that energy efficiency be considered when purchasing equipment?	6	0	0
…carbon reduction goals?	0	3	3

5.1.5 Trade Ally Interview Results

The Evaluators conducted phone interviews with 22 participating non-residential trade allies in 2022 and 2023. A total of 232 contacts were identified and each trade ally was contacted at least three times via email.

5.1.5.1 Background and Program Tenure

Responding trade allies represented a variety of business types (Table 5-7).

Table 5-7: Respondents' Business Types (n=22) (multiple selections allowed)

Business Type	n
Contractors/installers	13
Designers/engineers	2
Distributor	6
Energy service company	1
Manufacturer/Wholesaler	1
Power company	1

Most respondents specialize in lighting equipment (n=18); other specialties included building shell or weatherization services (n=2), food service equipment (n=2), horticulture equipment (n=1), and HVAC equipment (n=1). Thirteen of the responding trade allies serve customers in both Washington and Idaho, while the remaining eight work exclusively in Washington. More than half of the respondents have been involved with the program for several years (n=16); three respondents indicated 2023 was their first year in the program.

5.1.5.2 Engaging Customers

Respondents' target customers varied; five respondents serve residential and commercial customers, 17 respondents serve commercial customers only, and one respondent focuses on horticulture customers. Some respondents rely on word-of-mouth to generate project leads (n=7); other customer engagement strategies include sales team outreach, cold calls, and company marketing materials.

Half of respondents did not know about Avista's program specific marketing materials (n=12), but agreed that it would be beneficial to have. One respondent who was aware of the materials indicated they are confusing (n=1).

> *"if they could lay out the rebate in a way that makes sense to everybody you know, not everybody's the best communicators or salespeople, I think I'm a terrible salesperson, so if they had someone in marketing that made us a nice brochure of it, probably would help." –Trade Ally*

Respondents cited a variety of barriers preventing customers from engaging in the program (Table 5-8).

Table 5-8: Barriers to Participation

Barrier	n
Upfront costs	8
Time to participate	5
Skepticism towards program	2
Available equipment	2
Reluctance towards new technology	1
Application process	1
Rebate requirements	1
Disinterest	1
Lack of autonomy on building design	1

5.1.5.3 Application Process and Program Incentives

Six of the responding trade allies completed the rebate application on behalf of their customers; other respondents noted that customers (n=2) or distributors (n=1) completed the application. Among the six respondents who complete the application for customers, five identified challenges with the process (Table 5-9). Trade allies who were interviewed in 2022 did not comment on the application process.

Table 5-9: Application Challenges

Challenge	n
Confusion over which program to apply	1
Lack of descriptions for eligible light fixtures	1
Process for site-specific projects	1
Address validation tool not always working equipment	1
Midstream program	1

There was no consensus regarding current incentive levels. Eight respondents indicated that the current incentives are comprehensive and generous, while 12 respondents identified incentive level concerns. Eleven respondents also proposed additional measures be added to the program (Table 5-10).

Table 5-10: Incentive Suggestions (n=11)

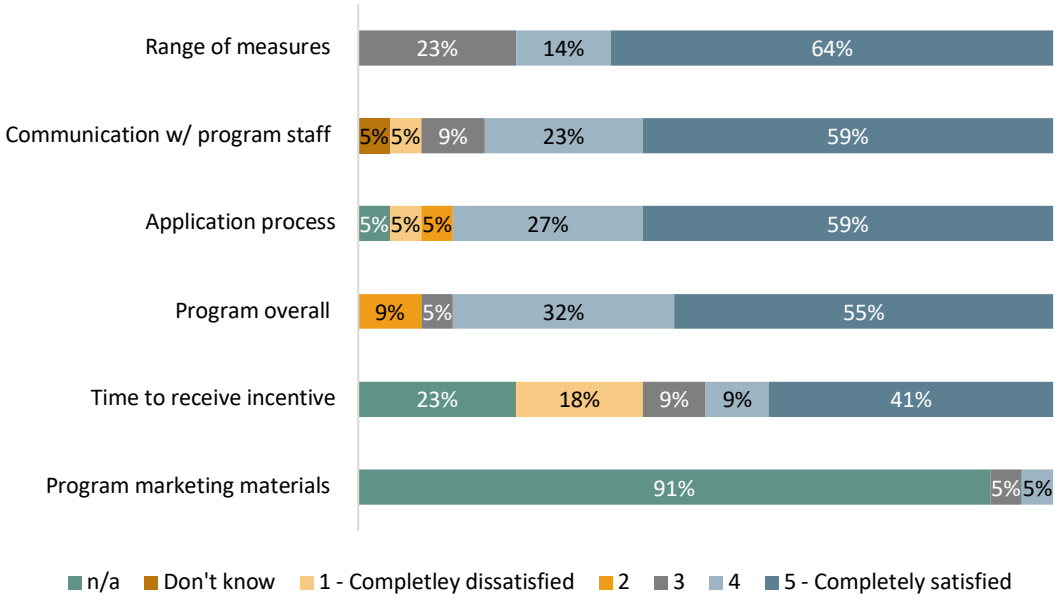
Measures	n
Incentives too low to encourage adoption	4
LED flat panel light fixtures	1
Greenhouse equipment	1
Windows	1
Sports field lighting	1
High output bulbs	1
Sign work	1
Increase lighting incentives in general	1

Increase all incentives	1
Proposed additions	7
Bathroom fan timer switches	1
Dehumidifiers	1
Duct wrap	1
Expanded heat pump options	1
Retrofits for incandescent to LED bulbs	1
Tankless water heaters	1
1500 watt lighting	1
Expanded options for sports lighting	1
Fryers	1
New griddle technology	1
Higher wattage bulbs	1

5.1.5.4 Program Satisfaction and Recommendations

In general, responding trade allies were satisfied with the program. Respondents were most satisfied with the range of measures eligible for a rebate, and least satisfied with the application process (Figure 5-19). Some respondents praised the program's simplicity (n=3), program incentives (n=3), program staff (n=2) comprehensiveness (n=1), and promotion of efficient equipment (n=1).

Figure 5-19: Program Satisfaction



Respondents reported the most challenges with the site-specific pathway (n=4). These respondents highlighted challenges with this pathway, citing confusion over the general process (n=1) and frustration with the length of the M&V review period (n=1). One respondent elaborated on a site-specific project that took over a year to receive a rebate, comparing this wait time to that of other neighboring utilities.

Additional challenges include the new application process regarding midstream distributors introduced in 2023 (n=1), lack of clarity on eligible equipment (n=1), confusion on who receives the rebate (n=1),

confusion on the customer portal (n=1), discrepancies in required information for applications (n=1), getting customer account number or meter numbers for the application (n=1).

Responding trade allies provided recommendations for program improvement. These recommendations ranged from increasing the availability of marketing materials to modifying the application process (Table 5-11).

Table 5-11: Recommendations for Improvement (n=12)

Recommendations	n
Provide Avista branded marketing materials	3
Streamline standard projects via instant rebate options	2
Create a formal trade ally network	1
Add trade ally bonuses	1
Discontinue Midstream program	1
Improve M&V period for site-specific jobs	1
Improve clarity of application process	1
Loosen qualifications for attic insulation	1
Add option for customers to go in and fill out application in-person	1

5.1.6 Conclusions and Recommendations

Based on data collected via participant surveys and trade ally interviews, the Evaluators provide the following conclusions and recommendations for improvement for the commercial rebate program moving forward.

5.1.6.1 Conclusions

The following conclusions represent key findings from the commercial prescriptive rebate program across the prescriptive lighting, appliances, small business direct install, and site-specific pathways:

1. **Program Awareness –** Across the various pathways, survey respondents most commonly learned about the rebate offerings from contractors, equipment vendors, and/or energy consultants. Survey respondents indicated email is the most effective way to communicate with them about rebate opportunities.
2. **Marketing Materials –** Half of the interviewed trade allies did not know about Avista's program-specific marketing materials (n=12), but agreed these resources would be useful to have.
3. **Barriers to Engagement –** The upfront cost of energy efficient equipment was the largest barrier to program engagement. Survey and interview respondents explained that firms are motivated to buy energy efficient equipment for the cost savings potential, but often lack the upfront capital to do so.
4. **Prior Energy Efficient Equipment Experience –** About half of the survey respondents across the various pathways noted that they had previously installed energy efficient equipment in their facilities.
5. **Program Experience –** Survey and interview respondents tended to be satisfied with all aspects of the program. Areas of dissatisfaction for both survey respondents and interviewed trade allies included difficulty finding necessary information on Avista's website and the range of eligible equipment.

6. **Site Specific Program Experience –** Interviewed trade allies reported the most challenges with the site-specific pathway offered through the program. These respondents cited confusion over the general process and frustration with the length of time required by the M&V review period.

5.1.6.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for non-residential commercial rebate programming moving forward.

1. **Program marketing –** Continue to deploy customer-focused promotional and marketing campaigns through email communication, as customers identified this as the most favorable method of communication. Consider a wide distribution of Avista-branded marketing materials to trade allies so that the trade allies can better promote and explain the program to their customers.
2. **Eligible Equipment –** Consider expanding equipment eligible for rebates based on trade ally recommendations. Trade ally respondents had more difficulties with the site-specific program than the midstream, prescriptive lighting, appliance rebate, and direct install programs. Integrating more measures into these midstream and downstream rebate pathways may alleviate pressure put on the site-specific pathway.

5.2 MIDSTREAM PROGRAM

Avista designed the Midstream Program to shift the onus of applying for rebates from end-use customers to distributors. Not only does this reduce customers'/contractors' administrative burden (i.e., no need to submit paperwork tracking energy efficient installations), but it is also anticipated to increase high-efficiency equipment options at competitive prices. Midstream rebates provide an immediate discount on eligible products, which appear as a line item on customer invoices. Starting on July 1, 2023, the Midstream Program replaced Avista's residential and commercial downstream space-heating and water-heating programs as well as the commercial food service equipment rebate program.

Through the Midstream Program, Avista seeks to achieve three overall objectives:

- Provide greater long-term, cost-effective savings for residential and commercial customers alike
- Reduce Avista's administrative burden in processing space-heating, water-heating, and commercial kitchen equipment applications
- Accelerate the market transformation of energy-efficient equipment

The Midstream Program provides bought-down equipment to both Residential and Commercial entities. This chapter discusses and presents results only for the non-residential measures.

5.2.1 Data Collection Activities

The process evaluation of the Commercial Midstream Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed one staff at Avista involved in the administration of the Commercial Rebates Program. This interview collected information from program staff about program design, administration, marketing, and stakeholders.

- *Trade Ally Interviews.* The Evaluators surveyed trade allies who participated in the Commercial Midstream program.

5.2.2 Staff Interviews

The Evaluators summarize the findings from the Midstream Program staff in-depth interviews in this section.

5.2.2.1 Program Design

Beginning in 2023, Avista transitioned to a midstream program for a subset of commercial measures. Avista's motivation for the switch to midstream was to achieve high saving goals and minimize customer confusion regarding these equipment types. Staff explained that the midstream model reduces the paperwork burden for customers and allows for more market transformation by focusing efforts on equipment distributors rather than end users. Measures rebated through the commercial midstream program included HVAC and water heating measures, as well as food service measures.

5.2.2.2 Program Administration

Distributors have flexibility in regard to how they utilize the HVAC and water heating incentives provided to them, as incentives can be used for equipment marketing, discounts, and education. Although many distributors pass the rebate onto the customer, they are not required to do so. Food service measure incentives must be passed through to the customer.

In general, despite a slow start to the program, staff have appreciated the midstream model, explaining that it is more efficient and allows for faster rebate processing. At the time of the 2023 interview, staff noted they had engaged eight distributors across both states, with plans to bring on three more. Staff explained that the biggest pain point of the program is explaining to staff and customers why the incentive is no longer being offered directly to the customers.

5.2.3 Midstream Trade Ally Interview Results

The Evaluators conducted phone interviews with five participating midstream distributors. Eight distributors participated in Avista's midstream program in 2023. All eight distributors were invited to participate in an interview; distributors were contacted up to three times via phone and email. Avista's midstream program encompasses both residential and commercial measures; these interviews represent responses from distributors across both sectors. More information regarding the results of these interviews can be found in the residential chapter in Section 4.1.6: Midstream Trade Ally Interview Results.

5.2.4 Conclusions and Recommendations

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

5.2.4.1 Conclusions

The following conclusions represent key findings from the midstream program data collection activities.

1. **Program process** – Midstream distributors highlighted some issues with the website and general application flow of the program, but noted that the program is new.

5.2.4.2 Recommendations

Based off of the above conclusions, the Evaluators suggest the following recommendations for residential programming moving forward.

1. **Increase training opportunities –** Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.

5.3 Active Energy Management Program

The Active Energy Management (AEM) pilot program provides commercial customers with information on how to improve their energy usage.

5.3.1 Data Collection Activities

The process evaluation of the Active Energy Management Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed one staff member at Avista involved in the administration of AEM pilot. This interview collected information from program staff about program design, administration, marketing, and stakeholders.

5.3.2 Staff Interviews

Starting as a pilot program, the Active Energy Management (AEM) pilot program provides commercial customers with information on how to improve their energy usage. Data collection procedures and information dissemination procedures were based off of data collected from two Avista owned "smart" buildings located in Spokane, WA. The Evaluators interviewed program staff involved with the AEM pilot to learn more about the program design and administration.

5.3.2.1 Program Design

The AEM pilot is a strategic energy management (SEM) program focused on non-capital-based energy efficiency measures. This pilot marks Avista's first foray into an SEM program. Staff recruited customers to participate in the pilot throughout 2021 and experienced some challenges due to the COVID-19 pandemic and staff turnover. The pilot seeks to provide customers with whole building solutions to energy usage, blending technology, engineer expertise, and strategic energy management best practices.

Staff originally hoped to target high energy using customers, but ultimately relied on existing relationships to recruit companies to participate. The pilot is offered in Washington and Idaho and customers represent a variety of business types.

Program participants benefit from receiving real time data on energy usage and identifying equipment in need of improvement. To date, participants have discovered maintenance issues with some of their equipment and made behavioral changes that have resulted in reductions in their utility bills.

5.3.2.2 Program Administration

The AEM pilot is administered by Edo, a third-party implementer. Edo technicians install a box at the participants' building automation server that connects to Avista's larger network so that they can track

specific energy usage data. Edo then uses this data to determine which equipment is and is not working optimally. Edo representatives meet with participants once a month to discuss progress and provide suggestions for improvement. Based on energy usage patterns, Edo representatives may also recommend equipment updates and refer customers to the commercial rebate offerings.

5.3.2.3 Marketing and Outreach

Staff noted the recruitment for the program was slow and eventually relied heavily on existing relationships. Program staff originally underestimated the extent of engineering knowledge the customer contacts needed to have to fully understand, appreciate, and implement program recommendations.

5.3.3 Conclusions and Recommendations

There are no process evaluation related conclusions nor recommendations for the Active Energy Management program.

5.4 Clean Buildings Program

The Clean Buildings Accelerator program provides building owners assistance with meeting Clean Building requirements and support with energy saving efforts. The Evaluators interviewed the program manager of the program at Avista to learn more about the program design and implementation strategy.

5.4.1 Data Collection Activities

The process evaluation of the Clean Buildings Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed one staff member at Avista involved in the administration of the Clean Buildings Program. This interview collected information from program staff about program design, administration, marketing, and stakeholders.

5.4.2 Staff Interviews

The Evaluators summarize the findings from the Clean Buildings Program staff in-depth interviews in this section.

5.4.2.1 Program Design

The Clean Building Accelerator (CBA) program consists of an initial orientation session, monthly 2-2.5-hour workshops for four months, a virtual energy scan, monthly 30-min coaching calls, an ENERGY STAR portfolio manager training, and three 2-hour workshops for recent graduates to discuss results and best practices. The program targets commercial building owners in Washington impacted by the HB1257 Clean Building Law and provides them assistance with meeting the law's requirements.

5.4.2.2 Program Administration

The CBA program is implemented by a third-party implementer, Stillwater Energy. Stillwater is responsible for the overall administration and day-to-day communication of the program. Participants receive the various coaching services for free and benefit from specific suggestions tailored to meet their buildings' needs and capabilities.

As of the 2023 interview, one cohort had completed its entire progression through the program, one cohort was midway through the program, and one cohort (cohort number three) was preparing to begin. Each cohort has about six to seven customers. In addition to preparing customers to become compliant with the Clean Building law, program implementers refer customers to Avista's commercial rebate programs if customers need new appliances and/or lighting measures.

5.4.2.3 Marketing and Outreach

Staff market the program through the Avista website and commercial account managers. When recruiting participants, staff prioritize duel-fuel buildings. Staff noted that program recruitment proved challenging, and they have to reduce cohort size goals.

5.4.3 Conclusions and Recommendations

There are no process evaluation related conclusions nor recommendations for the Clean Buildings program.

5.5 NON-RESIDENTIAL NON-PARTICIPANTS

5.5.1 Data Collection Activities

The Evaluators surveyed non-residential customers who did not participate in Avista's energy efficiency programs to gather feedback on customer knowledge of Avista Programs and their company's energy efficient behaviors.

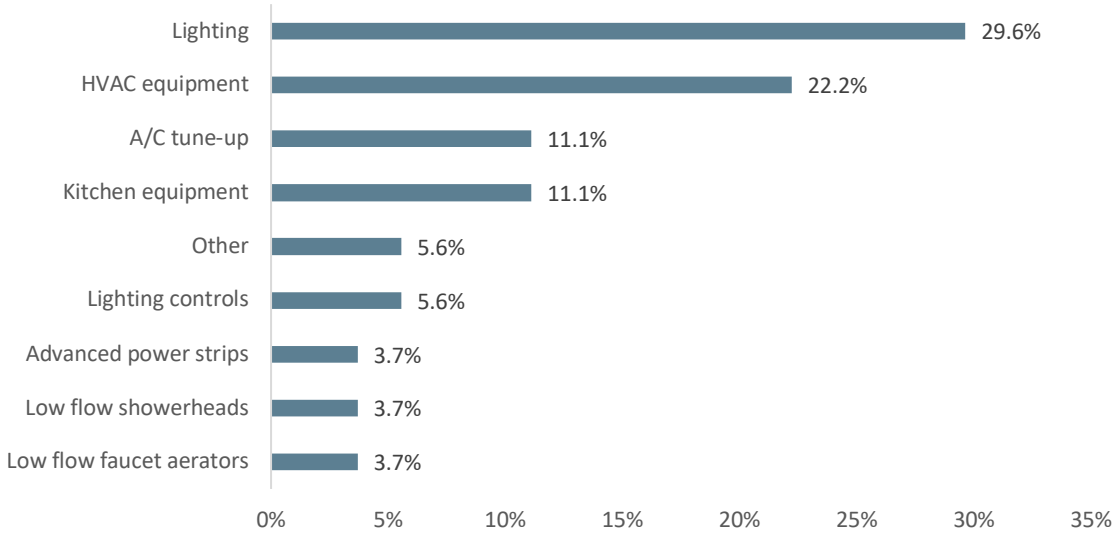
5.5.2 Non-Participant Survey Results

Tracking data included 1,278 customers with an email address. Customers were contacted via email up to three times and invited to complete the survey. One hundred and forty participants responded to the survey.

5.5.2.1 Respondent Behavior

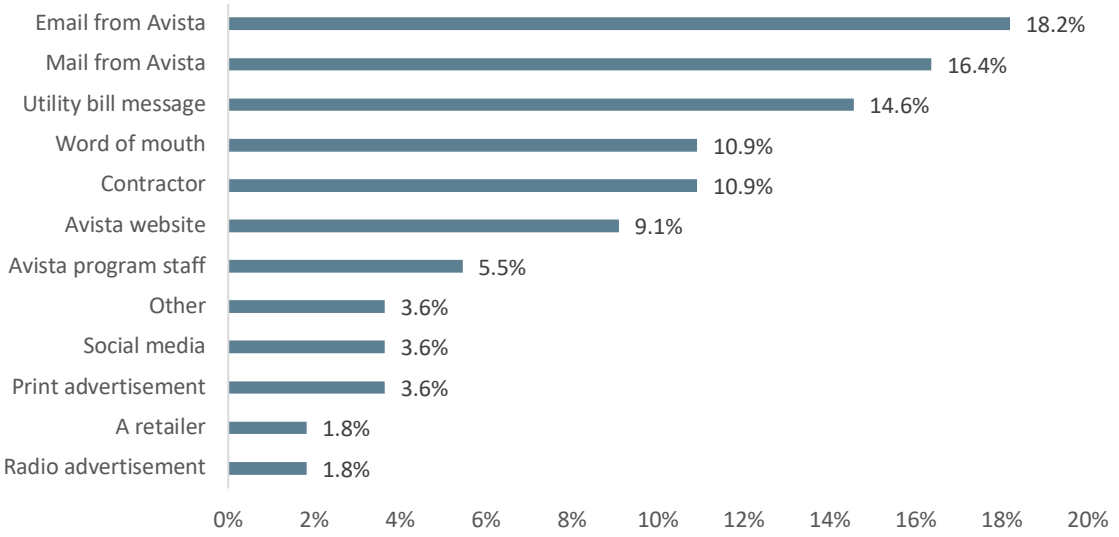
Most of the respondents had the authority to make improvements to their building(s) (62.5%, n=35). Almost half of respondents did not replace or upgrade electrical appliances in the last three years (48.2%, n=27). Among the 24 respondents who did replace and/or upgrade equipment in the last three years, lighting (29.6%, n=16) and HVAC equipment (22.2%, n=12) were the most common (Figure 5-20). None of these respondents were aware of Avista's incentives programs.

Figure 5-20: Upgraded equipment (n=24)



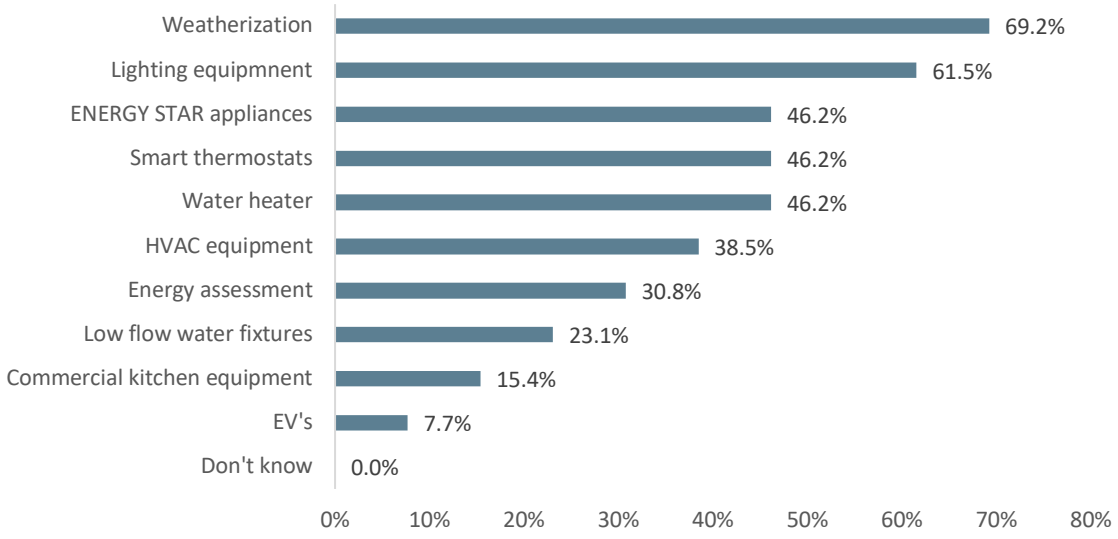
More than a quarter of respondents explained that they did not take advantage of Avista's incentives because they did not have information about the offerings (26.7%, n=24). About half of all respondents (53.6%, n=30) were aware of Avista's non-residential focused incentive programs. These respondents predominantly learned about programs directly from Avista through emails (18.2%, n=10), mail (16.4%, n=9), and messages on bills (14.6%, n=8) (Figure *5-21*).

Figure 5-21: Program Awareness (n=30)



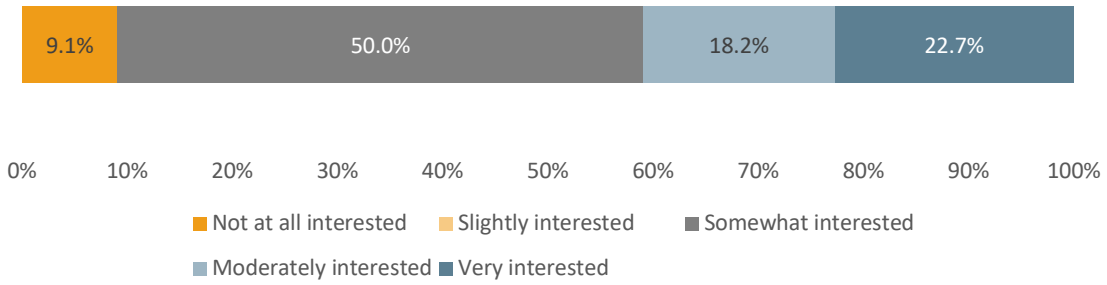
Respondents were most aware of lighting incentives (31.5%, n=17), equipment replacement incentives (27.8%, n=15), and HVAC incentives (25.9%, n=14). Almost a quarter of respondents were interested in energy-efficient upgrades (23.2%, n=13); of these respondents, most were interested in weatherization (69.2%, n=9) and lighting equipment (61.%%, n=8) (Figure *5-22*).

Figure 5-22: Interest by Category (n=13)



All but two respondents (9.1%) indicated they were at least somewhat interested in Avista's incentive programs (9.1%, n=2) (Figure *5-23*).

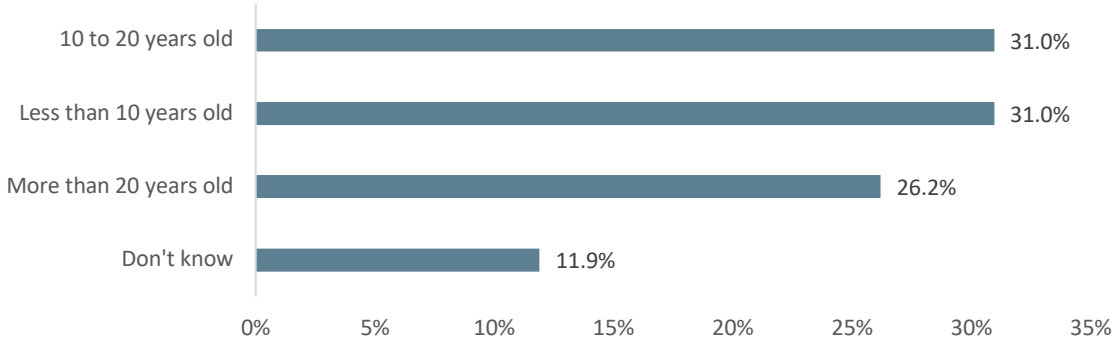
Figure 5-23: Participation interest (n=22)



5.5.2.2 Equipment Status

More than half of the respondents indicated that their HVAC equipment was the largest energy consumer at their facility (57.1%, n=32). Almost three-quarters of respondents had air-conditioning at their facilities (71.4%, n=40). Most of the air-conditioned facilities relied on central A/C (63.6%, n=28) and a third of these systems were less than 10 years old (36.0%, n=18). More than half of the respondents noted that their facilities had a gas furnace (55.0%, n=33), and a tenth used electrical resistance heating (11.7%, n=7). The age of the heating systems varied greatly (Figure 5-24) and half of these systems had been serviced in the last year (50.0%, n=28).

Figure 5-24: Heating equipment age (n=42)



Half of the respondents used programmable thermostats (51.0%, n=29) for temperature control, while a quarter used manual thermostats (25.0%, n=14). Half of the respondents indicated they had LED lights at their facilities (51.8%, n=29) and

Almost all respondents receive electricity from Avista (92.8%, n=52) two-thirds receive natural gas (66.0%, n=37).

5.5.2.3 Firmographics

Table 5-12 includes firmographic characteristics of survey respondents.

Table 5-12: Demographics (n=56, unless otherwise indicated)

Answer	%	Count
Ownership status		
Own and occupy	66.1%	37
Rent	21.4%	12
Own and rent to someone else	12.5%	7
Facility description		
Your company's only location	63.2%	12
One of several locations owned by your company	26.3%	5
I don't know	10.5%	2
Utility bill		
We are billed directly by Avista	100.0%	56
Not billed directly by Avista	0.0%	0
Building type		
Retail	12.5%	7
Religious worship	12.5%	7
Industrial/manufacturing	10.7%	6
Small office	10.7%	6
Health clinic	8.9%	5
Lodging	7.1%	4
Large office	5.4%	3
Government building	3.6%	2
Restaurant (sit down)	3.6%	2

Assembly hall/gathering space	3.6%	2
Agricultural	1.8%	1
Warehouse or distribution center	1.8%	1
Vacant lot	1.8%	1
Other	8.9%	5
I don't know	5.4%	3
Prefer not to answer	1.8%	1

5.5.3 Conclusions and Recommendations

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

5.5.3.1 Conclusions

The following conclusions represent key findings from the residential non-participant survey:

1. **Program Awareness –** About half of all respondents (53.6%, n=30) were aware of Avista's non-residential focused incentive programs, however a quarter of respondents explained that they did not take advantage of Avista's incentives because they did not have enough information about the offerings (26.7%, n=24).
2. **Energy efficiency familiarity –** Almost half of respondents did not replace or upgrade electrical appliances in the last three years (48.2%, n=27). Among the 24 respondents who did replace and/or upgrade equipment in the last three years, lighting (29.6%, n=16) and HVAC equipment (22.2%, n=12) were the most common.
3. **Interest in Avista programming** -- All but two respondents indicated they were at least somewhat interested in Avista's incentive programs.

5.5.3.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for non-residential programs moving forward.

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment nor did they feel they had enough information about the offerings to make informed decisions for improving the energy efficiency of their facility. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience for non-residential program participation.

6 APPENDIX

In this appendix, the Evaluators provide the survey and interview guide instruments deployed during this process evaluation.

6.1 SURVEYS

6.1.1 Residential Participant Survey

Avista-Residential Participant Survey (STANDARD)

Start of Block: Screener

Q194 Welcome! Thank you for taking this survey to tell us about your experience with Avista's residential energy efficiency programs! Your feedback is very important to us and will help us improve programs for customers like you. This survey should take about 15 minutes. Your responses are confidential and will be used for research purposes only. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy.

Upon completion of the survey we will collect your email address to send a $20 electronic gift card as a token of our thanks.

Q1 To start off this survey, we will ask you about your participation in the program.

Program records indicate that you received a rebate through Avista's Residential Energy Efficiency Program at **${e://Field/ADDRESS}** in 2022 or 2023. Is that correct?

- ○ Yes (1)
- ○ I participated BUT my address is incorrect *(Please provide correct address.)* (2) _____
- ○ No, I did not participate (3)

Skip To: End of Block If To start off this survey, we will ask you about your participation in the program. Program record... = No, I did not participate

End of Block: Screener

Start of Block: Program Participation

Display This Question:

If HVAC_TYPE1 Is Not Empty

Or HVAC_TYPE2 Is Not Empty

Or DRYER > 0

Or WASHER > 0

Or RFC > 0

Or FREEZER > 0

Or WH_TYPE1 Is Not Empty

Or WH_TYPE2 Is Not Empty

Or TSTAT > 0

Or HP > 0

Or ES_DOORS > 0

Q2 Please confirm the measures that you installed.
(If you are unsure if the measure was installed, please select the "No" option.)

Display This Choice:

If HVAC_TYPE1 Is Not Empty

Display This Choice:

If HVAC_TYPE2 Is Not Empty

Display This Choice:

If DRYER > 0

Display This Choice:

If WASHER > 0

Display This Choice:

If RFC > 0

Display This Choice:

If FREEZER > 0

Display This Choice:

If WH_TYPE1 Is Not Empty

Display This Choice:

If WH_TYPE2 Is Not Empty

Display This Choice:

If TSTAT > 0

Display This Choice:

If HP > 0

Display This Choice:

If ES_DOORS > 0

	Yes (1)	No (2)
Display This Choice: If HVAC_TYPE1 Is Not Empty ${e://Field/HVAC_TYPE1} (1)	○	○
Display This Choice: If HVAC_TYPE2 Is Not Empty ${e://Field/HVAC_TYPE2} (2)	○	○
Display This Choice: If DRYER > 0 Clothes Dryer (3)	○	○
Display This Choice: If WASHER > 0 Clothes Washer (4)	○	○
Display This Choice: If RFC > 0 Refrigerator-Freezer Combo (5)	○	○
Display This Choice: If FREEZER > 0 Stand-Alone Freezer (6)	○	○
Display This Choice: If WH_TYPE1 Is Not Empty ${e://Field/WH_TYPE1} (7)	○	○
Display This Choice: If WH_TYPE2 Is Not Empty ${e://Field/WH_TYPE2} (8)	○	○
Display This Choice: If TSTAT > 0 Smart Thermostat (9)	○	○

Display This Choice: *If HP > 0* Heat Pump (10)	○	○
Display This Choice: *If ES_DOORS > 0* Energy Star doors (11)	○	○

Display This Question:

If AI > 0

Or CI > 0

Or ATI > 0

Or WI > 0

Or FI > 0

Or WS > 0

Or WR > 0

Or ABI > 0

Q3 According to program records you also received the following improvements. Can you confirm that this is correct?

Display This Choice:

If AI > 0

Display This Choice:

If CI > 0

Display This Choice:

If ATI > 0

Display This Choice:

If WI > 0

Display This Choice:

If FI > 0

Display This Choice:

If WS > 0

Display This Choice:

If WR > 0

Display This Choice:

If ABI = 1

	Yes (1)	No (2)
Display This Choice: If AI > 0 Air Infiltration (1)	○	○
Display This Choice: If CI > 0 Ceiling Insulation (2)	○	○
Display This Choice: If ATI > 0 Attic Insulation (3)	○	○
Display This Choice: If WI > 0 Wall Insulation (4)	○	○
Display This Choice: If FI > 0 Floor Insulation (5)	○	○
Display This Choice: If WS > 0 Weather Stripping (6)	○	○
Display This Choice: If WR > 0 Window Replacement (7)	○	○
Display This Choice: If ABI = 1 Aerobarrier Insulation (8)	○	○

Display This Question:

If According to program records you also received the following improvements. Can you confirm that t... [Yes] (Count) > 0

Carry Forward Selected Choices from "According to program records you also received the following improvements. Can you confirm that this is correct?"

Q4 Did you plan to install the following measures before you learned about the assistance offered through Avista's Residential Energy Efficiency Program?

Display This Choice:

If AI > 0

Display This Choice:

If CI > 0

Display This Choice:

If ATI > 0

Display This Choice:

If WI > 0

Display This Choice:

If FI > 0

Display This Choice:

If WS > 0

Display This Choice:

If WR > 0

Display This Choice:

If ABI = 1

	Yes (1)	No (2)	I don't know (98)
Display This Choice: If AI > 0 Air Infiltration (x1)	○	○	○
Display This Choice: If CI > 0 Ceiling Insulation (x2)	○	○	○
Display This Choice: If ATI > 0 Attic Insulation (x3)	○	○	○
Display This Choice: If WI > 0 Wall Insulation (x4)	○	○	○
Display This Choice: If FI > 0 Floor Insulation (x5)	○	○	○
Display This Choice: If WS > 0 Weather Stripping (x6)	○	○	○
Display This Choice: If WR > 0 Window Replacement (x7)	○	○	○
Display This Choice: If ABI = 1 Aerobarrier Insulation (x8)	○	○	○

End of Block: Program Participation

Start of Block: Program Awareness

Q5 In this section we will ask you questions about your awareness of the program.

How did you learn about **Avista's Residential Energy Efficiency Program**?
(Please select all that apply.)

- ☐ Mailed information from Avista (1)
- ☐ Email from Avista (2)
- ☐ Newspaper or magazine article or advertisement (3)
- ☐ Contractor (4)
- ☐ Community Action Program (CAP Agency) (5)
- ☐ Tribal Housing Authority (6)
- ☐ Food Bank (7)
- ☐ Energy fair or other community events (8)
- ☐ Word of mouth from a personal contact *(e.g., family member, friend, neighbor, colleague, etc.)* (9)
- ☐ Radio advertisement (10)
- ☐ Utility bill message (11)
- ☐ Utility website (12)
- ☐ Another website (13)
- ☐ Social media*(i.e., Facebook, Instagram, Twitter, Tik Tok, etc.)* (14)

- ☐ Avista program staff (15)
- ☐ Information at a retailer (16)
- ☐ Other, please specify (96) _____

Q6 How much did each of the following contribute to your decision to purchase/install the energy efficient equipment you received the program?

	Not at all (1)	A little (2)	A moderate amount (3)	A lot (4)	A great deal (5)	Not applicable (97)
Reducing your monthly utility bill (1)	○	○	○	○	○	○
Helping the environment (2)	○	○	○	○	○	○
Other benefits, please specify (3)	○	○	○	○	○	○

Q7 When thinking about purchasing/installing the energy efficient equipment you received through the program, what sources of information were important in your decision making?
(Please select all that apply.)

- ☐ Contractor recommendation (1)
- ☐ Utility recommendation or information (2)
- ☐ Recommendation from a personal contact *(e.g., family member, friend, neighbor, colleague, etc.)* (3)
- ☐ Other, please specify (4) _____
- ☒ None of the above (5)
- ☒ I don't know (6)

Display This Question:
If OBR = 1
Or HEA = 1

Q8 How important was the Avista rebate in your decision to purchase/install the energy efficient equipment you received through the program?

- ○ Not at all important (1)
- ○ Somewhat important (2)
- ○ Moderately important (3)
- ○ Very important (4)
- ○ Extremely important (5)

Display This Question:

If HEA = 0

Q9 What is your level of awareness about Avista's home audit/assessment program, an in-home energy evaluation that identify recommendations to improve the home's overall energy efficiency, comfort, and health??

- ○ I have never heard of it before now (1)
- ○ I have heard of it but don't know anything about it (2)
- ○ I know a little about it (3)
- ○ I know a lot about it (4)

Display This Question:

If OBR = 0

X→

Q118 What is your level of awareness about Avista's Energy Efficiency Financing program that allows you to access zero down, low-interest energy efficiency project financing by repaying loan amount added on your Avista's monthly bill?

- ○ I have never heard of it before now (1)
- ○ I have heard of it but don't know anything about it (2)
- ○ I know a little about it (3)
- ○ I know a lot about it (4)

End of Block: Program Awareness

Start of Block: Home Energy Audit (HEA) Pilot

Q119 Were you planning on having a home energy audit BEFORE you learned about the program?

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (98)

Page Break

Q120 What were the most important reasons why you decided to get a Home Energy Audit?

- ☐ To learn more about how I use energy in my home (1)
- ☐ To learn how I can reduce my energy costs (2)
- ☐ To get free light bulbs/LEDs installed (3)
- ☐ To get free water-saving equipment installed (4)
- ☐ To improve home comfort (5)
- ☐ To improve the air quality in my home (or other health reason) (6)
- ☐ To learn how I can increase the value of my home (7)
- ☐ To help the environment (8)
- ☐ To learn how to become as energy efficient as my friends/neighbors (9)
- ☐ Contractor recommended it (10)
- ☐ I had one on a previous home (11)
- ☐ Other (please specify) (96)

_____

- ☐ ⊗ Don't know (98)

Page Break

Q121 How helpful did you find the recommendations and other information you received as a result of the Home Energy Audit?

- ○ Not at all helpful (1)
- ○ Slightly helpful (2)
- ○ Somewhat helpful (3)
- ○ Moderately helpful (4)
- ○ Extremely helpful (5)

Page Break

Display This Question:

If How helpful did you find the recommendations and other information you received as a result of th... = Not at all helpful

Q122 Why was that audit not helpful to you?

_____

Page Break

Q123 Since the home energy audit, would you say you have made all of the recommended energy efficiency improvements, made some of them, or not made any?

- ○ Made all (1)
- ○ Made some but not all (2)
- ○ Have not made any (3)
- ○ Don't know (98)

Page Break

Display This Question:

If Since the home energy audit, would you say you have made all of the recommended energy efficiency... = Made some but not all

Or Since the home energy audit, would you say you have made all of the recommended energy efficiency... = Have not made any

Q124 What are the main reasons you have not made those recommended improvements? Select all that apply.

- ☐ Cost (1)
- ☐ Do not have time (2)
- ☐ Waiting for current equipment to fail (3)
- ☐ Need help/Don't know how (4)
- ☐ Do not feel they need to be done (5)
- ☐ Recommended improvements will not save energy (6)
- ☐ Do not own the property (7)
- ☐ Need more information (8)
- ☐ Still planning to make improvements in the future (9)
- ☐ Other (please specify) (96) _____
- ☐ ⊗ Don't know (98)

Page Break

Q150 Are you interested in making additional energy efficiency improvements?

- Yes (1)
- No (2)
- I don't know (98)

Page Break

Display This Question:

If Are you interested in making additional energy efficiency improvements? = Yes

Q151 What additional improvements are you most interested in? Select all that apply

- ☐ Lighting (1)
- ☐ Space heating equipment (2)
- ☐ A/C tune-up (3)
- ☐ Smart thermostats (4)
- ☐ Low-flow faucet aerators (5)
- ☐ Low-flow showerheads (6)
- ☐ Water heating equipment (7)
- ☐ Advanced power strips (8)
- ☐ Efficient refrigerator (9)
- ☐ Efficient induction stove (10)
- ☐ Wall insulation, floor insulation, attic insulation (11)
- ☐ Efficient windows/doors (12)
- ☐ Energy efficient washer/dryer (13)
- ☐ Other – please specify (96)

_____

Page Break

Display This Question:

If LED_QTY > 0

Q1 Program records indicate the auditor installed ${e://Field/LED_QTY} LED light bulbs. Is that correct?

- Yes (1)
- No (2)
- Don't Know (98)

Display This Question:

If Program records indicate the auditor installed ${e://Field/LED_QTY} LED light bulbs. Is that corr... = No

Q2 How many LED light bulbs did you receive?

_____

Display This Question:

If Program records indicate the auditor installed ${e://Field/LED_QTY} LED light bulbs. Is that corr... = Yes

Or Or How many LED light bulbs did you receive? Text Response Is Greater Than 0

Q3 Are all the LED light bulbs you received currently in use and working properly?

- Yes (1)
- No (2)
- Don’t know (98)

Display This Question:

If Are all the LED light bulbs you received currently in use and working properly? = No

And Program records indicate the auditor installed ${e://Field/LED_QTY} LED light bulbs. Is that corr... = Yes

Q4 How many of the LED light bulbs are currently installed?

_____

Display This Question:

If If How many LED light bulbs did you receive? Text Response Is Greater Than 0

And Are all the LED light bulbs you received currently in use and working properly? = No

Q5 How many of those ${Q2/ChoiceTextEntryValue} LED light bulbs are currently installed?

_____

Display This Question:

If Are all the LED light bulbs you received currently in use and working properly? = No

Q6 Why aren't all the LED light bulbs still in use?

- ☐ Burnt out (1)
- ☐ Too bright (2)
- ☐ Not bright enough (3)
- ☐ Other (Please specify) (96) _____
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If SHOWER_QTY > 0

Q11 Program records indicate you received ${e://Field/SHOWER_QTY} showerhead(s). Is that correct?

- Yes (1)
- No (2)
- Don't know (98)

Display This Question:

If Program records indicate you received ${e://Field/SHOWER_QTY} showerhead(s). Is that correct? = No

Q12 How many low flow showerhead(s) did you receive?

_____

Display This Question:

If Program records indicate you received ${e://Field/SHOWER_QTY} showerhead(s). Is that correct? = Yes

Q13 How many of the ${e://Field/SHOWER_QTY} low flow showerhead(s) are currently installed?

_____

Display This Question:

If If How many low flow showerhead(s) did you receive? Text Response Is Greater Than 0

Q14 How many of the ${Q12/ChoiceTextEntryValue} low flow showerhead(s) are currently installed?

_____

Display This Question:

If If How many of the ${e://Field/SHOWER_QTY} low flow showerhead(s) are currently installed? Text Response Is Not Equal to ${e://Field/SHOWERHEAD_QTY}

Or If

If How many of the ${q://QID1214783894/ChoiceTextEntryValue} low flow showerhead(s) are currently in... Text Response Is Not Equal to ${q://QID1214783894/ChoiceTextEntryValue}

And And How many of the ${q://QID1214783894/ChoiceTextEntryValue} low flow showerhead(s) are currently in... Text Response Is Not Empty

Q191 Why aren't all showerhead(s) still installed? Select all that apply

- ☐ Not enough water pressure (1)
- ☐ Was not working properly (4)
- ☐ Liked my old aerator(s) better (5)
- ☐ Other – please explain (6) _____

Page Break

Display This Question:

If AERATOR_QTY > 0

Q15 Records indicate you received ${e://Field/AERATOR_QTY} faucet aerators(s). Is that correct?

- Yes (1)
- No (2)
- Don't know (98)

Display This Question:

If Records indicate you received ${e://Field/AERATOR_QTY} faucet aerators(s). Is that correct? = No

Q16 How many faucet aerator(s) did you receive through the program?

_____

Display This Question:

If Records indicate you received ${e://Field/AERATOR_QTY} faucet aerators(s). Is that correct? = Yes

Q17 How many of the ${e://Field/AERATOR_QTY} faucet aerator(s) are currently installed?

_____

Display This Question:

If If How many faucet aerator(s) did you receive through the program? Text Response Is Greater Than 0

Q18 How many of the ${Q16/ChoiceTextEntryValue} faucet aerator(s) are currently installed?

_____

Display This Question:

If If How many of the ${e://Field/AERATOR_QTY} faucet aerator(s) are currently installed? Text Response Is Not Equal to ${e://Field/AERATOR_QTY}

Or If

If How many of the ${q://QID1214783898/ChoiceTextEntryValue} faucet aerator(s) are currently installed? Text Response Is Not Equal to ${q://QID1214783898/ChoiceTextEntryValue}

And And How many of the ${q://QID1214783898/ChoiceTextEntryValue} faucet aerator(s) are currently installed? Text Response Is Not Empty

Q189 Why aren't the aerator(s) still installed? Select all that apply

- ☐ Not enough water pressure (1)
- ☐ Was not working properly (4)
- ☐ Liked my old aerator(s) better (5)
- ☐ Other – please explain (6) _____

Page Break

Q128 Have you participated in in any other residential programs through Avista since your home energy assessment?

- ☒ I have not participated in other residential programs through Avista (1)
- ☐ Water Heater program (2)
- ☐ HVAC program (3)
- ☐ Shell program (4)
- ☐ Fuel Efficiency Progtam (5)
- ☐ ENERGY STAR Homes Program (6)
- ☐ Income Qualified Program (7)
- ☐ Small Home & Multifamily Weatherization Program (8)
- ☐ Appliance Program (9)
- ☐ Multifamily Direct Install Program (10)
- ☐ Always on Home Energy Report Program (11)
- ☐ On Bill Repayment Program (12)
- ☐ Other (please specify) (96)

_____

Page Break

Display This Question:

If Have you participated in in any other residential programs through Avista since your home energy... != I have not participated in other residential programs through Avista

Q129 How influential were the recommendations you received from the Home Energy Audit for you to decide to participate in that program?

- Not at all influential (1)
- Slightly influential (2)
- Somewhat influential (3)
- Very influential (4)
- Extremely influential (5)
- Not sure (98)

Page Break

Q130 Do you have any suggestions about how Avista can improve the Home Energy Audit?

_____

_____

_____

_____

_____

End of Block: Home Energy Audit (HEA) Pilot

Start of Block: On-Bill Repayment (OBR) Pilot

Q132 Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repayment Program. Is this correct?

- Yes (1)
- No (2)
- I don't know (3)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q131 How did you first learn about the On Bill Repayment Program? Select all that apply

- ☐ Contractor (1)
- ☐ Program representative (4)
- ☐ Avista's website (5)
- ☐ Customer engagement portal (6)
- ☐ Word-of-mouth (7)
- ☐ Bill inserts or utility mailer (8)
- ☐ Email from Avista (9)
- ☐ Social media (10)
- ☐ Internet ad (11)
- ☐ Radio or TV ad (12)
- ☐ Print advertisement (13)
- ☐ Retailer (14)
- ☐ Other – please specify (15) _____
- ☐ ⊗ I don't know (16)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q133 Using a scale of 1 through 5, where 1 means "very difficult" and 5 means "very easy", how would you rate the process of enrolling in the On Bill Repayment program?

- 1 – Very difficult (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 – Very easy (5)
- I don't know (6)

Page Break

Display This Question:

If Using a scale of 1 through 5, where 1 means "very difficult" and 5 means "very easy", how would y... = 1 – Very difficult

Or Using a scale of 1 through 5, where 1 means "very difficult" and 5 means "very easy", how would y... = 2

Q134 Why was the enrollment process difficult?

_____

_____

_____

_____

_____

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q135 Using a scale of 1 through 5, where 1 means "Not at all satisfied" and 5 means "Very satisfied", how satisfied were you with the range of equipment that qualifies for financing?

- 1 - Not at all satisfied (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 - Very satisfied (5)
- I don't know (98)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q136 If the program financing was not available, how likely would you have been to purchase and install ${e://Field/OBR_MEASURE}?

- Not at all likely (1)
- Somewhat unlikely (2)
- Somewhat likely (3)
- Very likely (4)
- I don't know (5)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q137 With the availability of the financing options, did you purchase and install ${e://Field/OBR_MEASURE} sooner than you would have if the program was not available?

- Yes (1)
- No (2)
- I don't know (3)

Page Break

Display This Question:

If With the availability of the financing options, did you purchase and install ... = Yes

Q138 When would you have otherwise purchased and install ${e://Field/OBR_MEASURE}?

- Within 6 months (1)
- 7 months to 1 year (2)
- More than 1 year up to 2 years (3)
- More than 2 years up to 3 years (4)
- More than 3 years up to 5 years (5)
- More than 5 years (6)
- I don't know (7)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q140 Have you participated in in any other residential programs through Avista since your enrollment in the On Bill Repayment program?

- ○ Yes (please specify which program): (1) _____
- ○ No (2)

Page Break

Display This Question:

If Have you participated in in any other residential programs through Avista since your enrollment i... = Yes

(please specify which program):

Q139 How influential was the On Bill Repayment program in your decision to participate in that other program or programs?

- Not at all influential (1)
- Slightly influential (2)
- Somewhat influential (3)
- Very influential (4)
- Extremely influential (5)
- Not sure (6)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q141 Do you have any suggestions about how Avista can improve the On Bill Repayment program?

_____

_____

_____

_____

_____

End of Block: On-Bill Repayment (OBR) Pilot

Start of Block: Always On Home Energy Report

Q142 In the past six months, do you remember receiving an email alert from Avista about your always on energy use? "Always on" energy use refers to the energy used by appliances while they are plugged in, but turned off.

- Yes (1)
- No (2)
- I don't know/I am not sure (98)

Display This Question:

If In the past six months, do you remember receiving an email alert from Avista about your always on... = Yes

Q143 In general, what do you do when you receive an always on email alert?

- ○ Read them thoroughly and continue onto the website for more information (1)
- ○ Skim some of the content (2)
- ○ Glance at the pictures, graphs, or headlines (3)
- ○ I do not look at the alert at all (4)

Display This Question:

If In general, what do you do when you receive an always on email alert? = Read them thoroughly and continue onto the website for more information

Or In general, what do you do when you receive an always on email alert? = Skim some of the content

Or In general, what do you do when you receive an always on email alert? = Glance at the pictures, graphs, or headlines

Q144 After reviewing your always on alert, which of the following do you do? Select all that apply.

- ☐ Discuss one or more emails with others (1)
- ☐ Save one or more emails for reference (2)
- ☐ Started unplugging appliances when they are not in use (3)
- ☐ Installed advanced power strips (4)
- ☐ Visited Avista's website to learn more about your always on load" (5)
- ☐ Other (please specify) (6) _____
- ☐ ⊗ None of the above (7)

Display This Question:

If After reviewing your always on alert, which of the following do you do? Select all that apply. = Visited Avista's website to learn more about your always on load"

Q145 How helpful were the tips and information on Avista's website to help you identify and evaluate your always on load?

- ○ Not at all helpful (1)
- ○ Slightly helpful (2)
- ○ Somewhat helpful (3)
- ○ Moderately helpful (4)
- ○ Very helpful (9)

Q146 What other types of electric consumption would you be interested in learning more about and reducing? Please select all that apply.

- ☐ Water Heating (1)
- ☐ Space Heating (2)
- ☐ Space Cooling (3)
- ☐ Lighting (4)
- ☐ Laundry (5)
- ☐ Cooking (6)
- ☐ ⊗ None of the above (7)

Page Break

Q147 Would you prefer to receive

- ○ More frequent updates about specific energy use in your home (1)
- ○ Less frequent updates about specific energy use in your home (4)
- ○ About the same number of updates about specific energy use in your home (5)

Page Break

Q148 How would you suggest Avista improve efforts to help you save energy?

- ☐ Share more personalized information about your energy use (1)
- ☐ Provide larger financial incentives (2)
- ☐ Provide financial incentives for additional products (3)
- ☐ Other (please specify) (4) _____
- ☒ I don't know (5)

Q149 Since enrolling in the On Bill Repayment program have you noticed any changes in your utility bill from Avista?

- ○ Yes, it decreased (1)
- ○ Yes, it increased (2)
- ○ No change (3)
- ○ I don't know (4)

End of Block: Always On Home Energy Report

Start of Block: HVAC

Q10 In this section we will ask you about the **HVAC equipment** you installed.

Why did you select the model/type for your HVAC replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available/only choice (5)
- ☐ The contractor/retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

Q11 How old was your previous HVAC system at the time you installed the **${e://Field/HVAC_TYPE1}**?
(Your best estimate is fine.)

_____

Q12 What type of fuel did your old HVAC system use before installing the **${e://Field/HVAC_TYPE1}**?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Wood (3)
- ○ Oil (4)
- ○ Other, please specify (5) _____
- ○ I don't know (98)

Q13 Did the old, replaced HVAC system still work at the time you replaced it?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Q14 What type of fuel does your new **${e://Field/HVAC_TYPE1}** use?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Wood (3)
- ○ Oil (4)
- ○ Other, please specify (5) _____
- ○ I don't know (98)

Q15 Is the new **${e://Field/HVAC_TYPE1}** that you received a rebate for currently installed and working?

- ○ Yes (1)
- ○ No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- ○ No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- ○ No, it is not installed AND not working *(Please explain)* (4) _____
- ○ I don't know (98)

End of Block: HVAC

Start of Block: 2nd HVAC

Q16 In this section we will ask you about the **second HVAC equipment** you installed, which according to program records is a ${e://Field/HVAC_TYPE2}.

Why did you select the model/type for your HVAC replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available/only choice (5)
- ☐ The contractor/retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

Q17 How old was your previous HVAC system at the time you installed the **${e://Field/HVAC_TYPE2}**?
(Your best estimate is fine.)

_____

Q18 What type of fuel did your old HVAC system use before installing the **${e://Field/ HVAC_TYPE2}**?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Wood (3)
- ○ Oil (4)
- ○ Other, please specify (5) _____
- ○ I don't know (98)

Q19 Did the old, replaced HVAC equipment still work at the time you replaced it?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Q20 What type of fuel does your new **${e://Field/HVAC_TYPE2}** use?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Wood (3)
- ○ Oil (4)
- ○ Other, please specify (5) _____
- ○ I don't know (98)

Q21 Is the new **${e://Field/HVAC_TYPE2}** that you received a rebate for currently installed and working?

- ○ Yes (1)
- ○ No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- ○ No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- ○ No, it is not installed AND not working *(Please explain)* (4) _____
- ○ I don't know (98)

End of Block: 2nd HVAC

Start of Block: Clothes Dryer

Q22 In this section we will ask you about the **clothes dryer** you installed.

What type of clothes dryer did you have before installing your new ENERGY STAR-rated clothes dryer?

- ○ Standard efficiency clothes dryer (1)
- ○ ENERGY STAR rated clothes dryer (2)
- ○ A different clothes dryer (3)
- ○ I did not have a clothes dryer (4)
- ○ I don't know (98)

Display This Question:

If In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = Standard efficiency clothes dryer

Or In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = ENERGY STAR rated clothes dryer

Or In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = A different clothes dryer

Q23 Did the old, replaced clothes dryer still work at the time you replaced it?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Display This Question:

If In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = Standard efficiency clothes dryer

Or In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = ENERGY STAR rated clothes dryer

Or In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = A different clothes dryer

JS *

Q24 How old was your old, replaced clothes dryer at the time you installed the ENERGY STAR-rated clothes dryer?
(Your best estimate is fine.)

_____

X→

Q25 Is the new ENERGY STAR-rated clothes dryer that you received a rebate for currently installed and working?

- Yes (1)
- No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- No, it is not installed AND not working *(Please explain)* (4) _____
- I don't know (5)

End of Block: Clothes Dryer

Start of Block: Clothes Washer

X→

Q26 In this section we will ask you about the **clothes washer** you installed.

What type of clothes washer did you have before installing your new ENERGY STAR-rated clothes washer?

- ○ Standard efficiency clothes washer (1)
- ○ ENERGY STAR rated clothes washer (2)
- ○ A different clothes washer (3)
- ○ I did not have a clothes washer (4)
- ○ I don't know (98)

Display This Question:

If In this section we will ask you about the clothes washer you installed. What type of clothes wash... = Standard efficiency clothes washer

Or In this section we will ask you about the clothes washer you installed. What type of clothes wash... = ENERGY STAR rated clothes washer

Or In this section we will ask you about the clothes washer you installed. What type of clothes wash... = A different clothes washer

Q27 Did the old, replaced clothes washer still work at the time you replaced it?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Display This Question:

If In this section we will ask you about the clothes washer you installed. What type of clothes wash... = Standard efficiency clothes washer

Or In this section we will ask you about the clothes washer you installed. What type of clothes wash... = ENERGY STAR rated clothes washer

Or In this section we will ask you about the clothes washer you installed. What type of clothes wash... = A different clothes washer

JS *

Q28 How old was your old, replaced clothes washer at the time you installed the ENERGY STAR-rated clothes washer?
(Your best estimate is fine.)

_____

X→

Q29 Is the new ENERGY STAR-rated clothes washer that you received a rebate for currently installed and working?

- Yes (1)
- No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- No, it is not installed AND not working *(Please explain)* (4) _____
- I don't know (98)

End of Block: Clothes Washer

Start of Block: Refrigerator-Freezer combo

X→

Q30 In this section we will ask you about the **refrigerator-freezer** you installed.

What was the purpose of the new ENERGY STAR-rated refrigerator-freezer that you purchased?

- ○ A replacement for existing equipment in your home (1)
- ○ A new purchase, because you did not have a refrigerator and/or freezer in your home (2)
- ○ A purchase of an additional refrigerator-freezer for your home (3)

Display This Question:

If In this section we will ask you about the refrigerator-freezer you installed. What was the purpos... = A replacement for existing equipment in your home

Q31 What type of refrigerator-freezer did your new ENERGY STAR rated refrigerator-freezer replace?

- ○ Standard efficiency refrigerator-freezer (1)
- ○ ENERGY STAR rated refrigerator-freezer (2)
- ○ A stand-alone refrigerator only (3)
- ○ A stand-alone freezer only (4)
- ○ A different type of refrigerator-freezer (5)

Display This Question:

If In this section we will ask you about the refrigerator-freezer you installed. What was the purpos... = A replacement for existing equipment in your home

X→

Q32 Did the old, replaced refrigerator-freezer still work at the time you replaced it?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Display This Question:

If In this section we will ask you about the refrigerator-freezer you installed. What was the purpos... = A replacement for existing equipment in your home

JS ✱

Q33 How old was your old, replaced refrigerator-freezer at the time you installed the ENERGY STAR-rated refrigerator-freezer?
(Your best estimate is fine.)

_____

X→

Q34 Is the new ENERGY STAR-rated refrigerator-freezer that you received a rebate for currently installed and working?

- ○ Yes (1)
- ○ Yes (2)
- ○ No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (3) _____
- ○ No, it is not installed BUT it is working *(Please explain why it is not installed)* (4) _____
- ○ No, it is not installed AND not working *(Please explain)* (5) _____
- ○ I don't know (98)

End of Block: Refrigerator-Freezer combo

Start of Block: Stand-alone Freezer

Q35 In this section we will ask you about the **stand-alone freezer** you installed.

What type of stand-alone freezer did you have before installing your new ENERGY STAR-rated stand-alone freezer?

- ○ Standard efficiency freezer (1)
- ○ ENERGY STAR freezer (2)
- ○ A different type of freezer (3)
- ○ I did not have a stand-alone freezer (4)
- ○ I don't know (98)

Display This Question:

If In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = Standard efficiency freezer

Or In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = ENERGY STAR freezer

Or In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = A different type of freezer

Q36 Did the old, replaced stand-alone freezer still work at the time you replaced it?

- Yes (1)
- No (2)
- I don't know (98)

Display This Question:

If In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = Standard efficiency freezer

Or In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = ENERGY STAR freezer

Or In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = A different type of freezer

Q37 How old was your old, replaced stand-alone freezer at the time you installed the ENERGY STAR-rated stand-alone freezer?
(Your best estimate is fine.)

_____

Q38 Is the new ENERGY STAR-rated stand-alone freezer that you received a rebate for currently installed and working?

- ○ Yes (1)
- ○ No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- ○ No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- ○ No, it is not installed AND not working *(Please explain)* (4) _____
- ○ I don't know (98)

End of Block: Stand-alone Freezer

Start of Block: Water Heater

Q39 In this section we will ask you about the **water heater** you installed.

Why did you select the model/type for your water heater replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available/only choice (5)
- ☐ The contractor/retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

JS *

Q40 How old was your old, replaced water heater at the time you installed the **${e://Field/WH_TYPE1}**?
(Your best estimate is fine, please provide a numeric value.)

_____

Q41 What type of fuel did your old water heater use before installing the **${e://Field/WH_TYPE1}**?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Wood (3)
- ○ Oil (4)
- ○ Other, please specify (5) _____
- ○ I don't know (98)

Q42 Did the old, replaced water heater still work at the time you replaced it?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Q43 What type of fuel does your new **${e://Field/WH_TYPE1}** use?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Wood (3)
- ○ Oil (4)
- ○ Other, please specify (5) _____
- ○ I don't know (98)

Q44 Is the new **${e://Field/WH_TYPE1}** that you received a rebate for currently installed and working?

- ○ Yes (1)
- ○ No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- ○ No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- ○ No, it is not installed AND not working *(Please explain)* (4) _____
- ○ I don't know (98)

End of Block: Water Heater

Start of Block: 2nd WH

Q45 In this section we will ask you about the **second water heater** you installed, which according to program records is a ${e://Field/WH_TYPE2}.

Why did you select the model/type for your water heater replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available/only choice (5)
- ☐ The contractor/retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

JS *

Q46 How old was your old, replaced water heater at the time you installed the **${e://Field/WH_TYPE2}**?
(Your best estimate is fine.)

_____

Q47 What type of fuel did your old water heater use before installing the **${e://Field/WH_TYPE2}**?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Wood (3)
- ○ Oil (4)
- ○ Other, please specify (5) _____
- ○ I don't know (98)

Q48 Did the old, replaced water heater still work at the time you replaced it?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Q49 What type of fuel does your new **${e://Field/WH_TYPE2}** use?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Wood (3)
- ○ Oil (4)
- ○ Other, please specify (5) _____
- ○ I don't know (98)

Q50 Is the new **${e://Field/WH_TYPE2}** that you received a rebate for currently installed and working?

- ○ Yes (1)
- ○ No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- ○ No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- ○ No, it is not installed AND not working *(Please explain)* (4) _____
- ○ I don't know (98)

End of Block: 2nd WH

Start of Block: Smart Thermostat

Q51 In this section we will ask you about the smart thermostat you installed.

What type of thermostat did you have installed before installing a smart thermostat?

- ○ A programmable thermostat (not connected to Wi-Fi) that allows you to schedule the temperature settings for different times of day (1)
- ○ A standard thermostat that lets you set on/off temperatures (2)
- ○ A different Wi-Fi smart thermostat (3)
- ○ Did not previously have a thermostat (4)
- ○ I don't know (98)

Display This Question:

If In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A standard thermostat that lets you set on/off temperatures

Q52 You stated that the old thermostat was a standard thermostat that was not programmable. Did you manually change the temperature higher or lower when leaving the home or retiring for the night?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Q53 Who installed the smart thermostat that you received a rebate for?

- ○ Self- installed (1)
- ○ Contractor installed (2)
- ○ Other, please specify (3) _____

Q54 Is the smart thermostat connected to the internet?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Q55 What brand of smart thermostat do you have?

- ○ Nest (1)
- ○ Ecobee (2)
- ○ Honeywell (3)
- ○ Lennox iComfort (4)
- ○ Trane (5)
- ○ Emerson (6)
- ○ Bryant (7)
- ○ Carrier (8)
- ○ Other, please specify (9) _____
- ○ I don’t know (98)

Q56 Thinking about the smart thermostat that you received a rebate for, did you program a schedule to change the temperature setting at different times of day?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Q57 Do you let the smart thermostat manage the temperature of your home automatically?

- Yes (1)
- No (2)
- I don't know (98)

Q58 Which of the following best describes how often you make **manual** adjustments to the thermostat settings?

- Never (1)
- Once to a few times a month (2)
- Once to a few times a week (3)
- Once a day or more (4)
- I don’t know (98)

Q59 Do you have your thermostat set to run in 'away' or 'vacation mode' when you are not home?
Note your thermostat my refer to this feature by another name such as "home way assist," "smart away mode," or "smart away."

- ○ Yes (1)
- ○ No (2)
- ○ I am not aware of an "away mode" setting (3)
- ○ I don't know (98)

Display This Question:

If Do you have your thermostat set to run in 'away' or 'vacation mode' when you are not home?Note yo... = No

Q60 Why do you have “away mode” (or the similarly named featured on your smart thermostat) disabled?
(Please select all that apply.)

- ☐ I want my home to keep a comfortable temperature while I am gone (1)
- ☐ I am worried about privacy (2)
- ☐ I have pets that need to stay comfortable (3)
- ☐ I can’t figure out how to set it up (4)
- ☐ I have had problems with “away mode” (5)
- ☐ “Away mode” requires a smart phone connection and there are other people in my home who do not have phones connected to the thermostat (6)
- ☐ Someone is normally home (7)
- ☐ Other, please specify (8) _____

Display This Question:

If Do you have your thermostat set to run in ‘away’ or ‘vacation mode’ when you are not home?Note yo... = Yes

*

Q61 What temperature is your “away” setting for heating during the colder months?
(Please provide a numeric value.)

_____

Display This Question:

If Do you have your thermostat set to run in 'away' or 'vacation mode' when you are not home?Note yo... = Yes

Q62 What temperature is your "away" setting for cooling during the warmer months?
(Please provide a numeric value.)

_____

Display This Question:

If Do you have your thermostat set to run in 'away' or 'vacation mode' when you are not home?Note yo... = Yes

Q63 How is your thermostat set up to detect if you are home?

- ○ Thermostat occupancy sensor (1)
- ○ Phone location (2)
- ○ Both occupancy sensor and phone location (3)
- ○ I don't know (98)

Display This Question:

If TSTAT = 1

And HP = 1

And Who installed the smart thermostat that you received a rebate for? = Self- installed

Q64 Did you connect a C-wire to your thermostat when you installed it?

- ○ Yes (1)
- ○ Yes, but used an adapter kit (2)
- ○ No (3)
- ○ I don't know (98)

Q65 Which of the following does the smart thermostat control

- ○ Central Air Conditioning Only (1)
- ○ Heating System Only (2)
- ○ Both central air conditioning and heating (3)
- ○ I don't know (98)

Display This Question:

If Which of the following does the smart thermostat control = Heating System Only

Or Which of the following does the smart thermostat control = Both central air conditioning and heating

Q66 What type of heating system does your smart thermostat control in your home?

- Central heat pump (1)
- Electric baseboard (2)
- Electric furnace (3)
- Gas furnace (4)
- Oil furnace (5)
- Propane heater (6)
- None/ It does not control heating (7)
- I don’t know (98)

Display This Question:

If In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A programmable thermostat (not connected to Wi-Fi) that allows you to schedule the temperature settings for different times of day

Or In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A standard thermostat that lets you set on/off temperatures

Or In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A different Wi-Fi smart thermostat

Q67 Did your old, replaced thermostat still work at the time you replaced it?

- Yes (1)
- No (2)
- I don't know (98)

Display This Question:

If In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A programmable thermostat (not connected to Wi-Fi) that allows you to schedule the temperature settings for different times of day

Or In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A standard thermostat that lets you set on/off temperatures

Or In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A different Wi-Fi smart thermostat

JS *

Q68 How old was your thermostat at the time you replaced it?
(Your best estimate is fine.)

_____

X→

Q69 Is the new smart thermostat that you received a rebate for currently installed and working?

- Yes (1)
- No (2)
- I don't know (98)

Display This Question:

If Is the new smart thermostat that you received a rebate for currently installed and working? = No

X→

Q70 Why did you remove or replace the smart thermostat?
(Please select all that apply.)

- ☐ It was no longer working properly (1)
- ☐ I purchased a different, new smart thermostat that I like better (2)
- ☐ I liked my old thermostat better, so I re-installed it (3)
- ☐ I performed some remodeling or maintenance that required the removal of the smart thermostat (4)
- ☐ Other, please specify (5) _____
- ☐ ⊗ I don't know (98)

End of Block: Smart Thermostat

Start of Block: Heat Pump

Q71 In this section we will ask you about the **heat pump** you installed.

Why did you select the model/ type for your central heat pump replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available / only choice (5)
- ☐ The contractor / retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

Q72 Is the central heat pump that you received a rebate for currently installed and working?

- ○ Yes (1)
- ○ No, please explain: (2) _____
- ○ I don't know (98)

Q73 What type of equipment did you replace with the central heat pump you received a rebate for?

- ○ Cooling equipment only (1)
- ○ Heating equipment only (2)
- ○ Both cooling and heating equipment (3)
- ○ None - It was a new installation that did not replace any equipment. (4)
- ○ I I I don't know (98)

Display This Question:

If What type of equipment did you replace with the central heat pump you received a rebate for? = Heating equipment only

Or What type of equipment did you replace with the central heat pump you received a rebate for? = Both cooling and heating equipment

Q74 Did the central heat pump replacement that you received a rebate for replace an existing heating pump?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (3)

Display This Question:

If Did the central heat pump replacement that you received a rebate for replace an existing heating... = Yes

Q75 What type of heating system did you have before you installed the central heat pump replacement?

- ○ Electric resistance heating (1)
- ○ Air source heat pump (2)
- ○ Other, please specify (3) _____
- ○ No heating equipment (4)
- ○ I don't know (98)

Display This Question:

If Did the central heat pump replacement that you received a rebate for replace an existing heating... = Yes

Q76 Was your old, replaced heat pump functioning at the time of replacement?

- Functioning (1)
- Not functioning (2)
- I don't know (98)

Display This Question:

If Was your old, replaced heat pump functioning at the time of replacement? = Functioning

Q77 If you had not replaced the central heat pump, how much longer do you think it would have operated?

- Less than 2 years (1)
- 2 to 4 years (2)
- 5 to 10 years (3)
- More than 10 years (4)
- I don't know (98)

Q78 What is the approximate age of the central heat pump that was replaced?

_____

Q79 Around what year did you install the old central heat pump that you replaced?

- ○ Before 2006 (1)
- ○ Between 2006 and 2014 (2)
- ○ After 2014 (3)
- ○ I don't know (98)

End of Block: Heat Pump

Start of Block: Energy Star Doors

Q80 In this section we will ask you about the **ENERGY STAR doors** you installed.

Are the ENERGY STAR doors still installed?

- ○ Yes (1)
- ○ No, please explain: (2) _____

Q81 What type of door did your new ENERGY STAR door replace?

- ○ ENERGY STAR efficiency door (1)
- ○ Standard efficiency door (2)
- ○ I don’t know (98)

End of Block: Energy Star Doors

Start of Block: Contractor Satisfaction

Display This Question:

If CONTRACTOR = 1

Or Who installed the smart thermostat that you received a rebate for? = Contractor installed

Q82 Where did you find the contact information for the contractor that implemented the measure(s) you installed through the Residential Energy Efficiency Program?

- ○ **Avista** website (1)
- ○ A **Residential Energy Efficiency Program** representative referred you to the contractor (2)
- ○ The contractor was someone who you worked with before (3)
- ○ Through a personal contact *(e.g., family member, friend, colleague, neighbor, etc.)* (4)
- ○ Internet search (5)
- ○ Other, please specify (6) _____

Display This Question:

If CONTRACTOR = 1

Or Who installed the smart thermostat that you received a rebate for? = Contractor installed

X→

Q83 Did the contractor show you the discount you were receiving through **Residential Energy Efficiency Program** for implementing the measure(s) you installed?

- ○ Yes (1)
- ○ No (2)
- ○ I do not recall (98)

Display This Question:

If Who installed the smart thermostat that you received a rebate for? = Contractor installed

Or CONTRACTOR = 1

Q84 Please rate your agreement with the following statements regarding your experience with the contractor.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
The contractor was courteous and professional. (1)	○	○	○	○	○
The work was scheduled in a reasonable amount of time. (2)	○	○	○	○	○
The time it took to complete the work was reasonable. (3)	○	○	○	○	○

Display This Question:

If CONTRACTOR = 1

Or Who installed the smart thermostat that you received a rebate for? = Contractor installed

Q85 In addition to the work your contractor completed on the measure(s) installed through the program, did the contractor identify other energy saving opportunities in your house?

- ○ Yes (1)
- ○ No (2)
- ○ I don't recall (98)

Display This Question:

If In addition to the work your contractor completed on the measure(s) installed through the program... = Yes

Q86 What types of energy saving opportunities did the contractor suggest?

_____

End of Block: Contractor Satisfaction

Start of Block: Satisfaction

Q87 In this section of the survey, we will ask you questions about your satisfaction with the service and offerings related to Avista's Residential Energy Efficiency Program.

Q88 How interested are you in making improvements in your home that would...

	Not at all interested (1)	Somewhat interested (2)	Moderately interested (3)	Very interested (4)	Extremely interested (5)
Increase its energy efficiency? (1)	○	○	○	○	○
Improve your comfort? (2)	○	○	○	○	○
Improve your health and safety? (3)	○	○	○	○	○
Other benefits, please specify: (4)	○	○	○	○	○

Q89 What is the likelihood you would **install** insulation yourself if you were able to receive a rebate?

- ○ Not at all likely (1)
- ○ Somewhat likely (2)
- ○ Moderately likely (3)
- ○ Very likely (4)
- ○ Extremely likely (5)

Q90 How reliable is Avista as a source for information about saving energy in your home?

- ○ Not at all reliable (1)
- ○ Somewhat reliable (2)
- ○ Moderately reliable (3)
- ○ Very reliable (4)
- ○ Extremely reliable (5)

Q195 Did you contact CAP agency staff with questions about your project?

- ○ Yes (1)
- ○ No (2)

Page Break

Q91 Did you contact Avista staff with questions about completing your project?

- ○ Yes (1)
- ○ No (2)

Page Break

Q92 Did an Avista representative ever visit your home to inspect any work associated with your project?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Page Break

Q93 Please rate your satisfaction with the following:

Display This Choice:

If Did you contact Avista staff with questions about completing your project? = Yes

Display This Choice:

If Did you contact Avista staff with questions about completing your project? = Yes

Display This Choice:

If OBR = 0

Or HEA = 0

Display This Choice:

If CONTRACTOR = 1

Or Who installed the smart thermostat that you received a rebate for? = Contractor installed

Display This Choice:

If Who installed the smart thermostat that you received a rebate for? = Contractor installed

Or CONTRACTOR = 1

Display This Choice:

If Did an Avista representative ever visit your home to inspect any work associated with your project? = Yes

Display This Choice:

If Did an Avista representative ever visit your home to inspect any work associated with your project? = Yes

Display This Choice:

If Did you contact CAP agency staff with questions about your project? = Yes

Display This Choice:

If Did you contact CAP agency staff with questions about your project? = Yes

Display This Choice:

If Did you contact CAP agency staff with questions about your project? = Yes

	Very dissatisfied (1)	Somewhat dissatisfied (2)	Neither dissatisfied nor satisfied (3)	Somewhat satisfied (4)	Very satisfied (5)
Display This Choice: *If Did you contact Avista staff with questions about completing your project? = Yes* How long it took program staff to address your questions or concerns (1)	○	○	○	○	○
Display This Choice: *If Did you contact Avista staff with questions about completing your project? = Yes* How thoroughly program staff addressed your questions or concerns (2)	○	○	○	○	○
The program participation process (3)	○	○	○	○	○
Display This Choice: *If OBR = 0* *Or HEA = 0* The rebate amount you received (16)	○	○	○	○	○

The rebate amount you received (5)	○	○	○	○	○
Display This Choice: *If CONTRACTOR = 1* *Or Who installed the smart thermostat that you received a rebate for? = Contractor installed* The contractor who you worked with (13)	○	○	○	○	○
Display This Choice: *If Who installed the smart thermostat that you received a rebate for? = Contractor installed* *Or CONTRACTOR = 1* The quality of the work provided by the contractor (6)	○	○	○	○	○

Display This Choice: *If Did an Avista representative ever visit your home to inspect any work associated with your project? = Yes* The process of scheduling the inspection (7)	○	○	○	○	○
Display This Choice: *If Did an Avista representative ever visit your home to inspect any work associated with your project? = Yes* The process of conducting the inspection (8)	○	○	○	○	○
Display This Choice: *If Did you contact CAP agency staff with questions about your project? = Yes* How long it took the CAP agency to address your questions or concerns (17)	○	○	○	○	○

Display This Choice: If Did you contact CAP agency staff with questions about your project? = Yes How thoroughly the CAP agency addressed your questions or concerns (18)	○	○	○	○	○
Display This Choice: If Did you contact CAP agency staff with questions about your project? = Yes Overall performance of the CAP agency you worked with (19)	○	○	○	○	○
The program overall (9)	○	○	○	○	○

Page Break

Display This Question:

If Please rate your satisfaction with the following: [Very dissatisfied] (Count) > 0

Or Please rate your satisfaction with the following: [Somewhat dissatisfied] (Count) > 0

Q94 You indicated some dissatisfaction. Please provide details about why you were dissatisfied.

_____

Page Break

Q95 How satisfied are you with Avista as your energy service provider?

- ○ Very dissatisfied (1)
- ○ Somewhat dissatisfied (2)
- ○ Neither dissatisfied nor satisfied (3)
- ○ Somewhat satisfied (4)
- ○ Very satisfied (5)

Q96 How has your participation in Avista's Energy Efficiency Programs changed your satisfaction with Avista?

- ○ Greatly decreased your satisfaction with Avista (1)
- ○ Somewhat decreased your satisfaction with Avista (2)
- ○ Did not affect your satisfaction with Avista (3)
- ○ Somewhat increased your satisfaction with Avista (4)
- ○ Greatly increased your satisfaction with Avista (5)

Q97 How likely is it that you would recommend the Avista's Energy Efficiency Programs to a friend, relative, or colleague?

- ○ Not at all likely (1)
- ○ Somewhat likely (2)
- ○ Moderately likely (3)
- ○ Very likely (4)
- ○ Extremely likely (5)

Page Break

Q98 Please rate your level of health and safety concern with allowing contractors or others into your home for the following:

	Not at all concerned (1)	Somewhat concerned (2)	Moderately concerned (3)	Very concerned (4)	Extremely concerned (5)
Repairs/maintenance of equipment (1)	○	○	○	○	○
Identifying energy savings opportunities (2)	○	○	○	○	○

Page Break

Display This Question:

If Please rate your level of health and safety concern with allowing contractors or others into your... [Not at all concerned] (Count) < 2

Q99 You indicated some health and safety concerns about allowing contractors or others into your home. What are the reasons for your concern?
(Please select all that apply.)

- ☐ COVID-19 (1)
- ☐ Concerns about other transmissible diseases (2)
- ☐ Personal safety concerns (3)
- ☐ Other, please specify (4) _____
- ☐ ⊗ No specify reasoning (98)
- ☐ ⊗ Prefer not to answer (99)

End of Block: Satisfaction

Start of Block: Willingness to Pay

Q100 How likely would you have been to complete the same energy efficiency upgrades, if the incentive was **75%** of what you received?

- ○ Very unlikely (1)
- ○ Somewhat unlikely (2)
- ○ Neither likely nor unlikely (3)
- ○ Somewhat likely (4)
- ○ Very likely (5)

Display This Question:

If How likely would you have been to complete the same energy efficiency upgrades, if the incentive... = Very unlikely

Q101 How likely would you have been to complete the same energy efficiency upgrades, if the incentive was **50%** of what you received?

- ○ Very unlikely (1)
- ○ Somewhat unlikely (2)
- ○ Neither likely nor unlikely (3)
- ○ Somewhat likely (4)
- ○ Very likely (5)

Display This Question:

If How likely would you have been to complete the same energy efficiency upgrades, if the incentive... = Very unlikely

Q102 How likely would you have been to complete the same energy efficiency upgrades, if the incentive was **25%** of what you received?

- ○ Very unlikely (1)
- ○ Somewhat unlikely (2)
- ○ Neither likely nor unlikely (3)
- ○ Somewhat likely (4)
- ○ Very likely (5)

End of Block: Willingness to Pay

Start of Block: Demographics

Q103 This last set of questions will help Avista develop more effective programs that may best serve the needs of the community. Your answers will remain anonymous and aggregated, so no information will be linked with you or your household. You may choose “Prefer not to answer.”

Do you own or rent the home at **${e://Field/ADDRESS}**?

- ○ Own (1)
- ○ Rent (2)
- ○ Own and rent to someone else (3)
- ○ I don’t know (98)
- ○ Prefer not to answer (99)

Display This Question:

If This last set of questions will help Avista develop more effective programs that may best serve t... = Own

Or This last set of questions will help Avista develop more effective programs that may best serve t... = Own and rent to someone else

Q104 When was your home built?

- Before 1950 (1)
- 1950 to 1959 (2)
- 1960 to 1969 (3)
- 1970 to 1979 (4)
- 1980 to 1989 (5)
- 1990 to 1999 (6)
- 2000 to 2009 (7)
- 2010 to 2019 (8)
- 2020 to Present (9)
- I don't know (98)
- Prefer not to answer (99)

Q105 How many square feet is your home?
(Your best estimate is fine.)

- ○ Square Feet: (1) _____
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Q106 What is the main fuel used to heat your home?

- ○ Electricity (1)
- ○ Natural Gas (2)
- ○ Propane (3)
- ○ Other, please specify (4) _____
- ○ I don't heat my home (5)
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Q107 Do you use a central air conditioning system in your home?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Display This Question:

If Do you use a central air conditioning system in your home? = Yes

Q108 Is the central air conditioning system part of a heat pump?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Q109 What type of fuel does your water heater use?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Propane (3)
- ○ Other, please specify (4) _____
- ○ None (5)
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Q110 Which best describes your home?

- ○ Single-family house detached (1)
- ○ Single-family house attached to one or more other houses *(e.g., duplex, condominium, townhouse, etc.)* (2)
- ○ Mobile or manufactured home (3)
- ○ Apartment with 2 to 4 units (4)
- ○ Apartment with 5+ units (5)
- ○ Other, please specify (6) _____
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Q111 Including yourself, how many people live in your house year-round?

▼ 1 person (1) ... Prefer not to answer (99)

Q112 What is your age?

▼ 18 to 24 (1) ... Prefer not to answer (99)

Display This Question:

If What is your age? = 18 to 24

Or What is your age? = 25 to 34

Or What is your age? = 35 to 44

Or What is your age? = 45 to 54

Or What is your age? = 55 to 64

Q113 Is any member of your household age 65 or older?

- Yes (1)
- No (2)
- Prefer not to answer (99)

Q114 Including all money earned from wages, salaries, tips, commissions, workers' compensation, unemployment insurance, child support, or other sources, about how much was your total annual household income before taxes in 2022?

▼ Less than $10,000 (1) ... Prefer not to answer (99)

Q115 What is the highest level of education you have completed?

- ○ Did not graduate high school (1)
- ○ High school graduate (2)
- ○ Associates degree, vocation/ technical school, or some college (3)
- ○ Four-year college degree (4)
- ○ Graduate or professional degree (5)
- ○ Prefer not to answer (99)

End of Block: Demographics

Start of Block: Incentive

Q116 This is the end of the survey. As a thank you for your time answering our questions, we would like to provide you a $20 gift card for all respondents that qualify.

The email address we have for you is **${e://Field/EMAIL}**. Please let us know if you would like us to send your electronic gift card to this address or a different address.

- ○ Please send my electronic gift card to the **above** email address (1)
- ○ Please send my electronic gift card to the **following** email address: (2)

_____

End of Block: Incentive

6.1.2 Residential MFDI Survey (Property Managers)

Avista- Residential Participant Survey (MFDI)

Start of Block: Screener

QA What is your name?

_____

QB What is the name of the building you manage?

_____

QC How many units are in the building you manage?

_____

Q1 To start off this survey, we will ask you about your participation in the program.

Our program records indicate that your apartment building participated in one of Avista's Residential Energy Efficiency Program in 2022. Is that correct?

- ○ Yes (1)
- ○ No (4)

Skip To: End of Survey If To start off this survey, we will ask you about your participation in the program. Our program re... = No

End of Block: Screener

Start of Block: Program Awareness

Q2 In this section we will ask you questions about your awareness of the program.

How did you learn about **Avista's Residential Energy Efficiency Program**?
(Please select all that apply.)

- ☐ Mailed information from Avista (1)
- ☐ Email from Avista (2)
- ☐ Newspaper or magazine article or advertisement (3)
- ☐ Contractor (4)
- ☐ Community Action Program (CAP Agency) (5)
- ☐ Tribal Housing Authority (6)
- ☐ Food Bank (7)
- ☐ Energy fair or other community events (8)
- ☐ Word of mouth from a personal contact *(e.g., family member, friend, neighbor, colleague, etc.)* (9)
- ☐ Radio advertisement (10)
- ☐ Utility bill message (11)
- ☐ Utility website (12)
- ☐ Another website (13)
- ☐ Social media*(i.e., Facebook, Instagram, Twitter, Tik Tok, etc.)* (14)

- ☐ Avista program staff (15)
- ☐ Information at a retailer (16)
- ☐ Other, please specify: (96) _____

Q3 How much did each of the following contribute to your decision to install the energy efficient equipment you received through the program?

	Not at all (1)	A little (2)	A moderate amount (3)	A lot (4)	A great deal (5)	Not applicable (97)
Reducing your monthly utility bill (1)	○	○	○	○	○	○
Helping the environment (2)	○	○	○	○	○	○
Other benefits, please specify: (3)	○	○	○	○	○	○

Q4 When thinking about purchasing/installing the energy efficient equipment you received through the program, what sources of information where important in your decision making?
(Please select all that apply.)

- ☐ Contractor recommendation (1)
- ☐ Utility recommendation or information (2)
- ☐ Recommendation from a person contact *(e.g., family member, friend, neighbor, colleague, etc.)* (3)
- ☐ Other, please specify: (96) _____
- ☒ None of the above (97)
- ☒ I don't know (98)

Q5 How important was the Avista funding in your decision to install the energy efficient equipment you received through the program?

- ○ Not at all important (1)
- ○ Somewhat important (2)
- ○ Moderately important (3)
- ○ Very important (4)
- ○ Extremely important (5)

Q6 What is your level of awareness about Avista's home audit/assessment program?

- ○ I have never heard of it before now (1)
- ○ I have heard of it but don't know anything about it (2)
- ○ I know a little about it (3)
- ○ I know a lot about it (4)

End of Block: Program Awareness

Start of Block: Satisfaction

Q7 In this section of the survey, we will ask you questions about your satisfaction with the service and offerings related to Avista's Residential Energy Efficiency Program.

How interested are you in making improvements in your home that would...

	Not at all interested (1)	Somewhat interested (2)	Moderately interested (3)	Very interested (4)	Extremely interested (5)
Increase its energy efficiency? (1)	○	○	○	○	○
Improve your comfort? (2)	○	○	○	○	○
Improve your health and safety? (3)	○	○	○	○	○

Q8 What is the likelihood you would **install** insulation yourself if you were able to receive a rebate?

- ○ Not at all likely (1)
- ○ Somewhat likely (2)
- ○ Moderately likely (3)
- ○ Very likely (4)
- ○ Extremely likely (5)

Q9 How reliable is Avista as a source for information about saving energy in your home?

- ○ Not at all reliable (1)
- ○ Somewhat reliable (2)
- ○ Moderately reliable (3)
- ○ Very reliable (4)
- ○ Extremely reliable (5)

Q10 Did you contact Avista staff with questions about completing your project?

- ○ Yes (1)
- ○ No (2)

Q12 Did an Avista representative ever visit your building to inspect any work associated with your project?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Q13 Please rate your satisfaction with the following:

	Very dissatisfied (1)	Somewhat dissatisfied (2)	Neither dissatisfied nor satisfied (3)	Somewhat satisfied (4)	Very satisfied (5)	N/A (6)
The program participation process (3)	○	○	○	○	○	○
Energy saving equipment you received (4)	○	○	○	○	○	○
The contractor who did the installation (5)	○	○	○	○	○	○
The process of scheduling the inspection (7)	○	○	○	○	○	○
The program overall (10)	○	○	○	○	○	○

Display This Question:

If Please rate your satisfaction with the following: [Very dissatisfied] (Count) > 0

Or Please rate your satisfaction with the following: [Somewhat dissatisfied] (Count) > 0

Q14 You indicated some dissatisfaction. Please provide details about why you were dissatisfied.

_____

Q15 How satisfied are you with Avista as your energy service provider?

- ○ Very dissatisfied (1)
- ○ Somewhat dissatisfied (2)
- ○ Neither dissatisfied nor satisfied (3)
- ○ Somewhat satisfied (4)
- ○ Very satisfied (5)

Q16 How has your participation in Avista's Residential Energy Efficiency Program changed your satisfaction with Avista?

- ○ Greatly decreased your satisfaction with Avista (1)
- ○ Somewhat decreased your satisfaction with Avista (2)
- ○ Did not affect your satisfaction with Avista (3)
- ○ Somewhat increased your satisfaction with Avista (4)
- ○ Greatly increased your satisfaction with Avista (5)

Q17 How likely is it that you would recommend the Avista Residential Energy Efficiency Program to a friend, relative, or colleague?

- ○ Not at all likely (1)
- ○ Somewhat likely (2)
- ○ Moderately likely (3)
- ○ Very likely (4)
- ○ Extremely likely (5)

End of Block: Satisfaction

Start of Block: Incentive

Q33 This is the end of the survey. As a thank you for your time answering our questions, we would like to provide you a $10 gift card for all respondents that qualify.

Please let us know what email you would like us to send your electronic gift card to.

_____

End of Block: Incentive

6.1.3 Residential Non-Participant Survey

Avista Residential Nonparticipant

Start of Block: Default Question Block

Q2 Welcome! Thanks for agreeing to provide your feedback about your experience using Avista's service and programs. Your feedback is very important to us and will help us improve programs for customers like you. This survey should take about 15 minutes. Your responses are confidential and will be used for research purposes only. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. Upon completion of the survey we will collect your email address to send a $10 electronic gift card as a token of our thanks.

To start, we have a few questions about your awareness of some of Avista's programs and services.

Page Break

Q1 According to program records, Avista provides electric and/or gas services to your residence at ${e://Field/ADDRESS}. Is that correct?

- ○ Yes (1)
- ○ Yes, but address is incorrect (please write in correct address) (2)
  _____
- ○ No (3)

End of Block: Default Question Block

Start of Block: Block 2

Q3 To the best of your knowledge have you had a home energy assessment, HVAC tune-up, or replaced or upgraded equipment that requires electricity, in the last three years? This could have been related to lighting, HVAC, or refrigeration equipment.

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (98)

Page Break

Display This Question:

If To the best of your knowledge have you had a home energy assessment, HVAC tune-up, or replaced or... = Yes

Q4 What types of services or equipment upgrades have you done in the last three years? Select all that apply

- ☐ Lighting (1)
- ☐ HVAC equipment (98)
- ☐ A/C tune-up (99)
- ☐ Smart thermostat(s) (100)
- ☐ Low flow faucet aerator(s) (101)
- ☐ Low flow showerhead(s) (102)
- ☐ Advanced power strip(s) (103)
- ☐ Home energy assessment (104)
- ☐ Other – please specify (105) _____

Page Break

Display This Question:

If To the best of your knowledge have you had a home energy assessment, HVAC tune-up, or replaced or... = Yes

Q5 Did you receive an incentive from Avista for any of those upgrades or services?

- Yes (1)
- No (2)
- I don't know (98)

End of Block: Block 2

Start of Block: Block 1

Q7 Before today, have you heard that Avista offers a Residential Energy Efficiency Program?

- Yes (1)
- No (2)
- I don’t know (98)

Page Break

Display This Question:

If Before today, have you heard that Avista offers a Residential Energy Efficiency Program? = Yes

Q8 How did you learn about Avista's energy efficiency program offerings? Select all that apply

- ☐ Mailed information from Avista (1)
- ☐ Email from Avista (2)
- ☐ Newspaper or magazine article or advertisement (3)
- ☐ Contractor (4)
- ☐ Word of mouth from a personal contact (e.g., family member, friend, neighbor, colleague, etc.) (5)
- ☐ Radio advertisement (6)
- ☐ Utility bill message (7)
- ☐ Utility website (8)
- ☐ Another website (9)
- ☐ Social media (i.e., Facebook, Instagram, Twitter, Tik Tok, etc.) (10)
- ☐ Avista program staff (11)
- ☐ Information at a retailer (12)
- ☐ Other, please specify (13) _____
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If Before today, have you heard that Avista offers a Residential Energy Efficiency Program? = Yes

Q9 What programs or services were you already aware of? Select all that apply

- ☐ Incentives to replace inefficient equipment in your home (1)
- ☐ Incentives to incorporate energy efficiency into new construction designs (2)
- ☐ Incentives for heating and cooling equipment (3)
- ☐ Free home energy audit (4)
- ☐ Other – please specify (5) _____
- ☐ ⊗ Don't know (6)

Page Break

Q10 Are you interested in making any energy efficiency upgrades and participating in any of Avista's energy efficiency programs?

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (98)

Page Break

X→

Q11 What energy efficiency upgrades or programs are you interested in? Select all that apply

- ☐ Lighting (1)
- ☐ HVAC equipment (2)
- ☐ HVAC fuel switching (3)
- ☐ Water heater (4)
- ☐ Water heater conversion (5)
- ☐ Smart thermostats (6)
- ☐ Low flow faucet aerators (7)
- ☐ Low flow showerheads (8)
- ☐ ENERGY STAR Homes Program (9)
- ☐ ENERGY STAR Room Air Conditioners (10)
- ☐ Home energy audit or assessment (11)
- ☐ ENERGY STAR Appliances (e.g., washer, dryer, refrigerator, freezer) (12)
- ☐ Home weatherization (e.g., pipe wrap insulation, attic insulation, insulated door) (13)
- ☐ On Bill Repayment Program (14)

☐ Always On Home Energy Report Program (15)

☐ Other – please specify (96)

_____

☐ ⊗ Don't know (98)

Page Break

Q12 On a scale of 1 through 5, where 1 means “not at all interested” and 5 means “very interested”, how interested are you in participating in Avista’s energy efficiency programs?

- ○ 1 – Not at all interested (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 – Very interested (5)
- ○ Don’t know (98)

Page Break

Q6 What might prevent you from participating in Avista's programs? Select all that apply

- ☐ Don't know enough about the program (1)
- ☐ Energy savings from the equipment replacements or upgrades was not worth the trouble (2)
- ☐ Unlikely to replace any equipment (3)
- ☐ Too much time or trouble required to fill out the required paperwork (4)
- ☐ Incentives are not high enough to offset the cost of high efficiency equipment, compared to standard efficiency equipment (5)
- ☐ Prefer not to deal with Avista (6)
- ☐ I am financially able to make the upgrades without the incentives (7)
- ☐ Not interested in what Avista is offering (8)
- ☐ Don't have the authority to participate in any of the Avista programs (9)
- ☐ Other – please specify (96)

_____

- ☐ ⊗ Don't know (98)

Page Break

Q14 We understand that it is not always possible to make improvements and energy efficiency upgrades to your home. Which of the following best describes your authority to make decisions?

- ○ No authority – as a renter I am not permitted to make improvements and energy efficiency upgrades (1)
- ○ Some authority – as a renter I am permitted to make some improvements or upgrades (2)
- ○ Full authority – I am the owner (3)
- ○ Full authority – as part of my rental agreement I am required to maintain/repair the home (4)
- ○ Don't know (98)

Page Break

Q15 What do you feel is the largest energy consumer in your home?

- ○ Computer equipment (1)
- ○ Refrigeration (2)
- ○ HVAC (3)
- ○ Lighting (4)
- ○ Other – please specify (96) _____
- ○ Don't know (98)

Page Break

Q16 Are you aware of the current lighting type(s) installed in your home?

- ○ Yes (1)
- ○ No (2)

Page Break

Display This Question:

If Are you aware of the current lighting type(s) installed in your home? = Yes

Q17 Which of the following lighting technologies are currently installed? Select all that apply

- ☐ Incandescent (1)
- ☐ Halogen (2)
- ☐ Fluorescent (3)
- ☐ CFL bulbs or fluorescent tubes (4)
- ☐ LED (5)

Page Break

Q18 Is your home air conditioned?

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (98)

Page Break

Display This Question:

If Is your home air conditioned? = Yes

Q19 What type of A/C do you currently have in your home?

- ○ Central A/C (1)
- ○ Heat pump (2)
- ○ Mini-split (3)
- ○ Wall or window mounted A/C unit (4)
- ○ Don't know (98)

Page Break

Display This Question:

If What type of A/C do you currently have in your home? != Don't know

Q20 Approximately how old is the air conditioning system?

- ○ Less than 10 years old (1)
- ○ 10 to 20 years old (2)
- ○ More than 20 years old (3)
- ○ Don't know (98)

Page Break

Q21 What type of heating system do you currently have in your home?

- Electric resistance (i.e. baseboard) (1)
- Gas furnace (2)
- Heat pump (3)
- Mini-split (4)
- Don’t heat the home (5)
- Don’t know (98)

Page Break

Display This Question:

If What type of heating system do you currently have in your home? != Don't know

And What type of heating system do you currently have in your home? != Don't heat the home

Q22 Approximately how old is the heating system?

- ○ Less than 10 years old (1)
- ○ 10 to 20 years old (2)
- ○ More than 20 years old (3)
- ○ Don't know (98)

Page Break

Display This Question:

If What type of heating system do you currently have in your home? != Don't heat the home

Q23 When was the last time your heating and/or cooling system was serviced?

- ○ Less than 1 year ago (1)
- ○ 1 to 3 years ago (2)
- ○ More than 3 years ago (3)
- ○ It's never been serviced (4)
- ○ Don't know (98)

Page Break

Q24 What type of thermostat do you use?

- ○ Manual (1)
- ○ Programmable (2)
- ○ Smart thermostat (3)
- ○ Don't know (98)

Page Break

Q25 This last set of questions will help Avista develop more effective programs that may best serve the needs of the community. Your answers will remain anonymous and aggregated, so no information will be linked with you or your household. You may choose “Prefer not to answer.”

Page Break

Q41 What type of energy services do you receive from Avista? *Please select all that apply*

- ☐ Electricity (1)
- ☐ Natural gas (2)

Page Break

Q26 Do you own or rent the home at ${e://Field/ADDRESS}?

- Own (1)
- Rent (2)
- Own and rent to someone else (3)
- Don’t know (98)
- Prefer not to answer (99)

Page Break

Display This Question:

If Do you own or rent the home at ${e://Field/ADDRESS}? = Own

Or Do you own or rent the home at ${e://Field/ADDRESS}? = Own and rent to someone else

Q32 When was your home built?

- Before 1950 (1)
- 1950 to 1959 (2)
- 1960 to 1969 (3)
- 1970 to 1979 (4)
- 1980 to 1989 (5)
- 1990 to 1999 (6)
- 2000 to 2009 (7)
- 2010 to 2019 (8)
- 2020 to Present (9)
- Don't know (98)
- Prefer not to answer (99)

Page Break

Q33 How many square feet is your home? (Your best estimate is fine)

_____

Page Break

Q34 What is the main fuel used to heat your home?

- ○ Electricity (1)
- ○ Natural Gas (2)
- ○ Propane (3)
- ○ Pellet/wood stove (100)
- ○ Other, please specify (4) _____
- ○ I don't heat my home (5)
- ○ Don't know (98)
- ○ Prefer not to answer (99)

Page Break

Q35 Do you use a central air conditioning system in your home?

- ○ Yes (1)
- ○ No (4)
- ○ Don't know (5)
- ○ Prefer not to answer (6)

Page Break

Display This Question:

If Do you use a central air conditioning system in your home? = Yes

Q36 Is the central air conditioning system part of a heat pump?

- Yes (1)
- No (2)
- Don't know (98)
- Prefer not to answer (99)

Page Break

Q37 What type of fuel does your water heater use?

- ○ Natural Gas (1)
- ○ Electricity (2)
- ○ Propane (3)
- ○ Other, please specify (4) _____
- ○ None (5)
- ○ Don't know (98)
- ○ Prefer not to answer (99)

Page Break

Q38 Which best describes your home?

- ○ Single-family house detached (1)
- ○ Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.) (2)
- ○ Mobile or manufactured home (3)
- ○ Apartment with 2 to 4 units (4)
- ○ Apartment with 5+ units (5)
- ○ Other, please specify (6) _____
- ○ Don't know (98)
- ○ Prefer not to answer (99)

Page Break

Q39 Including yourself, how many people live in your house year-round?

- 1 person (1)
- 2 people (2)
- 3 people (3)
- 4 people (4)
- 5 people (5)
- 6 people (6)
- 7 people (7)
- 8 or more people (8)
- Prefer not to answer (99)

Page Break

Q40 What is your age?

- 18 to 24 (1)
- 25 to 34 (2)
- 35 to 44 (3)
- 45 to 54 (4)
- 55 to 64 (5)
- 65 to 75 (6)
- 75 or older (7)
- Prefer not to answer (99)

Page Break

Q42 Is there anything else you would like Avista to know?

_____

_____

_____

_____

_____

Page Break

Q30 Thank you for taking the time to provide us with this valuable information. As a thank you for completing this survey, we will send you a $10 gift card. You should expect to receive your gift card within 5-10 business days via email. Please be sure to check your spam and junk folders. To confirm, the correct email address to send the gift card to is ${e://Field/EMAIL}?

- ○ Please send my electronic gift card to the above email address (1)
- ○ Please send my electronic gift card to the following email address: (2)

_____

End of Block: Block 1

6.1.4 Nonresidential Participant Survey

Avista - Nonresidential Participant Survey

Start of Block: Screening

Q77 Welcome! Thank you for taking this survey to tell us about your experience with Avista's Non-Residential programs! Your feedback is very important to us and will help us improve programs for customers like you. This survey should take about 15 minutes. Your responses are confidential and will be used for research purposes only. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. Upon completion of the survey we will collect your email address to send a $20 electronic gift card as a token of our thanks.

Q1 Our program records indicate your organization received a rebate through Avista's **${e://Field/PROGRAM}** Program for installing **${e://Field/ALL_MEASURES}**. Is that correct?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Our program records indicate your organization received a rebate through Avista's ... = No

Q2 Is there someone else in your business who may be able to answer questions about your business's participation in the program?

- Yes (1)
- No (2)

Skip To: End of Block If Is there someone else in your business who may be able to answer questions about your business's... = No

Display This Question:

If Is there someone else in your business who may be able to answer questions about your business's... = Yes

Q3 Can you provide me with their contact information?

- Name (1) _____
- Phone Number (2) _____
- Email (3) _____

End of Block: Screening

Start of Block: Background

Q4 Which of the following most closely represents your job title/ role?
(Note, if your job title/role is not listed below please use "Other, please specify.")

- ○ Facilities Manager (1)
- ○ Energy Manager (2)
- ○ Other facilities management/ maintenance position (3)
- ○ Chief Financial Officer (4)
- ○ Other financial/ administrative position (5)
- ○ Proprietor/ Owner (6)
- ○ President/ CEO (7)
- ○ Manager (8)
- ○ Other, please specify: (9) _____

Q5 Does your company have any of the following policies or procedures in place?

	Yes (1)	No (2)	I don't know (98)
A person or people responsible for monitoring and/ or managing energy usage (1)	○	○	○
Defined energy savings goals (2)	○	○	○
A specific policy requiring that energy efficiency be considered when purchasing equipment (3)	○	○	○
Carbon reduction goals (4)	○	○	○

Q6 How did you **FIRST** learn about Avista's rebates for efficient equipment upgrades?

- ○ From a contractor, equipment vendor, or energy consultant (1)
- ○ From an Avista account representative (2)
- ○ From a program representative or Avista staff member (3)
- ○ From a search engine (Google, Yahoo, Bing, etc.) (4)
- ○ At an event or tradeshow (5)
- ○ Received an email blast or electronic newsletter (6)
- ○ Received an informational brochure (7)
- ○ From Avista's website (8)
- ○ From a personal contact (e.g., friend, family member, colleague, neighbor, etc.) (9)
- ○ Other, please specify: (10) _____
- ○ I don't know (98)

Q7 How long have you known about Avista's commercial rebates program?

- Less than a year (1)
- More than 1 year to 2 years (2)
- More than 2 years to 3 years (3)
- More than 3 years (4)
- I don't know (98)

Q8 Besides the rebate for installing **${e://Field/ALL_MEASURES}**, are you aware of any other offerings from Avista for commercial and industrial customers?

- Yes (1)
- No (2)

Display This Question:

If Besides the rebate for installing ${e://Field/ALL_MEASURES}, are you aware of any other offerings... = Yes

Q9 Which of the other programs are you aware of?
(Please select all that apply.)

- ☐ Site-specific (1)
- ☐ Prescriptive lightning (2)
- ☐ HVAC (Gas) (3)
- ☐ HVAC (variable frequency drive) (4)
- ☐ Shell (5)
- ☐ Food Service (6)
- ☐ Green Motors (7)
- ☐ Grocer Programs (8)
- ☐ Fleet Heat (9)
- ☐ Compressed Air (10)
- ☐ Business Partners Program (11)
- ☐ Washington State Clean Building Act Early Adopter Pilot Program (12)
- ☐ Energy Use Index Retrofit Pilot Program (13)
- ☐ Smart Buildings Center Tool Lending Pilot Program (14)

☐ Active Energy Management Pilot Program (15)

☒ None of the above (16)

Q10 How important was each of the following in your organization's decision to replace existing equipment with the new equipment?

	Not at all important (1)	Somewhat important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Reducing energy costs (1)	○	○	○	○	○
Reducing energy consumption for reasons other than cost (2)	○	○	○	○	○
Improving equipment performance (3)	○	○	○	○	○
Improving equipment aesthetics (4)	○	○	○	○	○
Improving customer and/or employee comfort (5)	○	○	○	○	○

Q11 What are the best ways to reach companies like yours with information about rebates for energy savings opportunities?
(Please select all that apply.)

- ☐ Visits from contractors or program staff (1)
- ☐ Target the owners or upper management of the business (2)
- ☐ Bill inserts (3)
- ☐ Email (4)
- ☐ Direct mail (5)
- ☐ Phone (6)
- ☐ Other, please specify: (7) _____

Q12 Which of the following considerations helped you decide to purchase energy efficient equipment instead of standard efficiency equipment?
(Please select all that apply.)

- ☐ Saving money on your energy bills (1)
- ☐ Saving energy (2)
- ☐ Protecting the environment (3)
- ☐ Recommendation from a contractor (4)
- ☐ Recommendation from Avista program staff (5)
- ☐ Financial incentive (6)
- ☐ Replacing equipment that was broken (7)
- ☐ The participation process was easy (8)
- ☐ Other, please specify: (9) _____

Q13 Before participating in the program, had you installed any other energy efficient equipment or measures?

- ○ Yes (1)
- ○ No (2)

End of Block: Background

Start of Block: Program Efficiency

Q15 When you were first approached about the program, did you have any concerns about participating or was it an easy decision?

- I had some concerns (1)
- It was an easy decision (2)
- I don't know (98)

Display This Question:

If When you were first approached about the program, did you have any concerns about participating o... = I had some concerns

Q16 What were your concerns?

_____

Display This Question:

If When you were first approached about the program, did you have any concerns about participating o... = I had some concerns

Q17 Why did you decide to participate despite your concerns?

_____

Q20 Who helped you complete the application for the program?
(Please select all that apply.)

- ☐ Another member of your company (1)
- ☐ A contractor (2)
- ☐ An equipment vendor (3)
- ☐ Other, please specify: (4) _____
- ☒ None, I completed the application myself (5)

Q21 How clear was the application to complete?

- ○ Extremely unclear (1)
- ○ Somewhat unclear (2)
- ○ Neither clear nor unclear (3)
- ○ Somewhat clear (4)
- ○ Extremely clear (5)

Display This Question:

If How clear was the application to complete? = Extremely unclear

Or How clear was the application to complete? = Somewhat unclear

Q22 What additional information would need to be provided to make the application process more clear?

_____

Q23 Please rate how acceptable the following were:

	Not all acceptable (1)	Somewhat acceptable (2)	Moderately acceptable (3)	Very acceptable (4)	Completely acceptable (5)
The ease of finding the information needed on the Avista website. (1)	○	○	○	○	○
The ease of completing the application process. (2)	○	○	○	○	○
The time it took for your application to be approved. (3)	○	○	○	○	○
The effort required to provide the required supporting documentation. (4)	○	○	○	○	○
The overall application processes. (5)	○	○	○	○	○

Q24 Did you have a clear sense of whom you could go to for assistance with the application process?

- Yes (1)
- No (2)

Q25 How did the rebate amount compare to what you expected?

- It was much less (1)
- It was somewhat less (2)
- It was about the amount expected (3)
- It was somewhat more (4)
- It was much more (5)
- I don't know (98)

Display This Question:

If How did the rebate amount compare to what you expected? = It was much less

Or How did the rebate amount compare to what you expected? = It was somewhat less

Q26 You indicated the rebate amount was **less than** what you expected. What led you to believe you would get a higher rebate than you did?

_____

Q27 Once the project was complete, how much time passed until your organization received the rebate payment?

- ○ Less than 2 weeks (1)
- ○ 2 to 4 weeks (5)
- ○ More than 4 weeks to 6 weeks (2)
- ○ More than 6 weeks to 8 weeks (3)
- ○ Other, please specify: (4) _____

Q28 How satisfied were you with the amount of time it took to receive the rebate?

- ○ Very dissatisfied (1)
- ○ Somewhat dissatisfied (2)
- ○ Neither satisfied nor dissatisfied (3)
- ○ Somewhat satisfied (4)
- ○ Extremely satisfied (5)

Display This Question:

If How satisfied were you with the amount of time it took to receive the rebate? = Very dissatisfied

Or How satisfied were you with the amount of time it took to receive the rebate? = Somewhat dissatisfied

Q29 You indicated some dissatisfaction with the time it took to receive the rebate. What could be improved

_____

End of Block: Program Efficiency

Start of Block: Measurement and Verification

Display This Question:

If LIGHTING = 1

Q30 In this section we will ask you about the **lighting** you installed.

Is the lighting you purchased currently installed and operating?

- Yes, all (1)
- Some, but not all (100)
- No (98)
- Don't know (101)

Display This Question:

If LIGHTING = 1

Q31 Did the lighting that you received a rebate for replace an existing lamps/fixtures?

- Yes (1)
- No (2)
- I don’t know (98)

Page Break

Display This Question:

If VFD = 1

Q32 In this section we will ask you about the **Variable Frequency Drive (VFD)** you installed.

Is the VFD currently installed and operating?

- ○ Yes (1)
- ○ No, please explain: (2) _____
- ○ I don't know (3)

Display This Question:

If In this section we will ask you about the Variable Frequency Drive (VFD) you installed. Is the VF... = Yes

Q33 What type of equipment is the VFD installed on?

- ○ Cooling Pump (1)
- ○ Fan (2)
- ○ Heating pump or combo (3)
- ○ I don't know (98)

Page Break

Display This Question:

If FURNACE = 1

Q34 In this section we will ask you about the ${e://Field/ALL_MEASURES} i you installed.

Is the equipment currently installed and operating?

- ○ Yes (1)
- ○ No. please explain: (2) _____
- ○ I don't know (3)

Display This Question:

If In this section we will ask you about the ${e://Field/ALL_MEASURES} i you installed. Is the equip... = Yes

X→

Q35 What type of equipment is it?

- ○ Single stage furnace (1)
- ○ Multi stage furnace (2)
- ○ Boiler (3)
- ○ Unit heater (4)
- ○ Smart thermostat (99)
- ○ I don't know (98)

Display This Question:

If In this section we will ask you about the ${e://Field/ALL_MEASURES} i you installed. Is the equip... = Yes

Q36 What is the capacity of the equipment?
(Please provide numeric value, if you are unsure please state "I don't know.")

_____

Page Break

Display This Question:

If INSULATION = 1

Q37 In this section we will ask you about the **insulation** you installed.

Approximately how many square feet of insulation was installed?
(Please provide numeric value, if you are unsure please state "I don't know.")

_____

Display This Question:

If INSULATION = 1

Q38 What is the final R-value of the insulation?

- ○ R11-R18 (1)
- ○ R19+ (2)
- ○ R30-R44 (3)
- ○ I don't know (98)

Page Break

Display This Question:

If MOTOR = 1

Q39 In this section we will ask you about the **motor** you had rewound.

Is the newly rewound motor currently installed in operating?

- Yes (1)
- No, please explain: (2) _____
- I don't know (98)

Display This Question:

If MOTOR = 1

Q40 Is the motor being used for industrial or agricultural needs?

- Industrial (1)
- Agricultural (2)
- I don't know (98)

Page Break

Display This Question:

If BLOCK_HEATER = 1

Q41 In this section we will ask you about the **block heater controls** you installed.

Are the block heater controls currently installed in operating?

- Yes (1)
- No, please explain: (2) _____
- I don't know (98)

Display This Question:

If BLOCK_HEATER = 1

Q42 Are the controls engine-mounted or wall-mounted?

- Engine-mounted (1)
- Wall-mounted (2)
- I don't know (98)

Page Break

Display This Question:

If FS_EQP = 1

Q43 In this section we will ask you about the **food service equipment** you installed.

Is the ${e://Field/ALL_MEASURES} installed OR in regular use?

- Yes (1)
- No, please explain: (2) _____
- I don't know (98)

Display This Question:

If FS_EQP = 1

Q44 Did the ${e://Field/ALL_MEASURES} that you received a rebate for replace existing equipment?

- Yes (1)
- No (2)
- I don't know (98)

Page Break

Display This Question:

If REFRIGERATION_EQP = 1

Q45 In this section we will ask you about the **refrigeration equipment** you installed.

Is the ${e://Field/ALL_MEASURES} installed and currently operating?

- Yes (1)
- No, please explain: (2) _____
- I don't know (98)

Display This Question:

If REFRIGERATION_EQP = 1

Q46 Did the ${e://Field/ALL_MEASURES} that you received a rebate for replace existing equipment?

- Yes (1)
- No (2)
- I don't know (98)

Page Break

Display This Question:

If SITESPECIFIC = 1

Q75 In this section we will ask you about the **site specific equipment** you installed.

Is the ${e://Field/ALL_MEASURES} installed and currently operating?

- Yes (1)
- No, please explain: (2) _____
- I don't know (98)

Display This Question:

If SITESPECIFIC = 1

Q76 Did the ${e://Field/ALL_MEASURES} equipment that you received a rebate for replace existing equipment?

- Yes (1)
- No (2)
- I don't know (98)

Page Break

Q47 After your project was complete, did a program representative inspect the work completed through the program?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Q48 Please indicate your agreement with the following statements:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
The inspector was courteous. (1)	○	○	○	○	○
The inspector was efficient. (2)	○	○	○	○	○
The inspector was knowledgeable. (3)	○	○	○	○	○
The inspector was professional. (4)	○	○	○	○	○

End of Block: Measurement and Verification

Start of Block: Small Business Direct Install

Q63 Program records indicate that your business received lighting equipment through Avista's Small Business Direct Install program. Is this correct?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know if we received lighting equipment (98)

Page Break

Display This Question:

If Program records indicate that your business received lighting equipment through Avista's Small Bu... = I don't know if we received lighting equipment

Q64 Is there someone else we should speak with that might know about the lighting equipment receiving through the Small Business Direct Install Program?

- ○ Yes – Please provide their name and email address or phone number (1)

_____

- ○ No (4)
- ○ Don't know (5)

Page Break

Q65 Did you receive a project proposal/assessment through the program? A project proposal/assessment may have been provided if someone from the SBDI program team completed an assessment of the lighting in your facility prior to installation.

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (98)

Page Break

Q66 Using the scale below, how helpful was that project proposal to you?

- 1 – Not at all helpful (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 – Very helpful (5)
- Don't know (98)

Page Break

Display This Question:

If Using the scale below, how helpful was that project proposal to you? = 1 – Not at all helpful

Or Using the scale below, how helpful was that project proposal to you? = 2

Q67 Why do you think the project proposal was not helpful?

_____

_____

_____

_____

_____

Page Break

Q68 Are you interested in making additional energy efficiency improvements?

- Yes (1)
- No (2)
- Don't know (3)

Page Break

Display This Question:

If Are you interested in making additional energy efficiency improvements? = Yes

Q69 What additional improvements are you most interested in? Select all that apply

- ☐ HVAC equipment (1)
- ☐ Demand Control Ventilation (4)
- ☐ Commercial A/C tune-up (5)
- ☐ Pool Covers (6)
- ☐ Pumps (7)
- ☐ Heat Pump Water Heaters (8)
- ☐ Custom projects (9)
- ☐ Other – please specify (10) _____

Page Break

Q70 Have any of the bulbs from SBDI been removed since initial installation?

- ○ Yes – how many have been removed: (1) _____
- ○ No (4)
- ○ Don't know (5)

Page Break

Display This Question:

If Have any of the bulbs from SBDI been removed since initial installation? = Yes – how many have been removed:

Q71 Why were the bulbs removed? Select all that apply

- ○ They were too bright (1)
- ○ They were too dim (4)
- ○ They stopped working (5)
- ○ They flickered (6)
- ○ Didn't like the color of the light (7)
- ○ For another reason – please specify (8)

_____

Page Break

Q72 Did the contractors who installed the lighting, leave behind any uninstalled, spare equipment (e.g., lighting, lamps, bulbs)?

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (3)

Page Break

Display This Question:

If Did the contractors who installed the lighting, leave behind any uninstalled, spare equipment (e.... = Yes

Q73 What kind of uninstalled equipment did they leave behind?

_____

End of Block: Small Business Direct Install

Start of Block: Barriers and Satisfaction

Q49 What are the most significant challenges that your organization faces when making energy efficient improvements?
(Please select all that apply.)

- ☐ High initial cost (1)
- ☐ Understanding the potential areas for improvement *(i.e., lack of technical knowledge)* (2)
- ☐ Funding competition with other investments or improvements (3)
- ☐ Long payback period or return on investment (4)
- ☐ Lack of awareness about available rebates for energy efficient equipment (5)
- ☐ Lack of corporate support for energy efficiency investments (6)
- ☐ Lack of staff time dedicated to energy efficiency upgrades (7)
- ☐ We do not own the building(s) (8)
- ☐ Other, please specify: (9) _____
- ☐ ⊗ No challenges or barriers (10)
- ☐ ⊗ I don't know (98)

Q50 How much of a barrier have supply chain issues been on your organization's ability to:

	Not a barrier (1)	Somewhat of a barrier (2)	Moderate barrier (3)	Major barrier (4)	Extreme barrier (5)
Purchase new equipment (1)	○	○	○	○	○
Receive new equipment (2)	○	○	○	○	○
Install new equipment (3)	○	○	○	○	○

Q51 During your project did you interact or contact any Avista staff?

- ○ Yes (1)
- ○ No (2)

Q52 Please provide your satisfaction with each of the following:

Display This Choice:

If During your project did you interact or contact any Avista staff? = Yes

Display This Choice:

If During your project did you interact or contact any Avista staff? = Yes

	Very dissatisfied (1)	Somewhat dissatisfied (2)	Neither satisfied nor dissatisfied (3)	Somewhat satisfied (4)	Very satisfied (5)
Display This Choice: If During your project did you interact or contact any Avista staff? = Yes How long it took program staff to address your questions or concerns (1)	○	○	○	○	○
Display This Choice: If During your project did you interact or contact any Avista staff? = Yes How thoroughly they addressed your questions or concerns (2)	○	○	○	○	○
The equipment that was installed (3)	○	○	○	○	○
The quality of the installation (4)	○	○	○	○	○

The steps you had to take to get through the program (5)	○	○	○	○	○
The amount of time it took to your rebate (6)	○	○	○	○	○
The range of equipment that qualifies for a rebate (7)	○	○	○	○	○
The amount of time it took to install the new equipment (8)	○	○	○	○	○
How well the service provider explained the program rules and processes (9)	○	○	○	○	○
The program overall (10)	○	○	○	○	○

Display This Question:

If Please provide your satisfaction with each of the following: [Very dissatisfied] (Count) > 0

Or Please provide your satisfaction with each of the following: [Somewhat dissatisfied] (Count) > 0

Q53 You indicated some dissatisfaction; can you please provide further details?

_____

Q54 What is your level of satisfaction with Avista as your service provider?

- ○ Very dissatisfied (1)
- ○ Somewhat dissatisfied (2)
- ○ Neither satisfied nor dissatisfied (3)
- ○ Somewhat satisfied (4)
- ○ Very satisfied (5)

Q55 How has your participation in the program affected your satisfaction with Avista as your service provider?

- ○ Greatly decreased your satisfaction with Avista as your service provider (1)
- ○ Somewhat decreased your satisfaction with Avista as your service provider (2)
- ○ Did not affect your satisfaction with Avista as your service provider (3)
- ○ Somewhat increased your satisfaction with Avista as your service provider (4)
- ○ Greatly increased your satisfaction with Avista as your service provider (5)

Q56 How likely is it that you would recommend the program to a personal contact, such as a friend, family member, neighbor, or colleague?

- Not at all likely (1)
- Somewhat likely (2)
- Moderately likely (3)
- Very likely (4)
- Extremely likely (5)

End of Block: Barriers and Satisfaction

Start of Block: Firmographics

Q57 What best describes the facility located **${e://Field/ADDRESS}**?

- Your company's only location (1)
- One of several locations owned by your company (2)
- The headquarter location of a company with several locations (3)
- I don't know (98)

Q58 What is the status of your organization's facility where the installation of **${e://Field/ALL_MEASURES}** took place?

- ○ We own and occupy the facility (1)
- ○ We own the facility and rent it to someone else (2)
- ○ We rent the facility (3)
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Page Break

Q59 Do you have any other comments that you would like to provide to Avista about energy efficiency in the commercial or industrial sector and/or the programs they offer?

_____

Q74 Do you have any other comments about your satisfaction and participation in Avista's Energy Efficiency programs?

_____

End of Block: Firmographics

Start of Block: Incentive

Q60 Thank you for taking the time to provide us with this valuable information. As a thank you for completing this survey, we will send you a $20 gift card. You should expect to receive your gift card within 5-10 business days via email. Please be sure to check your spam and junk folders. To confirm, the correct email address to send the gift card to is ${e://Field/EMAIL}?

- ○ Please send my electronic gift card to the **above** email address (1)
- ○ Please send my electronic gift card to the **following** email address: (2)

_____

End of Block: Incentive

6.1.5 Nonresidential Non-Participant Survey

Avista Nonresidential Nonparticipant

Start of Block: Default Question Block

Q2 Welcome! Thanks for agreeing to provide your feedback about your experience using Avista's service and programs. Your feedback is very important to us and will help us improve programs for customers like you. This survey should take about 15 minutes. Your responses are confidential and will be used for

research purposes only. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. Upon completion of the survey we will collect your email address to send a $10 electronic gift card as a token of our thanks.

To start, we have a few questions about your awareness of some of Avista's programs and services.

Page Break

Q1 According to program records, Avista provides electric and/or gas services to your business at ${e://Field/PREMISE_ADDRESS}. Is that correct?

- ○ Yes (1)
- ○ Yes, but address is incorrect (please write in correct address): (2)
  _____
- ○ No (3)

Skip To: End of Survey If According to program records, Avista provides electric and/or gas services to your business at ... = No

Page Break

Q3 To the best of your knowledge has your organization replaced or upgraded equipment that requires electricity, in the last three years? This could have been lighting, HVAC equipment, or refrigeration?

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (98)

Page Break

Display This Question:

If To the best of your knowledge has your organization replaced or upgraded equipment that requires... = Yes

Q4 What types of equipment or upgrades did your organization replace or upgrade in the last three years? Select all that apply

- ☐ Lighting (1)
- ☐ Lighting controls (2)
- ☐ HVAC equipment (3)
- ☐ Kitchen equipment (4)
- ☐ A/C tune-up (5)
- ☐ Smart thermostat(s) (6)
- ☐ Low flow faucet aerators (7)
- ☐ Low flow showerheads (8)
- ☐ Advanced power strips (9)
- ☐ Other – please specify (97)

_____

Page Break

Display This Question:

If To the best of your knowledge has your organization replaced or upgraded equipment that requires... = Yes

Q5 Did your organization receive an incentive from Avista for any of that equipment?

- Yes (1)
- No (2)
- I don't know (98)

End of Block: Default Question Block

Start of Block: Block 1

Q7 Before today, have you heard that Avista offers incentives to businesses that install energy-efficient equipment?

- Yes (1)
- No (2)
- I don’t know (98)

Page Break

Display This Question:

If Before today, have you heard that Avista offers incentives to businesses that install energy-effi... = Yes

Q8 How did you learn about Avista's energy efficiency program offerings? Select all that apply

- ☐ Mailed information from Avista (1)
- ☐ Email from Avista (2)
- ☐ Newspaper or magazine article or advertisement (3)
- ☐ Contractor (4)
- ☐ Word of mouth from a personal contact (e.g., family member, friend, neighbor, colleague, etc.) (5)
- ☐ Radio advertisement (6)
- ☐ Utility bill message (7)
- ☐ Utility website (8)
- ☐ Another website (9)
- ☐ Social media (i.e., Facebook, Instagram, Twitter, Tik Tok, etc.) (10)
- ☐ Avista program staff (11)
- ☐ Information at a retailer (12)
- ☐ Other, please specify (13) _____
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If Before today, have you heard that Avista offers incentives to businesses that install energy-effi... = Yes

Q9 What programs or services were you already aware of? Select all that apply

- ☐ Incentives to replace inefficient equipment in your business (1)
- ☐ Incentives to incorporate energy efficiency into new construction designs (2)
- ☐ Incentives for heating and cooling equipment (3)
- ☐ Incentives for lighting and lighting controls (4)
- ☐ Incentives for commercial kitchen equipment (5)
- ☐ Other – please specify (6) _____
- ☐ ⊗ Don't know (7)

Page Break

Q10 Are you interested in making any energy efficiency upgrades through Avista's energy efficiency programs?

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (98)

Page Break

Display This Question:

If Are you interested in making any energy efficiency upgrades through Avista's energy efficiency pr... = Yes

Q11 What energy efficiency upgrades or programs are you interested in? Select all that apply

- ☐ Lighting (1)
- ☐ Lighting controls (2)
- ☐ HVAC equipment (3)
- ☐ Commercial kitchen equipment (4)
- ☐ Water heater (5)
- ☐ Smart thermostats (6)
- ☐ Low flow faucet aerators (7)
- ☐ Low flow showerheads (8)
- ☐ ENERGY STAR room air conditioners (9)
- ☐ Energy audit or assessment (10)
- ☐ ENERGY STAR appliances (i.e. washer, dryer, refrigerator, freezer) (11)
- ☐ Weatherization (i.e. pipe wrap insulation, attic insulation, insulated door) (12)
- ☐ Other – please specify (96)

_____

- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If Are you interested in making any energy efficiency upgrades through Avista's energy efficiency pr... = Yes

Q12 On a scale of 1 through 5, where 1 means "not at all interested" and 5 means "very interested", how interested are you in participating in Avista's energy efficiency programs?

- 1 – Not at all interested (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 – Very interested (5)

Page Break

Q13 What might prevent you from participating in Avista's programs? Select all that apply

- ☐ Don't know enough about the program (1)
- ☐ Energy savings from the equipment replacements or upgrades was not worth the trouble (2)
- ☐ Unlikely to replace any equipment (3)
- ☐ Too much time or trouble required to fill out the required paperwork (4)
- ☐ Incentives are not high enough to offset the cost of high efficiency equipment, compared to standard efficiency equipment (5)
- ☐ Prefer not to deal with Avista (6)
- ☐ I am financially able to make the upgrades without the incentives (7)
- ☐ Not interested in what Avista is offering (8)
- ☐ Don't have the authority to participate in any of the Avista programs (9)
- ☐ Other – please specify (96)

_____

- ☐ ⊗ Don't know (98)

Page Break

Q14 We understand that it is not always possible to make improvements and energy efficiency upgrades to your building. Which of the following best describes your authority to make decisions?

- ○ No authority – as a renter I am not permitted to make improvements and energy efficiency upgrades (1)
- ○ Some authority – as a renter I am permitted to make some improvements or upgrades (2)
- ○ Full authority – I am the owner (3)
- ○ Full authority – as part of my rental agreement I am required to maintain/repair the facility (4)
- ○ Don't know (98)

Page Break

Q15 What do you feel is the largest energy consumer in your facility?

- ○ Computer equipment (1)
- ○ Refrigeration (2)
- ○ HVAC (3)
- ○ Lighting (4)
- ○ Kitchen equipment (5)
- ○ Other – please specify (96) _____
- ○ Don't know (98)

Page Break

Q16 Are you aware of the current lighting type(s) installed in your facility?

- ○ Yes (1)
- ○ No (2)

Page Break

Display This Question:

If Are you aware of the current lighting type(s) installed in your facility? = Yes

Q17 Which of the following lighting technologies is currently installed? Select all that apply

- ☐ Incandescent (1)
- ☐ Halogen (2)
- ☐ Fluorescent (3)
- ☐ CFL bulbs or fluorescent tubes (4)
- ☐ LED (5)

Page Break

Q18 Is your facility air conditioned?

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (98)

Page Break

Display This Question:

If Is your facility air conditioned? = Yes

Q19 What type of A/C do you currently have in your facility? Please choose all that apply

- ☐ Central A/C (1)
- ☐ Heat Pump (2)
- ☐ Mini-split (3)
- ☐ Wall or window mounted a/c unit (4)
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If What type of A/C do you currently have in your facility? Please choose all that apply != Don't know

Q20 Approximately how old is the air conditioning system?

- ○ Less than 10 years old (1)
- ○ 10 to 20 years old (2)
- ○ More than 20 years old (3)
- ○ Don't know (98)

Page Break

Q21 What type of heating system do you currently have in your facility? Please choose all that apply

- ☐ Electric resistance (i.e. baseboard) (1)
- ☐ Gas furnace (2)
- ☐ Heat Pump (3)
- ☐ Mini split (4)
- ☐ ⊗ Don't heat the facility (5)
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If What type of heating system do you currently have in your facility? Please choose all that apply != Don't know

And What type of heating system do you currently have in your facility? Please choose all that apply != Don't heat the facility

Q22 Approximately how old is the heating system?

- ○ Less than 10 years old (1)
- ○ 10 to 20 years old (2)
- ○ More than 20 years old (3)
- ○ Don't know (98)

Page Break

Q23 When was the last time your heating and/or cooling system was serviced?

- ○ Less than 1 year ago (1)
- ○ 1 to 3 years ago (2)
- ○ More than 3 years ago (3)
- ○ It's never been serviced (4)
- ○ Don't know (98)

Page Break

Q24 What type of thermostat do you use?

- ○ Manual (1)
- ○ Programmable (2)
- ○ Smart thermostat (3)
- ○ Don’t know (98)

Page Break

Q25 This last set of questions will help Avista develop more effective programs that may best serve the needs of the community. Your answers will remain anonymous and aggregated, so no information will be linked with you or your household. You may choose “Prefer not to answer.”

Page Break

Q32 What type of energy services does Avista provide to your business at ${e://Field/PREMISE_ADDRESS}? *Please select all that apply*

- [ ] Electricity (1)
- [ ] Natural gas (2)

Q26 Does your organization own or rent the facility at ${e://Field/PREMISE_ADDRESS}?

- ○ Rent (1)
- ○ Own and occupy (2)
- ○ Own and rent to someone else (3)
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Page Break

Display This Question:

If Does your organization own or rent the facility at ${e://Field/PREMISE_ADDRESS}? = Rent

Or Does your organization own or rent the facility at ${e://Field/PREMISE_ADDRESS}? = Own and rent to someone else

Q27 Which describes your facility at ${e://Field/PREMISE_ADDRESS}? Would you say the facility is…

- Your company's only location (1)
- One of several locations owned by your company (2)
- The headquarter location of a company with several locations (3)
- Don't know (98)
- Prefer not to answer (99)

Page Break

Q31 What are your building(s)' hours of operations?

_____

Page Break

Q28 Which of the following best describes how your organization is billed for electricity/gas used at this location?

- ○ We are billed directly by Avista (1)
- ○ We are NOT billed directly by Avista, our bill is handled by another part of our company or a third-party service provider (2)
- ○ We are NOT billed directly by Avista, the cost for our utilities is included in our rent/lease (3)
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Page Break

Q29 What type of building is the facility at ${e://Field/Ppremise_ADDRESS}?

- ○ Industrial/manufacturing (1)
- ○ Agricultural (2)
- ○ Warehouse or distribution center (3)
- ○ Education - College (4)
- ○ Education - K-12 (5)
- ○ Education – Pre-K (6)
- ○ Daycare/childcare center (7)
- ○ Government building (8)
- ○ Fast food restaurant (9)
- ○ Restaurant (sit down) (10)
- ○ Grocery (11)
- ○ Hospital (12)
- ○ Health clinic (13)
- ○ Small office (14)
- ○ Large office (15)
- ○ Lodging (16)
- ○ Religious worship (17)
- ○ Assembly hall/gathering space (18)

- ○ Retail (19)
- ○ Parking garage (20)
- ○ Vacant lot (21)
- ○ Other – please specify (96) _____
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Page Break

Q30 Thank you for taking the time to provide us with this valuable information. As a thank you for completing this survey, we will send you a $10 gift card. You should expect to receive your gift card within 5-10 business days via email. Please be sure to check your spam and junk folders. To confirm, the correct email address to send the gift card to is ${e://Field/EMAIL}?

- ○ Please send my electronic gift card to the above email address (1)
- ○ Please send my electronic gift card to the following email address: (2)

_____

End of Block: Block 1

6.2 INTERVIEW GUIDES

6.2.1 Residential Trade Allies

6.2.1.1 Introduction and General Program Information

To begin with, I have a few questions about your firm.

Q1. How would you describe your business? Are you a(n)…
1. Distributor
2. Contractor/Installer
3. Designer/Engineer
4. Energy Service Company
5. Builder
5. Other, please specify: _____
98. I don't know
99. Refuse to answer

Q2. What services does your company provide to residential customers as an Avista Trade ally?
1. Water heaters (gas or electric)
2. HVAC equipment (gas or electric)
3. Smart thermostats
3. Building shell/weatherization (insulation, windows, doors, air sealing, etc.)
4. New construction ENERGY STAR homes
5. Lighting
6. Faucet aerators; showerheads
7. Power strips
8. Washer/Dryer Appliances
9. Refrigerator/Freezer
10. Other (please specify)

98. I don't know
99. Refuse

Q3. Which state(s) do you operate in?
1. Washington
2. Idaho

Q4. How would you describe your typical customer? [multifamily homes, single family homes, low-income homes]

6.2.1.2 Program Experience & Participation

My next few questions are about your experiences and satisfaction with using Avista programs and services.

Q5. How long have you been working with Avista? How did you first become involved?

Q6. In the last year, how often have you incorporated Avista incentives into project bids and sales pitches? Would you say you….
1. Almost always incorporate Avista incentives (90% to 100%)
2. Mostly (60% to 89%)
3. Sometimes (40% to 59%)
4. Rarely (10% to 39%)
5. Almost Never (0% to 9%)
98. Don't know
99. Refuse
NOTES: *(probe for why they don't incorporate incentives; types of people who do not qualify)*

Q7. How many projects have you completed in the last year that received support from Avista? *(total number and % of total work)*

Q8. What are some of the primary reasons customers provide for not wanting to enroll in the Avista programs and install energy efficient equipment?

Q9. We've heard a lot about supply chain disruptions affecting programs across the U.S. Have you observed any such disruptions? If so, what types of equipment do they involve? Where is the disruption occurring? (Manufacturing, transportation, etc.). What impact, if any, have supply chain disruptions had on your work with Avista?

6.2.1.3 Program Implementation & Incentives

Q10. APPLICATION PROCESS

- Do you submit the rebate application? (*or do you provide the customer with the information they need and they submit the application)*
- ***If they submit the application…***

- How satisfied have you been with the **process of applying** for incentives over the last year?
- What changes, if any, would you make to the **process of applying** for Avista incentives? Why would you make those changes?
- How long does it take for you to receive an incentive once you submit an application?

Q11. INCENTIVES

- Is there any energy-saving equipment that is not currently being **incentivized** through Avista's residential program, that you would like to see incentivized? What equipment is that?
- Are there any specific types of qualifying program equipment for which the **incentive** payments are not high enough to encourage your customers to install it? What type of equipment?
- Are there any specific types of qualifying program equipment for which the **incentive** payments are higher than they need to be to encourage your customers to install it? What type of equipment?
- Do you have any recommendations for how Avista might improve the incentive process?

Q12. What are your **quality assurance** procedures? Does Avista conduct any review of your projects after you have completed them?

Q13. Are there any differences in program experience based on the measures provided or jurisdictions?

6.2.1.4 Marketing & Communications

Q14. How does your company handle marketing of high efficiency equipment? Do you have a specific sales approach? (Do you promote the benefits of high efficiency equipment? What benefits do customers most respond to?)

Q15. Does Avista provide your firm with any marketing materials to assist with program participation and customer engagement? If yes, how do you feel about the materials provided?

Q16. How do you typically acquire projects? Are you generally cold calling to customers, are customers seeking you out, are you providing marketing materials by mail, something else?

6.2.1.5 Satisfaction & Conclusion

Q17. On a scale of 1 to 5 where 1 means not at all satisfied, and 5 means completely satisfied, how would you rate the following factors? *(N/A if not applicable)*

1. The program application process
2. The range of measures that qualify for the program
3. The amount of time it takes to receive the incentive
4. Communication with program staff

5. Marketing materials you received from Avista
6. Training materials you received from Avista
7. The program overall

Q18. [Ask only if any of the above factors are <3] What are the reasons for your dissatisfaction with those aspects of the program?

Q19. What do you think works particularly well about the Avista program that you participated in?

Q20. What do you find challenging about working with Avista program?

Q21. Do you have any suggestions for improving Avista program?

6.2.2 Nonresidential Trade Allies

6.2.2.1 Introduction to Interview

Thanks for taking time to talk with me today about your experience with Avista. We will cover topics such as how well, or not, Avista has supported your customer's projects and your experience with Avista staff and forms.

Our chat will take about 30 minutes. All your responses will be treated as confidential. We will report only the overall findings to Avista, not any individual responses.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture what you are telling me accurately. The recording is confidential. Is it ok that I record the call?

[IF YES] Start recording

[IF NO] Take notes as best as possible

6.2.2.2 Introduction and General Program Information

To begin with, I have a few questions about your firm.

Q22. How would you describe your business? Are you a(n)…
1. Distributor
2. Contractor/Installer
3. Designer/Engineer
4. Energy Service Company
5. Other, please specify: _____
98. I don't know
99. Refuse to answer

Q23. What services does your company provide to commercial customers as an Avista Trade ally?
1. Water heaters (gas or electric)
2. HVAC equipment (gas or electric)
3. Smart thermostats
4. Building shell/weatherization (insulation, windows, air sealing, etc.)
5. Lighting

6. Grocer equipment
7. Food service equipment
8. Motors
9. Air compressors
10. Other (please specify)
98. I don't know
99. Refuse

Q24. Which state(s) do you operate in?
1. Washington
2. Idaho

Q25. How would you describe your typical customer? [For example, are you serving small businesses, serving large Fortune 500-type companies, government entities, schools, manufacturing facilities, or something else?]

6.2.2.3 Program Experience & Participation

My next few questions are about your experiences and satisfaction with using Avista programs and services.

Q26. How long have you been working with Avista? How did you first become involved?

Q27. In the last year, how often have you incorporated Avista incentives into project bids and sales pitches? Would you say you….
1. Almost always incorporate Avista incentives (90% to 100%)
2. Mostly (60% to 89%)
3. Sometimes (40% to 59%)
4. Rarely (10% to 39%)
5. Almost Never (0% to 9%)
98. Don't know
99. Refuse
NOTES: *(probe for why they don't incorporate incentives; types of people who do not qualify)*

Q28. How many projects have you completed in the last year that received support from Avista? *(total number and % of total work)*

Q29. What are some of the primary reasons customers provide for not wanting to enroll in the Avista programs and install energy efficient equipment?

Q30. We've heard a lot about supply chain disruptions affecting programs across the U.S. Have you observed any such disruptions? If so, what types of equipment do they involve? Where is the disruption occurring? (Manufacturing, transportation, etc.). What impact, if any, have supply chain disruptions had on your work with Avista?

6.2.2.4 Program Implementation & Incentives

Q31. APPLICATION PROCESS

- Do you submit the rebate application? (*or do you provide the customer with the information they need and they submit the application)*

- ***If they submit the application…***
  - How satisfied have you been with the **process of applying** for incentives over the last year?
  - What changes, if any, would you make to the **process of applying** for Avista incentives? Why would you make those changes?
  - How long does it take for you to receive an incentive once you submit an application?

Q32. INCENTIVES

- Is there any energy-saving equipment that is not currently being **incentivized** through Avista's residential program, that you would like to see incentivized? What equipment is that?
- Are there any specific types of qualifying program equipment for which the **incentive** payments are not high enough to encourage your customers to install it? What type of equipment?
- Are there any specific types of qualifying program equipment for which the **incentive** payments are higher than they need to be to encourage your customers to install it? What type of equipment?
- Do you have any recommendations for how Avista might improve the incentive process?

Q33. What are your **quality assurance** procedures? Does Avista conduct any review of your projects after you have completed them?

6.2.2.5 Marketing & Communications

Q34. How does your company handle marketing of high efficiency equipment? Do you have a specific sales approach? (Do you promote the benefits of high efficiency equipment? What benefits do customers most respond to?)

Q35. Does Avista provide your firm with any marketing materials to assist with program participation and customer engagement? If yes, how do you feel about the materials provided?

Q36. How do you typically acquire projects? Are you generally cold calling to customers, are customers seeking you out, are you providing marketing materials by mail, something else?

6.2.2.6 Satisfaction & Conclusion

Q37. On a scale of 1 to 5 where 1 means not at all satisfied, and 5 means completely satisfied, how would you rate the following factors? *(N/A if not applicable)*

1. The program application process
2. The range of measures that qualify for the program
3. The amount of time it takes to receive the incentive
4. Communication with program staff
5. Marketing materials you received from Avista
6. Training materials you received from Avista

7. The program overall

Q38. [Ask only if any of the above factors are <3] What are the reasons for your dissatisfaction with those aspects of the program?

Q39. What do you think works particularly well about the Avista program that you participated in?

Q40. What do you find challenging about working with Avista program?

Q41. Do you have any suggestions for improving Avista program?

Q42. Confirm email for gift card:

6.2.3 Midstream Distributors

6.2.3.1 Background, Roles & Responsibilities

1. Can you tell me a little bit about your organization and the type of work you do?
2. What types of equipment or services do you work with?
3. What type of customers do you typically work with through Avista's Midstream program? (*probe for contractors, direct sales to businesses, types of businesses, etc.)*
4. About what share of your program sales are to contractors versus customers making the installation or upgrades themselves?
5. Does your company work with national or regional chains?
6. Approximately how much of your work is with repeat clients?

6.2.3.2 Awareness & Motivation

7. How long have you been with the Avista program?
8. How did you first get involved with the program?
9. What motivated you to participate?
10. What interactions do you have with program staff throughout the program process?
11. How, if at all, did you expect that participating in the program would affect your sales? Has your participation met those expectations?

6.2.3.3 Marketing & Customer Interactions

12. How do you market the program to your customers?
    1. Do you use any marketing or informational materials provided through the program?

13. Are there additional materials or support you would like to receive through the program?

14. What kinds of strategies do you use to sell the program-qualified equipment?

15. What concerns or barriers exist, prohibiting customers from purchasing program-qualifying equipment/participating in the program?

16. What kinds of questions do customers usually ask around energy-efficiency equipment?

6.2.3.4 Program Influence

17. Have you increased your stocking of program-qualified equipment because of the program?

18. **[IF YES]** Can you tell me a little bit about how the program led you to increase stocking for that equipment?

19. Do you believe you would have sold the same amount of program-qualifying equipment if the program was not available? Why or why not?

20. How has participating in the program affected your business?

6.2.3.5 Program Satisfaction & Feedback

21. What was the process to enroll in the program like? Anything confusing?

22. What aspects of the program works well?

23. What aspects of the program are challenging?

24. Are there any parts of the program that customers seem to find challenging?

25. Is there any equipment that should be added into the program?

26. Do you have any suggestions or recommendations to improve the program?

APPENDIX G – NEEA 2023 ANNUAL SAVINGS REPORT – ELECTRIC

Memorandum

April 3, 2024

TO: Nicole Hydzik, Director of Energy Efficiency, Avista Utilities; Meghan Pinch, Manager of Program Managers, Avista Utilities; Kim Boynton, Manager of Planning and Analytics, Avista Utilities

CC: Stephanie Rider, Director, NEEA Data, Planning, and Analytics;
Susan Hermenet, Vice President, NEEA Research, Evaluation and Analytics;
Virginia Mersereau, Senior Manager of Strategy, NEEA Corporate Strategy

FROM: Christina Steinhoff, Principal Planning Analyst, NEEA Data, Planning and Analytics

SUBJECT: Final 2023 Annual Savings Report for Avista's Idaho Service Territory (Electric)

NEEA is an alliance of utilities and energy efficiency organizations that pools resources and shares risks to transform markets toward energy efficiency that benefits consumers in the Northwest. The alliance works together to accelerate the innovation and adoption of energy-efficient products, services, and practices in the Northwest. By pooling together regional resources, NEEA:

- Leverages relationships with the Department of Energy, trade allies, and national and regional manufacturers to identify and advance new efficient technologies, product designs, test procedures, product specifications and standards to increase the availability and demand for energy-efficient products, services and practices,
- Conducts research and energy use analysis, market characterization studies, and stock assessments to help the region identify the best efficiency opportunities and inform utilities resource planning efforts,
- Defines and executes program strategies to remove market barriers leading to increased adoption of the most energy efficient products available,
- Builds relationships with midstream supply chain partners such as distributors, retailers, and trade allies to collect regional data and build market capability and infrastructure to increase availability within the Northwest of the most efficient products,
- Gathers, cleans, and analyzes sales, shipment, and distributor data to track markets and inform regional investment decisions.

NEEA's end goal is to make energy efficiency a self-sustaining standard of practice in markets. Codes and standards are a core element of locking in that permanent market change, so NEEA works at state and national levels to influence more efficient building codes and equipment

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efficiency standards to save customers energy and ensure that Northwest needs are represented in the process.

Utilities, energy efficiency administrators, and the Regional Technical Forum (RTF) all benefit from NEEA's work through knowledge sharing, the development of new energy efficiency measures, and the resulting market changes leading to energy savings.

NEEA accesses and analyzes market data for each program in order to track the effects of these market transformation efforts over time as well as to report incremental energy savings in the region each year. Avista Utilities (Idaho) has asked NEEA to report savings specific to its service territory where possible as part of NEEA's annual report out.

This memo provides the *final* energy savings estimates for 2023. Details about baseline and technical assumptions are in Appendix A and the attached Excel spreadsheet.

Please contact Christina Steinhoff at csteinhoff@neea.org with any questions about this report.

Final 2023 Savings Estimate Summary

NEEA estimates Avista Utilities' (Idaho) 2023 annual electric energy savings associated with its initiatives is 0.68 aMW (Table 1). To calculate the savings, NEEA removes an estimate of savings occurring from naturally occurring adoption based on baseline trends in the Northwest, and savings reported through Avista Utilities' (Idaho) local incentive programs (Appendix A).

Table 1: 2023 Annual Report Savings Estimates (aMW)

	Total
Total	0.68
Residential	0.29
Commercial	0.35
Industrial	0.04
Agricultural	0.00

Notes: The values represented are rounded to the hundredth decimal in this summary table. See the accompanying excel workbook for the detailed figures. These are site-based, first year electric savings. Net Market Effects= Total Regional Savings- Local Program Savings -Baseline Savings[1]

- [1] Net Market Effects is savings above the Naturally Occurring Market Baseline established at the start of a program net of utility program savings.

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2023 Highlights

NEEA supports the region meet energy efficiency goals through market transformation work that spans in-market programs, codes and standards, emerging technology, as well as complementary data collection and research efforts. The sections below highlight that work for 2023.

In-market Programs

NEEA operates a portfolio of Market Transformation programs in seven cross-sector groups—consumer products, building envelope, HVAC, lighting, motors, new construction, and water heating. The programs within these sectors intervene in markets to create lasting change by removing barriers and leveraging opportunities.

Consumer Products

Dryers

NEEA was a founding member in a national coalition of efficiency advocates (the Super-Efficient Dryer Initiative) that helped introduce heat pump clothes dryers in North America through early test procedure and specification development. NEEA followed this with incentives and other engagement with manufacturers to help spur adoption and reduce the first cost barrier for early generations of heat pump dryers. In 2023, two manufacturers introduced new combination washer/dryer units that utilize heat pump drying technology, showing continued evolution of the technology for this end use.

Televisions

NEEA is able to report savings from its work on ENERGY STAR televisions. NEEA's efforts began several years ago, resulting in a NEEA-developed test procedure to better estimate energy usage. The test procedure was adopted by ENERGY STAR and the Consumer Technology Association (CTA-2045-C and D). Additionally, as part of NEEA's work on TVs, major manufacturers have committed to a voluntary agreement to provide their TV energy performance, which will provide consumers with more transparent information on TV energy consumption and inform future midstream incentives through the program. The agreement should lead to a more complete set of product test data becoming publicly available, increasing NEEA's ability to track changes in the full market.

Retail Products Portfolio

During 2023, three new utility sponsors joined the ENERGY STAR RPP program, bringing the share of US households represented by program sponsors up to 24.2%. Achieving greater scale is one way NEEA and the ESRPP program increases the collective influence that the program can have on retailer assortment decisions and ultimately manufacturer product roadmaps and new ENERGY STAR specifications.

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New Construction

Manufactured Homes

NEEA completed a Transition Market Progress Evaluation Report to assess the market progress of the Northwest Energy Efficient Manufactured Housing (NEEM)+ specification—a certification NEEA supports that is more stringent than ENERGY STAR. The study verified that home sales of NEEM+ has been steady over the past two years and that NEEA should continue to monitor the market to ensure that the homes remain a viable alternative on an ongoing basis.

Standards and Test Procedures

To speed up the rule-making process, NEEA and energy efficiency advocates entered into a multi-product agreement with the Association of Home Appliance Manufacturers (AHAM) to negotiate several appliance standards. AHAM agreed to more stringent efficiency levels in most cases. Meanwhile NEEA and the advocates conceded more time for manufacturers to comply. The agreement helped avoid lawsuits that could have delayed the standards process for many products, including clothes washers, clothes dryers, and refrigerators.

Overall, NEEA responded to more than 27 requests for comment from the Department of Energy regarding Federal standards and test methods. These comment letters covered more than 25 products including consumer furnaces, water heaters, circulating pumps, and clothes dryers. NEEA's comments provided regional data and recommendations to help the DOE set appropriate rules that provide Northwest benefits and are supportable by the market.

Notably, the DOE adopted a new Electric Motors standard. NEEA influence the development of this standard through working with the National Electrical Manufacturers Association (NEMA) to find common ground and through providing comments throughout the rule-making process based on its experience with motor market transformation programs in the Northwest. NEEA now is planning for savings modeling and influence evaluation work to quantify the value of this achievement.

Building Energy Codes

Draft results of a third-party review of NEEA's work show that NEEA is influencing code development both nationally and in the region by bringing proposals to decision makers in Oregon, Washington and to the Internal Energy Conservation Code (IECC), which is the basis for Montana and Idaho codes. NEEA is also filling gaps in the energy code process in each state. Additionally, more than half of commercial and residential market actors report that NEEA-supported training is positively influencing their knowledge, behaviors, or attitudes. NEEA expects to publish the report in Q2 2024.

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Emerging Technology

Six ENERGY STAR product categories went into effect, which NEEA provided input. Most significantly, Residential HVAC products, including central and ductless AC and heat pumps, went into effect in January 2023, and ENERGY STAR integrated several key pieces of feedback from NEEA. ENERGY STAR Version 5.0 for water heaters went into effect in April 2023, encompassing heat pump water heaters, whole home tankless, and high efficiency gas storage units. Work on updating the water heater specification began in 2021, and ENERGY STAR incorporated NEEA feedback on performance and connectivity in the final specification. The updated residential Windows, Doors, and Skylights specification went into effect in October 2023. NEEA played a significant role in advancing the specification through our leadership in the Partnership for Advanced Window Solutions. Residential Dishwashers and Light Commercial HVAC also went into effect in 2023, and ENERGY STAR added Residential Cooking products as a category in 2023. Lastly, a Clothes Dryers revision and a new Micro Heat Pump specification opened in late 2023.

Data Collection and Research

Building Stock Assessments

NEEA finished collecting building characteristic and energy consumption data on single-family and multi-family homes and will publish data and reports in Q1 2024. The Residential Building Stock Assessment (RBSA) provides data on the existing housing stock in the Northwest to help with planning. The 2022 RBSA includes the addition of tracking solar panels, electric vehicle chargers, presence of electric vehicles and accessory dwelling units. NEEA also began planning for the next Commercial Building Stock Assessment, which will be in field in 2024.

Market Data and Research

Several programs are in the midst of their first market progress evaluation report, including the Commercial HVAC programs (High-Performance HVAC and gas Efficient Rooftop Units) and the Extended Motor Products program. These evaluations will bring increased understanding of the market opportunity for these measures, as well as NEEA's progress toward its Market Transformation goals. NEEA is also conducting several state energy code compliance and standard influence evaluations in the field.

End Use Load Research (EULR)

The EULR project is an ongoing regional study designed to gather accurate end-use load profiles for electrically powered equipment in homes and businesses. In 2023, NEEA completed installations for 400 residential homes and 70 commercial office/retail buildings. The Regional Technical Forum used the information from previous years to calibrate its new Energy Efficiency

and Demand Response (REEDR) tool, which analyzes residential building energy models in EnergyPlus. Regional utilities and the National Renewable Energy Laboratory used the data to update/calibrate their energy use load shapes. Meanwhile, universities, consultants, utilities, and other organizations from all over the world are downloading the 15-minute interval public data available on neea.org. Now, the project's steering committee and working group will consider proposals to fund and conduct joint analyses of the EULR data. Funders of the project can submit a proposal or sponsor others submitting proposals.

Monitoring & Tracking

NEEA is monitoring the progress in the ductless heat market. NEEA formally began its DHP program in 2008 with a goal to displace inefficient electric heating (such as baseboard heaters and inefficient electric forced-air furnaces) from single-family homes. NEEA's Long-term Monitoring and Tracking Report showed that the total number of counties with access to DHP installers has continued to increase to a total of 135, incented installations for DHPs continues to increase, and the total proportion of HVAC contractors installing DHPs in the Northwest has maintained a steady level.

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Appendix A

Allocation Methodology

Avista Utilities (Idaho) requested that NEEA use a service territory allocation approach where possible starting in 2023. NEEA uses the best available data to estimate these shares. More details about the allocation approaches by program is available on the *Service Territory Shares* worksheet of the attached spreadsheet.

Baseline and Technical Assumptions

This report follows NEEA's method of measuring electric energy savings from market transformation efforts. The baseline is an estimate of the market adoption for the region without intervention by NEEA, the Bonneville Power Administration, the Energy Trust of Oregon, and utilities. Prior to reporting the savings above the baseline, NEEA removes the savings counted through the local programs. This effort avoids double counting energy savings.

The technical assumptions come from third-party research including NEEA-contracted research and the Regional Technical Forum.

More details about the assumptions are available here:
neea.org
Go to the Portal Login→Savings Reports

Memorandum

April 3, 2024

TO: Nicole Hydzik, Director of Energy Efficiency, Avista Utilities; Meghan Pinch, Manager of Program Managers, Avista Utilities; Kim Boynton, Manager of Planning and Analytics, Avista Utilities

CC: Peter Christeleit, Manager of Natural Gas Portfolio and Strategy, NEEA; Stephanie Rider, Director, Data, Planning, and Analytics, NEEA; Becky Walker, NEEA, Vice President, Market Development and Transformation, NEEA; Susan Hermenet, Vice President, Research, Evaluation and Analytics, NEEA; Virginia Mersereau, Vice President of Corporate Strategy and Communications, NEEA

FROM: Christina Steinhoff, Principal Planning Analyst, NEEA

SUBJECT: Avista Utilities' 2023 Annual Savings Report for Idaho (Natural Gas)

NEEA is an alliance of utilities and energy efficiency organizations that pools resources and shares risks to transform markets toward energy efficiency that benefits consumers in the Northwest. The alliance works together to accelerate the innovation and adoption of energy-efficient products, services, and practices in the Northwest. By pooling together regional resources, NEEA:

- Leverages relationships with the Department of Energy, trade allies, and national and regional manufacturers to identify and advance new efficient technologies, product designs, test procedures, product specifications and standards to increase the availability and demand for energy-efficient products, services and practices,
- Conducts research and energy use analysis, market characterization studies, and stock assessments to help the region identify the best efficiency opportunities and inform utilities resource planning efforts,
- Defines and executes program strategies to remove market barriers leading to increased adoption of the most energy efficient products available,
- Builds relationships with midstream supply chain partners such as distributors, retailers, and trade allies to collect regional data and build market capability and

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infrastructure to increase availability within the Northwest of the most efficient products,
- Gathers, cleans, and analyzes sales, shipment, and distributor data to track markets and inform regional investment decisions.

NEEA's goal is to make energy efficiency a self-sustaining standard of practice in markets. Codes and standards are a core element of locking in that permanent market change, so NEEA works at state and national levels to influence more efficient building codes and equipment efficiency standards to save customers energy and ensure that Northwest needs are represented in the process.

Utilities, energy efficiency administrators, and the Regional Technical Forum all benefit from NEEA's work through knowledge sharing, the development of new energy efficiency measures, and the resulting market changes leading to energy savings.

NEEA reports these energy savings to Avista Utilities (Idaho) as they develop over time. Because most programs in the gas portfolio are still in the early stages of Market Transformation, the savings are mostly comprised of early work on building energy codes. NEEA is focused on advancing new technologies, implementing strategies to remove market barriers and leveraging market opportunities to increase the adoption of new efficient products, which should lead to additional savings over time. The attached *Frequently Asked Questions* document provides an overview of this work.

NEEA tracks energy savings based on the work described as a lagging indicator of progress. This memo provides energy savings estimates for 2023. Details about baseline and technical assumptions are in the attached Excel spreadsheet. Please contact Christina Steinhoff at csteinhoff@neea.org with any questions.

2023 Savings Estimate Summary

Avista Utilities' (Idaho) share of the 2023 natural gas energy savings associated with NEEA's initiatives is 217,045 annual therms[1] (Table 1). To calculate the savings, NEEA removes an estimate of savings occurring from naturally occurring adoption based on baseline trends in the Northwest, and savings reported through regional local incentive programs. Appendix A provides more details about the calculation and allocation methodology.

[1] Annual therms represent first-year savings and a sustained reduction in load.

Table 1: 2023 Energy Savings* (Annual Therms)

Residential New Construction	Commercial Products (Standards)	Efficient Rooftop Units	Total Savings
216,883	161	0	217,045

**Net Market Effects = Total Regional Savings - Local Program Savings - Baseline Savings*

Regional Gas Savings Portfolio

NEEA is developing and advancing new energy efficiency measures to add to its savings portfolio. Annual gas savings will increase over time as programs in the portfolio advance into full-scale market development. Table 2 lists NEEA's expectations for gas savings.

Table 2: Savings Expectations

Program	Products	Year Expected for Reporting*
Commercial Code	Working on future code development	TBD
Residential Code	IECC 2018 with Idaho amendments	2021
Efficient Rooftop Units	Efficient Rooftop Units	2022 (expected to ramp up in 2026/2027)
Products (Standards)	Commercial Boilers, Residential Gas Furnaces	2023, 2029
High-Performance Windows*	ENERGY STAR version 7, where U-Factor ≤ 0.22	2025
Efficient Gas Water Heater*	Gas Heat Pump Water Heater	2025

**Years are pending program advancements.*
The table above only includes programs that were in the portfolio for the whole year. Advanced Commercial Gas Water Heating was advanced in December of 2023 and other potential programs are expected to be part of the portfolio in Cycle 7 starting in 2025.

Appendix A: Methodology to Estimate Energy Savings

Allocation Methodology

NEEA allocates code savings for gas measures using a state/service territory approach. NEEA models code savings rates by state and applies the state-level savings rates to state-level new construction square footage estimates from Dodge Data & Analytics and units from the U.S. Housing and Urban Development to calculate energy savings. NEEA allocates the state-level savings to service territories based on the utility's share of the state residential customers (Residential Codes) and commercial energy sales (Commercial Codes) from the Energy Information Administration (EIA-861).

Table 3: State Code Savings Allocation Share for Avista Utilities (Idaho)

Sector	WA	OR	ID
Residential	0.00%	0.00%	18.33%
Commercial	0.00%	0.00%	15.38%

For voluntary programs, NEEA allocates regional savings (Idaho, Oregon, and Washington) using the utility's share of investment in NEEA's natural gas portfolio (Table 4).

Table 4: Avista Utilities' (Idaho) Share of Regional Savings

Business Plan	Share of NEEA's Regional Funding
2020-2024	3.55%

Naturally Occurring Baseline

NEEA approximates the share of the savings that would have occurred without market intervention. To calculate these savings, NEEA forecasts the naturally occurring baseline adoption at the regional level for energy efficiency measures within each Market Transformation program. NEEA uses the best available data—historical sales data, industrial reports, market studies, etc. A third-party evaluation reviews the methodology as well as provides recommendations for adjustments. NEEA also presents the methodology and forecast to its Cost Effectiveness Advisory Committee, which includes funder representatives from each funder in the alliance, state regulators from across the region, and the Northwest Power and Conservation Council.

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Local Programs

NEEA avoids reporting savings from units already counted through local utility programs by subtracting an estimate of the incentives associated with NEEA's Market Transformation efforts. NEEA surveys its gas funders annually to estimate the overlap at the regional level and removes the utility's funder share of this overlap prior to reporting energy savings.

Technical Assumptions

The technical assumptions are assumptions NEEA uses when calculating the savings rates such as hours of operation, HVAC interaction factors, and climate zone weights. NEEA uses the best available information such as regional stock assessments, the Regional Technical Forum, third-party research, and the 2021 Power Plan. NEEA also presents the assumptions to its Cost Effectiveness Advisory Committee.

The savings rate is measured against the energy consumption of the alternative. In cases where NEEA works on different efficiency levels of the same product, the savings rate is incremental to the lower efficiency measure. The resulting value represents the incremental energy savings of the measure in comparison to the alternative.

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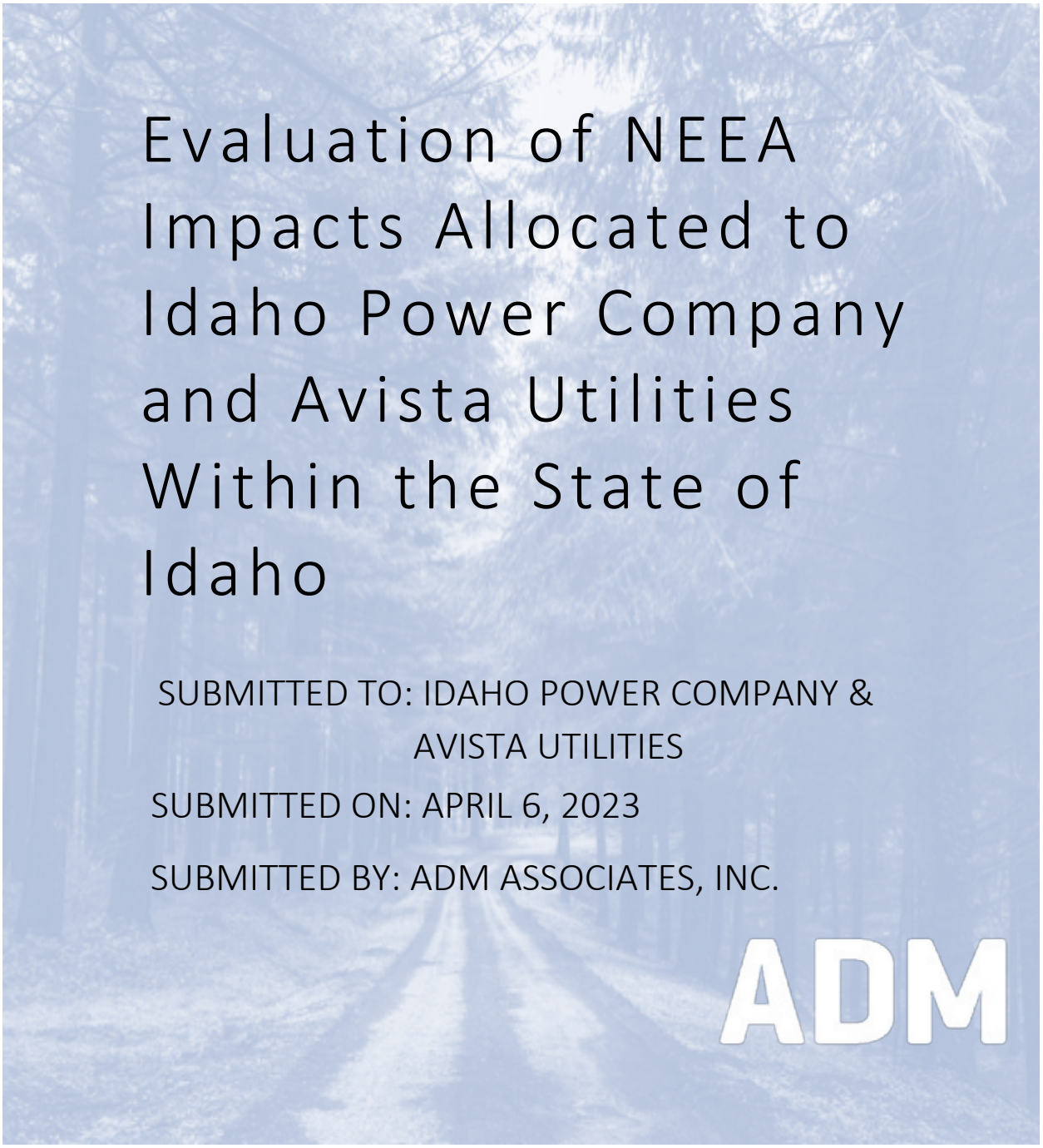
APPENDIX I – IDAHO NEEA EVALUATION REPORT



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We would like to thank the staff at NEEA for their time and effort in contributing to the evaluation of the Idaho-specific NEEA impacts. This evaluation was conducted with regular coordination with staff at NEEA, Idaho Power Company, and Avista, who each provided quick feedback and turnaround to the requests of the evaluation team as well as open and forthright insights into the operations of their initiatives and efforts.

Table of Contents

List of Figures

List of Tables

1 Executive Summary

This report is a summary of the evaluation, measurement, and verification (EM&V) effort of the Northwest Energy Efficiency Alliance (NEEA) activities and energy impact estimates as it relates to savings allocated to Idaho Power Company (IPC) and Avista Utilities (Avista) within the state of Idaho for the program years 2017-2021. The evaluation was administered by ADM Associates, Inc (herein referred to as the "Evaluators").

The Evaluators collected data for the evaluation through review of NEEA codes and standards methodology documents, NEEA cost-effectiveness methodology documents, previously completed NEEA measure evaluations, application of prescriptive unit energy savings (UES), annual savings reports, and collection of historical funding invoices. The Evaluators estimated the energy impacts of the energy efficiency measures and codes and standards updates through application of Regional Technical Forum (RTF) prescriptive savings, International Energy Conservation Code (IECC) simulation models, and data documented from field studies. Table 1-1 through Table 1-3 summarizes NEEA's ex-ante electric savings (aMW) for the past 5 years (2017 through 2021) for Idaho Power Company electric savings in the state of Idaho, Avista electric savings in the state of Idaho, Avista gas savings in the state of Idaho, respectively.

Table 1-1 Summary of Idaho Power ID Verified Electric Savings

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	2.65	1.72	64.75%
2018	2.77	1.04	37.65%
2019	1.99	2.43	122.00%
2020	1.91	2.72	142.28%
2021	1.82	1.71	93.51%
Total	**11.15**	**9.61**	**86.23%**

Table 1-2 Summary of Avista ID Verified Electric Savings

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	0.60	0.31	51.19%
2018	0.57	0.36	63.33%
2019	0.43	0.50	115.22%
2020	0.41	0.48	118.44%
2021	0.39	0.40	103.32%
Total	**2.41**	**2.06**	**85.41%**

Table 1-3 Summary of Avista ID Verified Gas Savings

Year	Ex Ante Therms Savings	Ex Post Therms Savings	Realization Rate
2019	43,745	22,808	52.14%
2020	5,678	385	6.79%

Year	Ex Ante Therms Savings	Ex Post Therms Savings	Realization Rate
2021	152,881	152,881	100.00%
Total	**202,304**	**176,074**	**87.03%**

During this evaluation work, the Evaluators compared service territory share to funder share allocation. The Evaluators ultimately used service territory allocation methodology to estimate total verified savings and cost-effectiveness of efforts benefitting Idaho customers within Avista's and Idaho Power's service territories, as seen in the tables above. The tables present the average megawatt hours (aMW) and Therms verified to claim within the state of Idaho for each utility. The Evaluators estimated verified savings by multiplying verified net market units, verified UES, and verified savings allocation share.

The Evaluators concluded that the savings estimates for the 2017 through 2021 program years verified to be allocated to Idaho Power electric is 9.61 aMW at 86.23% realization rate. The verified Idaho electric savings for Avista during this period is 2.06 aMW at 85.41% realization rate. The verified Idaho gas savings for Avista during this period is 176,074 Therms at 87.03% realization rate.

The Evaluators also conducted cost-effectiveness testing for each measure, initiative, and program year. The Evaluators summarize the overall cost-effectiveness by program year. The Evaluators found that codes and standards efforts were cost effective for all program years, with cost-benefit ratios ranging between 8 to 49. The Evaluators believe that the cost effectiveness and the savings of the code efforts are currently overestimated, due to lack of estimation of NEEA influence over code updates. The Evaluators describe this caveat in detail under the Codes section of the report.

The Evaluators found that all efficiency measure efforts were not cost effective for all program years, with cost-benefit ratios ranging between 0 and 0.7. Therefore, Avista and Idaho Power funding towards NEEA remains cost effective due to codes and standards efforts. Further cost-effectiveness testing for each efficiency measure, standard, and code effort is further detailed in the results section below.

Table 1-4: Idaho Power Electric Idaho Overall Cost Effectiveness by Program Year

Program Year	UCT Costs[1]	UCT Benefits	UCT
2017	$2,532,792.41	$13,374,742.01	5.28
2018	$2,492,098.69	$9,900,643.72	3.97
2019	$2,491,376.81	$18,155,345.04	7.29
2020	$2,612,183.81	$20,639,160.48	7.90
2021	$2,762,562.35	$11,091,961.06	4.02
Total	**$12,891,014.08**	**$73,161,852.31**	**5.68**

[1] Due to carry over dollars between quarters and program years, the total annual funding amounts may not match with Idaho Power reported spend towards NEEA efforts.

Table 1-5: Avista Electric Idaho Overall Cost Effectiveness by Program Year

Program Year	UCT Costs[2]	UCT Benefits	UCT
2017	$576,173	$3,040,522	5.28
2018	$566,915	$4,279,882	7.55
2019	$510,076	$5,984,066	11.73
2020	$432,580	$5,237,060	12.11
2021	$480,617	$3,408,526	7.09
Total	**$2,566,361**	**$21,950,055**	**8.55**

Table 1-6: Avista Gas Idaho Overall Cost Effectiveness by Program Year

Program Year	UCT Costs[3]	UCT Benefits	UCT
2019	$154,261	$315,142	2.04
2020	$139,208	$6,048	0.04
2021	$157,375	$2,491,877	15.83
Total	**$450,844**	**$2,813,068**	**6.24**

As seen in the tables above, NEEA efforts by program year remained cost-effective using the Idaho Power and Avista avoided costs and updated verified Ex Post savings to demonstrate savings and cost-effectiveness in their respective Idaho service territories.

1.1 Evaluation Objectives

The Evaluators identified the following research objectives for the energy efficiency and codes and standards impact evaluations as it pertains to IPC and Avista within the state of Idaho:

1. Verify and validate the energy and demand (kWh, Therms) impacts attributable to NEEA activities taking the following into account:
    a. The savings calculation methodologies NEEA employs for claiming savings
    b. The allocation method of those savings to IPC And Avista
    c. The cost-effectiveness of those savings for IPC and Avista;
2. Interview NEEA, IPC, and Avista staff to understand the NEEA savings methodology, NEEA baseline creation for market transformation and energy saving impacts of NEEA efforts;

[2] Due to carry over dollars between quarters and program years, the total annual funding amounts may not match with Avista reported spend towards NEEA efforts.

[3] Due to carry over dollars between quarters and program years, the total annual funding amounts may not match with Avista reported spend towards NEEA efforts.

3. Report findings and observations. Make recommendations as applicable;
4. Review and comment on NEEA assumptions and methods for determining and calculating savings;
5. Review and verify the methodologies and claimed energy impacts that are attributable to IPC and Avista; and,
6. Complete reviews and verify calculations with 90/10 confidence and precision, where applicable
7. If applicable, propose alternate methods that would result in more accurately quantified and allocated savings.

This evaluation was requested from Idaho Power and Avista staff due to the Idaho Public Utilities Commission (IPUC or Commission) Order Number 35270 in case IPC-E-21-04 and Order Number 35129 in AVU-E-20-13/AVU-G-20-08. The Evaluators cite language from Order Number 35270 for which similar language was used in Order Number 35129:

> *"The Commission notes Staff's concern with NEEA claimed energy savings and directs the Company to conduct an independent EM&V to clarify the NEEA claimed savings. We agree it is concerning for NEEA to claim savings from electrical codes in jurisdictions outside of Idaho. We direct the Company to verify the accuracy of these claimed savings through an independent EM&V. If the savings from interjurisdictional codes and standards cannot be verified, then the method for claiming NEEA savings should be adjusted to remove non-Idaho electrical code savings. If NEEA is no longer cost-effective after an independent EM&V is conducted, the Company should reexamine its continued participation. (IPUC Order Nos. 35129 and 35270)*
>
> *To the extent possible, the Company may work with other Idaho regulated electric utilities that are conducting a similar EM&V to examine NEEA claimed savings." (IPUC Order No. 35270)*

1.2 NEEA Background

NEEA was established in 1997 by the energy efficiency community in Idaho, Oregon, Washington, and Montana. NEEA operates on the philosophy that the region can accomplish more energy savings than that of the sum of its individual organizations. The alliance works at a regional and national level to influence the supply chain and increase the market's ability to deliver energy efficiency at a larger scale.

NEEA claims savings for three types of programs:

1. Efficiency measures
2. Federal standards
3. Building codes

The methodology for calculating net market effects differs between each of the above program types. NEEA completes efforts for each of the above program types throughout the Northwest region to garner regional savings that benefit all utilities and customers throughout. This involves training and education for contractors, outreach, collaboration with large manufacturers and market actors, and maintaining an overall involvement in standards and codes updates to ensure maximum energy efficiency potential is reached.

NEEA plays a large and significant role in energy efficiency within the Northwest. Its contributions have amounted to large energy efficiency savings across the region. The goal of this evaluation work is to determine the energy efficiency benefits are benefitting Idaho customers directly. Although NEEA's work contributes to the entire region, how much of those savings are accrued within Idaho and how much of those savings affect the local Idaho grid?

The Evaluators' approached this project with those questions in mind as they verified energy efficiency savings attributable within the state of Idaho to each Avista and Idaho Power.

1.3 Data Provided

The Evaluators requested and received the following documentation from NEEA to facilitate this evaluation work:

- Allocation methodology documentation
- Cost effectiveness documentation
- 2017-2021 invoices for Avista electric, Avista gas, and Idaho Power electric
- 2017-2021 annual savings reports for Avista electric, Avista gas, and Idaho Power electric
- Idaho codes documentation, codes contracts completed, market progress evaluation reports, and logic models
- Consumer products, HVAC, water heating, next step homes, and federal standards UES methodology documentation
- Federal standards influence evaluation reports

1.4 Findings and Recommendations

The Evaluators offer the following findings and recommendations for the evaluation of NEEA efforts in Idaho.

1.4.1 Findings

- **Overall,** the Evaluators found that contribution to NEEA efforts for standards, and codes remained cost-effective across program years 2017 through 2021, with cost-benefit ratios ranging between 11.92 to 167.66, with the exception of one codes program in Avista Gas. However, the Evaluators found that all efficiency measure efforts were not cost effective for all program years, with cost-benefit ratios ranging between 0.0 and 0.7. Using the service territory methodology, measures and codes had overestimated savings accrued out-of-state and had underestimated savings accrued within Idaho. The Evaluators estimated savings using service territory allocation methodology, which led to realization rates for individual measures under 100% and over 100%; however, the overall effect of this change revealed NEEA efforts remained cost-effective for each Idaho Power electric, Avista electric, and Avista gas due to codes and standards savings.

General Findings

- **Finding #1:** Utilities that fund NEEA can choose whether savings are reported by allocation share methodology or service territory methodology. The allocation share methodology overrepresents out-of-state and out-of-service territory savings across measures, codes, and standards while simultaneously underrepresenting in-state and in-service-territory savings across measures, codes, and standards. However, the service territory methodology accurately represents benefits directed to Avista and Idaho Power customers within the state of Idaho.
- **Finding #2:** The data NEEA utilizes to estimate net market savings is available at resolutions that allow NEEA to estimate precise savings for each utility service territory.
- **Finding #3:** The Evaluators found that the methodology in which savings were estimated across measures were inconsistent. For some measures, service territory methodology was used, and for others, funder share allocation methodology was used.
- **Finding #4**: NEEA prioritizes cost-effective savings in terms of regional benefit. Therefore, savings and cost-effectiveness are distributed across the region evenly, despite observed distribution of savings across states. Although this philosophy has merit, more precise estimates of utility-level and program-level savings help NEEA's stakeholders relay relevant savings and cost-effectiveness results to their respective regulatory commissions. This remains critical, due to some state-level commission orders to pursue all cost-effective energy efficiency efforts.
- **Finding #5:** The interviews revealed that although the three parties fundamentally want to improve energy efficiency and increase market adoption of emerging technologies, their preferred approaches to this shared goal vary. Unlike the utilities, who strive to demonstrate the cost-effectiveness of their initiatives and investments on an annual or bi-annual cycle, NEEA operates on a five-year funding cycle, which is different than the typical annual or biannual utility planning cycle.
- **Finding #6:** NEEA's programs are designed with a broader constituency in mind than that of its member utilities. While the Idaho utilities' programs are targeted to produce benefits for their ratepayers, – NEEA is tasked with developing programs that need to consider what is best for the entire four-state region. At its core, NEEA's ethos assumes that changes made in one state will eventually spillover into another state and that in the long run, regional change will be realized.
- **Finding #7:** NEEA currently allocates code savings via funder share methodology, which estimates a proportion of total NEEA funding to each utility based on number of electric retail customers and overall load. Therefore, savings from code adoption in other states are in-part assigned to Idaho. The Evaluators found that out-of-state code building savings are currently being attributed to Idaho utilities. The Evaluators are skeptical that spillover from out-of-state code changes result in energy savings within the state of Idaho. Although the barriers to code adoption from one state to the next may be similar, there is no evidence to suggest that these learnings transfer to observable and measurable savings. NEEA has stated that starting in 2022, code savings will be allocated via service territory allocation.
- **Finding #8:**The NEEA Cost Effectiveness Advisory Committee (CEAC) meets quarterly with the NEEA objectives to provide space for discussion around results of recently completed

evaluation, progress of field studies, relevant updates to programs, and acceptance or questioning of NEEA methodology towards calculation of savings.

Efficiency Measure Findings

- **Finding #9:** The Evaluators estimated verified Ex Post aMW for the efficiency measures to display 39%, 52%, and 0% realization rates for Idaho Power electric, Avista electric, and Avista gas savings within the state of Idaho, respectively. The difference in claimed savings and verified savings is due to the change to using service territory allocation rather than funder share allocation. The efficiency measures category Ex Ante savings included savings for measures completed in Washington, Oregon, and Montana – therefore, for some measures, the funder share allocation methodology underestimated Idaho-specific savings while others overestimated out-of-state savings. The overall effect of this change resulted in a lower than 100% realization rate.
- **Finding #10:** The database review revealed that a variety of fields (measure life, UES) were empty across measure types due to lack of savings claimed for the measure, which made verification of values difficult and complicates tracking of a measure progress over time.
- **Finding #11:** The database review revealed that NEEA's current method for distribution of modeled naturally occurring baseline units between local program and NEEA efforts is not reasonable. A portion of energy efficient technology sales are due to naturally occurring baseline. NEEA nets out modeled naturally occurring baseline in order to avoid claiming savings for units that would have been sold had no program or NEEA-effort been provided within the market. However, the method in which these baseline units are netted out is not distributed equitably. For some measures, NEEA estimates that a large proportion of local program units are baseline, and therefore a larger proportion of the remaining net market effects is assigned to NEEA efforts. The Evaluators raise concern for this assumption, as it is unlikely locally incentivized, rebated measures display the same free ridership as non-incentivized measures in the region.
- **Finding #12:** The Evaluators reviewed the utilized UES via the Regional Technical Forum (RTF) workbooks, field study data, and simulation analysis findings and note no large concerns with NEEA UES methodology or market baseline assumptions.
- **Finding #13:** The Evaluators found that NEEA calculates cost-effectiveness of its portfolio using the total regional savings rather than the net market effects. The Evaluators determined that this methodology raises concern, and the NEEA cost-effectiveness tests currently account for all measure, standard, and code completions across the entire region, effectively double counting local program savings and simultaneously claiming naturally occurring baseline savings. Because Avista and Idaho Power calculate their own internal cost effectiveness tests, this finding does not impact Idaho Power or Avista reporting. However, the Evaluators highlight this finding, as NEEA savings allocation and cost allocation methods are not currently consistent with regulatory requirements.

Standards Findings

- **Finding #14:** The Evaluators estimated verified Ex Post aMW for the standards efforts to display 34% and 50% realization rates for Idaho Power electric and Avista electric within the state of Idaho, respectively. Avista gas did not claim any savings for standards. The difference between claimed savings and verified savings is due to the change to using service territory allocation rather than funder share allocation. A minor cause of discrepancy is due to corrected baseline units using influence evaluation values.
- **Finding #15:** NEEA contracts third-party evaluators to conduct "influence evaluations" for each standard, which summarizes NEEA's overall qualitative and quantitative influence towards federal standards updates. NEEA uses the quantitative assessment as an estimate of federal standards naturally occurring baseline. The Evaluators found that some of these influence scores were not integrated properly to estimate baseline units. The Evaluators also found more than half (13 of 25) federal standard measures lack influence evaluations.

Code Findings

- **Finding #16:** The Evaluators estimated verified Ex Post aMW for the code efforts to display 137%, 125%, and 87% realization rates for Idaho Power electric, Avista electric, and Avista gas savings within the state of Idaho, respectively. The difference between claimed savings and verified savings is due to the change to using service territory allocation rather than funder share allocation. Overall, the funder share allocation underestimated Idaho-specific code savings using the current NEEA policy of claiming 100% code after code is implemented.
- **Finding #17:** Currently, NEEA does not complete third-party evaluations of NEEA "influence" towards codes updates as is currently done for federal standards updates. Therefore, NEEA currently claims 100% savings for code-built homes. As summarized in the standards influence evaluations summarized in Table 3-35, NEEA influence towards standards ranges between 2.6% and 61%. If codes are evaluated similarly, and portray a similar range of influence, NEEA code savings could be significantly overrepresenting savings. NEEA's current policy is to report 100% of code-built residential and commercial building savings (while integrating compliance rates) for 10 years after the effective code update date. Currently, NEEA does not maintain a model to estimate naturally occurring baseline over time, as it does for its energy efficiency measures. Essentially, the current NEEA methodology assumes that there would be a 10-year lag in current residential and commercial building code if NEEA did not participate in code update efforts.
- **Finding #18:** The Evaluators reviewed simulation model methodology used by NEEA to estimate code savings and found that UES methodology for code savings do not present any concerns.

1.4.2 Recommendations

- **Recommendation #1:** The Evaluators recommend Avista and Idaho Power request NEEA to report annual savings via the service territory methodology for each measure claimed by NEEA for each Idaho Power electric, Avista electric, and Avista gas. (Based on Finding #1, #2, #3)

- **Recommendation #2:** The Evaluators recommend that Avista and Idaho Power request annual savings reports to include estimates of administrative costs, incentive costs, and non-incentive costs by service territory. This will allow each utility to calculate more accurate cost-effectiveness tests for each initiative to determine whether extension of funding is a viable option within each utility's regulatory environment. (Based on Finding #4)
- **Recommendation #3:** The Evaluators recommend that NEEA work with utilities to accurately produce service territory-level savings and to best serve each state's current regulatory environment and utility's localized concerns. (Based on Finding #5)
- **Recommendation #4:** The Evaluators recommend that NEEA track progress for each code change relative to administrative dollars spent towards state-level codes and associated energy savings accrued by each state-level code. With the 20-year market transformation in mind, the service-territory-level savings will still accrue over the 20-year horizon, however, using this methodology, actual market transformation effects of co-created savings will be more accurately tracked. (Based on Finding #6, #7)
- **Recommendation #5:** The Evaluators recommend that measure-level values are detailed as accurately as possible, and that each field is completed in the workbook to allow for year-over-year tracking of regional units, baseline units, retirement units, and unit energy savings values over time. (Based on Finding #10)
- **Recommendation #6** The Evaluators recommend that NEEA distribute naturally occurring baseline units more equitable between local program units and total regional units. (Based on Finding #11)
- **Recommendation #7**: In the case that cost effectiveness tests are completed using NEEA-reported savings, the Evaluators recommend that Avista and Idaho Power calculate cost-effectiveness using net market effects rather than total regional savings, as is consistent with current regulatory requirements to report gross savings that would not have occurred without program intervention. (Based on Finding #13)
- **Recommendation #8:** The Evaluators recommend that third-party evaluations are completed for the federal standards claimed by NEEA, as well as any federal standards in which NEEA hopes to claim savings for in the future. Using the quantitative estimate of NEEA influence, the Evaluators recommend that NEEA calculate a naturally occurring baseline for each standard. (Based on Finding #15)
- **Recommendation #9:** The Evaluators recommend an evaluation is completed for each code update to estimate NEEA's qualitative and quantitative influence towards the code update. (Based on Finding #17)

2 Impact Evaluation Approach

The primary objective of the impact evaluation was to determine ex-post verified net energy savings. This section describes the impact evaluation activities that performed for the evaluation of NEEA's net market savings impacts attributed to Idaho service territory as well as the partition of those Idaho

savings to IPC and Avista, respectively. The Evaluators summarize the general approach to validate the energy and demand impacts attributable to NEEA activities in relation to savings calculation methodologies for claiming energy savings, allocation of those savings to IPC and Avista, and cost-effectiveness of those savings for IPC and Avista.

The Evaluators used the following approaches to review and validate NEEA's energy savings assumptions associated with the efficiency measures, market transformation, and codes and standards efforts employed by NEEA. Each of these approaches are in accordance with the protocols defined by the International Performance Measurement and Verification Protocols (IPMVP) and the Uniform Methods Project (UMP). Table 2-1 summarizes the impact evaluation activities by initiative.

Table 2-1: Impact Evaluation Tasks by NEEA Activity

Initiative	Database Review	Document Verif.	Electric/Gas Impact Methodology
Efficiency measures	✓	✓	Deemed Savings / Engineering Algorithms
Codes and standards	✓	✓	

The M&V methodologies are activity-specific and determined by ex-ante methodology as well as relative contribution of a given activity to NEEA's overall energy efficiency impacts. The Evaluators reviewed relevant information on infrastructure, framework, and guidelines set out for EM&V work in several guidebook documents that have been published over the past several years. These included the following:

- Northwest Power & Conservation Council Regional Technical Forum (RTF)
- Workpapers of previous NEEA measure savings estimate evaluations
- National Renewable Energy Laboratory (NREL), United States Department of Energy (DOE) The Uniform Methods Project (UMP): Methods for Determining Energy Efficiency Savings for Specific Measures, April 2013[4]
- International Performance Measurement and Verification Protocol (IPMVP) maintained by the Efficiency Valuation Organization (EVO) with sponsorship by the U.S. Department of Energy (DOE)[5]

All components of the data collection and analysis are available to stakeholders and will remain available through prudence review and investigation as required by the Idaho Public Utilities

[4] Notably, The Uniform Methods Project (UMP) includes the following chapters authored by ADM. Chapter 9 (Metering Cross-Cutting Protocols) was authored by Dan Mort and Chapter 15 (Commercial New Construction Protocol) was Authored by Steven Keates.

[5] Core Concepts: International Measurement and Verification Protocol. EVO 100000 – 1:2016, October 2016.

Commission subsequent to the evaluation period. Table 2-2 summarizes the measures, codes, and standards implemented by and claimed by NEEA between the 5-year period of 2017 through 2021.

Table 2-2: Summary of NEEA Initiatives

Sector	Initiative	Measure, Standard, or Code	Electric or Gas
Agriculture	Other Non-Residential Standards	Standard	Electric
Commercial	Building Operator Certification Expansion	Measure	Electric
	Commercial Code Enhancement	Code	Electric
	Commissioning Buildings	Measure	Electric
	Condensing Rooftop Units	Measure	Electric
	Desktop Power Supplies	Measure	Electric
	Efficient Rooftop Units	Measure	Gas
	Extended Motor Products	Measure	Electric
	Luminaire Level Lighting Controls	Measure	Electric
	Other Codes (Commercial)	Code	Electric/Gas
	Other Non-Residential Standards	Standard	Electric
	Other Strategic Energy Management	Measure	Electric
	Reduced Wattage Lamp Replacement	Measure	Electric
	Window Attachments	Measure	Electric
	XMP Pumps	Measure	Electric
Industrial	Certified Refrigeration Energy Specialist (CRES)	Measure	Electric
	Commissioning Buildings	Measure	Electric
	Drive Power	Measure	Electric
	Other Non-Residential Standards	Standard	Electric
	Other Strategic Energy Management	Measure	Electric
	Reduced Wattage Lamp Replacement	Measure	Electric
Residential	Ductless Heat Pumps	Measure	Electric
	Efficient Gas Water Heater	Measure	Gas
	Efficient Homes	Code	Electric
	Extended Motor Products	Measure	Electric
	Heat Pump Water Heaters	Measure	Electric
	Manufactured Homes	Measure	Electric
	Next Step Homes	Measure	Electric/Gas
	Other Codes (Multifamily)	Code	Electric
	Other Residential Standards	Standard	Electric
	Residential Lighting	Measure	Electric
	Residential New Construction	Code	Electric
	Residential New Construction/Next Step Homes	Measure	Electric/Gas
	Retail Product Portfolio	Measure	Electric
	Super-Efficient Dryers	Measure	Electric
	Televisions	Measure	Electric
	XMP Pumps	Measure	Electric

The Evaluators estimated savings for each of the initiatives listed in the table above by verifying total regional units, total local program units, total baseline units, and total retirement units are incorporated correctly, in addition to measure UES values. Once the net market units and UES values were verified, the Evaluators then verified that the most reasonable methods for allocating savings to the Idaho and utility service territory are incorporated to estimate savings for each Avista and IPC service territories.

2.1 Activity-Specific M&V

In this section, the Evaluators detail our evaluation activities to evaluate the following activities that result in energy impact savings from NEEA in Idaho:

- Efficiency Measures
- Standards
- Codes

2.1.1 Efficiency Measures

NEEA offers a variety of energy efficiency measures to residential and nonresidential customers in the Northwest region by working with manufacturers and retailers to lower barriers for customers to purchase and install energy efficiency measures. This effort allows NEEA the ability to identify opportunities to increase the overall efficiency of entire product categories, such as air conditioners, furnaces, and clothes washers and dryers. For the purpose of this report, we refer to the energy efficiency measures and the energy savings claimed through each of these measures in the ESRPP and measure initiatives as: “Efficiency Measures”.

One of the main objectives of this evaluation is to review and verify NEEA’s methodology for claiming energy and demand savings through the efficiency measures offered through various NEEA efforts. The Evaluators presents the following measure list for this activity in the table below.

Table 2-3: Summary of NEEA Efficiency Measures by Sector

Sector	Initiative
Commercial	Building Operator Certification Expansion
	Commissioning Buildings
	Condensing Rooftop Units
	Desktop Power Supplies
	Efficient Rooftop Units
	Extended Motor Products
	Luminaire Level Lighting Controls
	Other Strategic Energy Management
	Reduced Wattage Lamp Replacement
	Window Attachments
	XMP Pumps
Industrial	Certified Refrigeration Energy Specialist (CRES)
	Commissioning Buildings
	Drive Power
	Other Strategic Energy Management
	Reduced Wattage Lamp Replacement
Residential	Ductless Heat Pumps
	Efficient Gas Water Heater
	Extended Motor Products
	Heat Pump Water Heaters
	Manufactured Homes
	Next Step Homes
	Residential Lighting
	Residential New Construction/Next Step Homes
	Retail Product Portfolio
	Super-Efficient Dryers
	Televisions
	XMP Pumps

The Evaluators summarize the initiative-specific and measure-specific impact analysis activities and requirements for the Efficiency Measures in the section below.

2.1.2 Codes and Standards

NEEA has supported code activities in the Northwest states since its founding in 1997, principally by funding staff positions or organizations responsible for code adoption and education. NEEA's goals with these efforts are to encourage the adoption of more stringent residential and nonresidential energy codes and to improve energy code program adherence and effectiveness.

Energy codes function to lock into place energy efficiency measures that are commonly used within the building construction industry. This occurs by eliminating the option of having an efficiency less than that mandated by code for newly constructed buildings. This can effectively produce significant energy savings even when the code minimum is set at the market average efficiency by eliminating the option to install less-than-average efficient products still in the marketplace today.

One of the main objectives of this evaluation is to review NEEA's impact on adopted code and the associated claimed energy savings allocated by NEEA towards NEEA's energy codes and standards efforts, and furthermore, to verify the allocation of those estimated savings to each IPC and Avista.

Table 2-4: Summary of NEEA Codes & Standards Measures

Code/Standard	Initiative
Code	Commercial Code Enhancement
	Other Codes (Commercial)
	Efficient Homes
	Other Codes (Multifamily)
	Residential New Construction
Standard	Other Non-Residential Standards – Commercial
	Other Non-Residential Standards – Industrial
	Other Non-Residential Standards – Agricultural
	Other Residential Standards

The following sections detail the impact methods used for each of the codes and standards NEEA has implemented and in which NEEA claims energy efficiency savings.

2.2 Step 1: Database Review

Before conducting each impact analysis, the Evaluators conducted a database review for each of the measures. The Evaluators requested all available program tracking data from NEEA that pertains to the 2017 through 2021 program years and consolidated these datasets into one consistently formatted summary of NEEA's efforts and initiative impacts. This exists as a unified dataset with indicator variables for calendar year and for applicability to Avista, IPC, or both utilities.

This dataset was then reviewed thoroughly to identify and address any inconsistencies in formatting, data entry, formula entry, and functionality.

2.3 Step 2: Document-Based Verification

This section describes the Evaluator's general methodology for conducting document-based verification for NEEA's initiatives in which energy efficiency savings are achieved and quantified.

Documentation for this task will include documented measure specifications, UES workbooks, whitepapers, testing procedures, previous evaluations, logic models, and presentations that communicate details used to estimate Idaho-level savings for each measure. In the case that the Evaluators found any deviations between the sales data, model qualifications, UES values, engineering algorithms, or assumed input values, the Evaluators noted and summarize these differences in the aggregated workbooks.

2.4 Step 3: UES Review

To facilitate our review of savings calculations, the Evaluators reviewed and documented whether (1) NEEA's methodology used for the calculation was appropriate, (2) NEEA's assumptions used were reasonable and appropriate, and (3) NEEA's savings calculations were completed correctly. With these

findings, the Evaluators report observations as well as make recommendations to revise such methodologies.

The Evaluators employed the following approaches to complete impact evaluation activities for reviewing and evaluating NEEA estimated energy savings:

- Deemed Savings
- Engineering Algorithms

The Evaluators did not explore simulation model analysis or billing analysis, as reliable deemed savings estimates, field data, and technical reference manuals were readily available to verify savings estimates used in NEEA's analysis. In the following sections, we summarize the general guidelines and activities the Evaluators followed while conducting each of the above analyses.

2.5 Step 4: Market Transformation Baseline Review

One of the main objectives of this evaluation is to review and verify NEEA's methodology for baseline creation for NEEA's market transformation and energy savings impact efforts. The Evaluators interviewed NEEA staff to gain further context on the documentation, procedures, and assumptions used during baseline creation, and second, review such documentation and the application of the assumed values to each measure in which a market transformation baseline is created.

The Evaluators also reviewed, in detail, documentation, previous evaluations, and whitepapers, for each to gather more understanding of how NEEA calculates naturally occurring baseline for each of its measures, codes, and standards.

NEEA's product baselines represent the market share of qualified products that would exist at a given time in absence of NEEA's intervention in the market. NEEA develops baseline curves or forecasts to anticipate the proportions each qualified product market share will naturally occur long-term by employing available market data and assumptions.

2.6 Step 5: Staff Interviews

The Evaluators conducted thorough interviews with NEEA, IPC, and Avista staff to further understand the NEEA savings methodology for estimating measure and codes impact savings and the methodology and assumptions in creating the NEEA baseline for market transformation. As detailed below, the staff interviews addressed all the objectives identified in the RFP.

The following subsections present overviews of our approach to staff interviews, followed by information on how we identified and answered important research questions, how we approached data collection, and how we implemented these interviews.

Table 2-5 summarizes our data collection approaches for each initiative.

Table 2-5: Summary of Staff Interviews

Initiative	Staff / Implementers
Efficiency Measures	■ 4 NEEA staff ■ 2 IPC staff ■ 2 Avista staff
Codes and Standards	

The Evaluators used the various information sources – program documentation review and staff interviews to provide convergent information to address the identified research questions. We made effective use of each source by identifying which sources will provide the most applicable information to each question, as shown in Table 2-6.

Table 2-6: Data Sources to Answer Research Questions

Process Evaluation Research Question	Documentation and Data	Staff
Are initiatives run per design and efficiently/effectively?	✓	✓
Is staffing/organization sufficient and appropriate?	✓	✓
What is the methodology for allocating co-created energy savings to Idaho Power Company, Avista, and other utilities in Idaho?	✓	✓
Are the methodologies employed for calculating and allocating savings documented and followed consistently across measures and initiatives?	✓	✓
What is the basis of the assumptions used in each the calculating and allocation of savings across measures and initiatives?	✓	✓
What is the methodology for NEEA's baseline creation for market transformation and energy savings impacts of NEEA's efforts?	✓	✓
Are the baseline creation methodologies followed consistently across initiatives and measures?	✓	✓
How has cost-effectiveness changed over the past years and why?	✓	✓
Are quality assurance procedures appropriate and effective?	✓	✓
Are management and implementation tools appropriate and effective?	✓	✓
Are program materials effective and complete?	✓	✓

2.7 Step 6: Cost-Effectiveness Testing

Finally, the Evaluators calculated each utility's cost-effectiveness, avoided energy costs, and implementation costs. We used our in-house-developed cost-effectiveness tool to provide cost-effectiveness assessments for the IPC and Avista Portfolios by NEEA energy savings activity. NEEA calculated cost effectiveness for the NEEA portfolio using avoided costs from the 7th Power Plan, a least-cost power plan for the Pacific Northwest created by the Northwest Power and Conservation Council and updated approximately every 6 to 7 years.

However, the Evaluators calculate cost-effectiveness assessments for this evaluation work using Idaho Power's and Avista's specific avoided cost relevant to each program year.

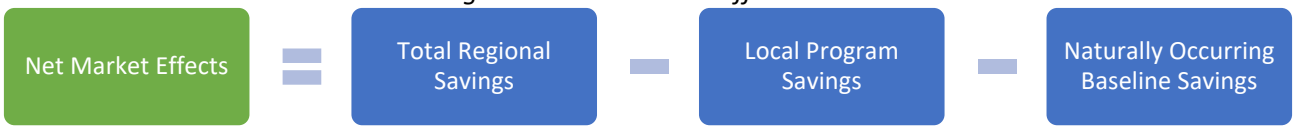
As Idaho utilizes the Utility Cost Test (UCT) to evaluate a program, the Evaluators determined the economic performance with UCT. This test assists with identifying avenues to improve cost-effectiveness, such as adjustments to measure incentive levels, administration spending, or adjustment to program offerings. Cost-effectiveness workbooks were built "ground-up", at the highest granularity level supported by the program data. The Evaluators calculated cost effectiveness at the measure-level, which was then aggregated to initiative- and portfolio-level values. This allows IPC and Avista to address individual NEEA offerings and potentially select lower-performing initiatives to consider for funding reductions or reallocations.

3 Evaluation Results

This section provides the results of the overall impact evaluation, as well as the results between efficiency measures and codes and standards measures. The Evaluators calculated the verified electric and natural gas savings estimated to reasonably claim as NEEA net market effects within the state of Idaho for each Avista and Idaho Power.

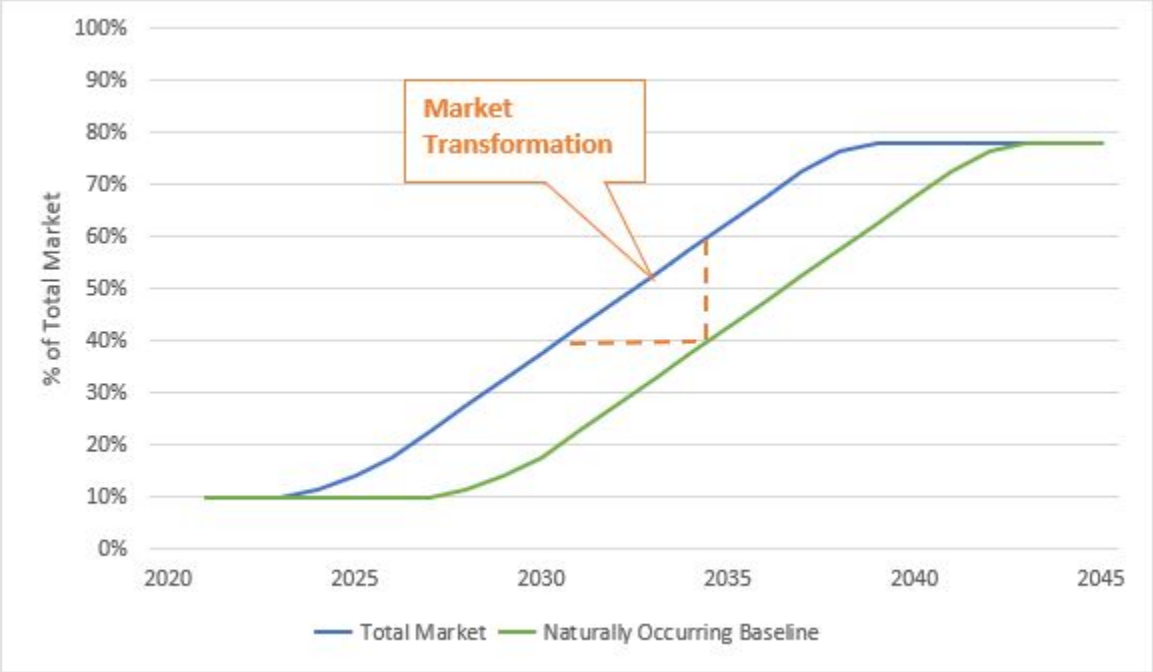
Net market effects are summarized by NEEA in the following figure:

Figure 3-1: Net Market Effects[6]



Market transformation is achieved through removing barriers from consumers, manufacturers, and the market so that consumers adopt these technologies at a faster pace than without these efforts. The following figure displays the philosophy behind NEEA's market transformation progress.

Figure 3-2: Illustration of Naturally Occurring Market Adoption Approach[7]



The Evaluators outline NEEA's general Ex Ante savings methodology steps as the following:

[6] NEEA Operational Guidelines for Estimating Electric Energy Savings, 2022.
[7] NEEA Operational Guidelines for Estimating Electric Energy Savings, 2022.

1. Total regional units are quantified using regional program and sales data
2. Local program units are quantified using local program data
3. Baseline units are quantified using market transformation baseline models
4. Retired units are quantified using market transformation baseline models
5. Net market units for the Pacific Northwest region are calculated using the above inputs
6. Net market units for the funding utility are allocated using service territory or funder share allocation methodology
7. Claimable net savings allocated to funding utilities are calculated by multiplying net market units by the measure-level UES

The Evaluators outline the above steps in each of the equations detailed below. Each equation input listed below were reviewed by the Evaluators to confirm that the estimates are reasonable for current use. The Evaluators also identify opportunities to improve estimates using currently available data.

NEEA calculates net market units to represent energy efficiency upgrades that would not have occurred without NEEA intervention in the Northwest. Net market units are calculated in a way that nets out upgrades completed due to local program intervention, upgrades completed due to naturally occurring baseline, and units estimated to retire. The net market units are calculated for each individual measure as follows:

Equation 3-1: Regional Net Market Units

$$Net\ Market\ Units_{Northwest\ Region} = Total\ Regional\ Units_{Northwest\ Region} - Local\ Program\ Units_{Northwest\ Region} - Baseline\ Units_{Northwest\ Region} - Retirement\ Units_{Northwest\ Region}$$

Where,

$Total\ Regional\ Units$ = The total number of measures installed within the northwest region (Idaho, Montana, Oregon, and Washington)

$Local\ Program\ Units$ = The total number of measures rebated by local programs, estimated using Energy Trust of Oregon, Bonneville Power Administration, and local utility program data

$Baseline\ Units$ = The estimated baseline units using the measure-level NEEA market transformation baseline models

$Retirement\ Units$ = The estimated retired units, also calculated using NEEA market transformation baseline models

In order to convert the net market units for the northwest region into net market units for the Idaho-specific region, an allocation method is utilized to allocate a portion of those savings to the Avista and Idaho Power utilities within the state of Idaho. The utilities are provided a choice as to whether savings are reported with one of the following two options:

- **Funder Share Allocation**: This methodology was developed by NEEA and allocates a percent share of total funding amounts to each utility. These values include inputs such as: total load growth forecasts, weighted retail customers by utility, weighted retail energy sales by utility,

and caps on funding share increases. Further details of this methodology are provided in Section 3.3.2.

- **Service Territory Allocation**: This methodology produces a percent share of total measure completes or new construction completes estimated to occur within the utility shareholder's utility. This value is aggregated using utility-provided data within the Northwest region, which provides resolution that allows NEEA to assign each project to a specific utility service territory. Further details of this methodology are provided in Section 3.3.1.

Further details of each allocation method are presented in Section 3.3. The following equation details how the service territory allocation value chosen above is incorporated to calculate the utility-specific net market units.

Equation 3-2: Service Territory Allocation of Savings

$$Net\ Market\ Units_{Utility\ Service\ Territory} = Net\ Market\ Units_{Northwest\ Region} * Service\ Territory\ Allocation_{Utility\ Territory}$$

The following equation details how the funder share territory allocation value chosen above is incorporated to calculate the utility-specific net market units.

Equation 3-3: Funder Share Allocation of Savings

$$Net\ Market\ Units_{Utility\ Service\ Territory} = Net\ Market\ Units_{Northwest\ Region} * Funder\ Share\ Allocation_{Utility\ Service\ Territory}$$

As depicted above, the Idaho-specific share of total Avista service territory net market units is estimated by multiplying against the estimated proportion of Idaho service territory within the Avista Utilities service territory. Further details are presented in Section 3.3.

Finally, the initiative-level savings are calculated by multiplying the net market units by the verified UES, by program year. NEEA references the Regional Technical Forum (RTF) UES for the majority of measures offered. The resulting equation is as follows:

Equation 3-4: Verified Ex-Post Idaho-Specific Savings

$$Verified\ Ex\ Post\ Savings = Net\ Market\ Units_{Utility\ Idaho\ Service\ Territory} * Verified\ UES$$

The verified Ex-Post savings are then divided by the NEEA Ex-Ante savings to calculate the resulting realization rate. The verified Ex-Post Idaho-specific savings and realization rate is calculated by initiative and sector for each individual year and 5-year period evaluated.

3.1 Ex Ante Savings

In this section, the Evaluators summarize the Ex-Ante savings estimated by NEEA and reported on an annual basis to Avista and Idaho Power.

Table 3-1: Summary of Idaho Power Electric Idaho Ex Ante Savings

Program Year	Ex-Ante Savings: Measures (aMW)	Ex-Ante Savings: Codes (aMW)	Ex-Ante Savings: Standards (aMW)	Ex-Ante Savings: Total (aMW)
2017	0.31	0.89	1.45	2.65
2018	0.40	1.23	1.15	2.77
2019	0.28	1.32	0.40	1.99
2020	0.39	1.12	0.41	1.91
2021	0.42	1.00	0.41	1.82
Total	**1.78**	**5.56**	**3.81**	**11.15**

Table 3-2: Summary of Avista Electric Idaho Ex Ante Savings

Program Year	Ex-Ante Savings: Measures (aMW)	Ex-Ante Savings: Codes (aMW)	Ex-Ante Savings: Standards (aMW)	Ex-Ante Savings: Total (aMW)
2017	0.06	0.18	0.37	0.60
2018	0.06	0.22	0.30	0.57
2019	0.06	0.28	0.09	0.43
2020	0.08	0.24	0.09	0.41
2021	0.08	0.21	0.09	0.39
Total	**0.34**	**1.13**	**0.94**	**2.41**

Table 3-3: Summary of Avista Gas Idaho Ex Ante Savings

Program Year	Ex-Ante Savings: Measures (Therms)	Ex-Ante Savings: Codes (Therms)	Ex-Ante Savings: Standards (Therms)	Ex-Ante Savings: Total (Therms)
2019	636	43,109	0	43,745
2020	0	5,678	0	5,678
2021	0	152,881	0	152,881
Total	**636**	**201,667**	**0**	**202,304**

One of the objectives of this evaluation was to review the proportional savings of measures, codes, and standards savings attributed to Avista and Idaho Power. During in-depth interviews, Avista and Idaho Power staff noted that they had noticed savings from codes and standards have increased in proportion to total savings over the years, whereas the proportion of savings from measures have decreased over time. The following figures summarize the proportional contributions of each the measures, codes, and standards Ex-Ante savings determined by NEEA between 2017 and 2021 for each utility. As seen below, the proportion of savings developed through code and standards efforts has slowly decreased across the 5-year time period, starting from 92% and ending at 77% for Avista and starting at 89% and ending at 77% for Idaho Power.

Figure 3-3: Contributions to Ex-Ante Avista Idaho Electric Savings by Measures, Standards, and Codes

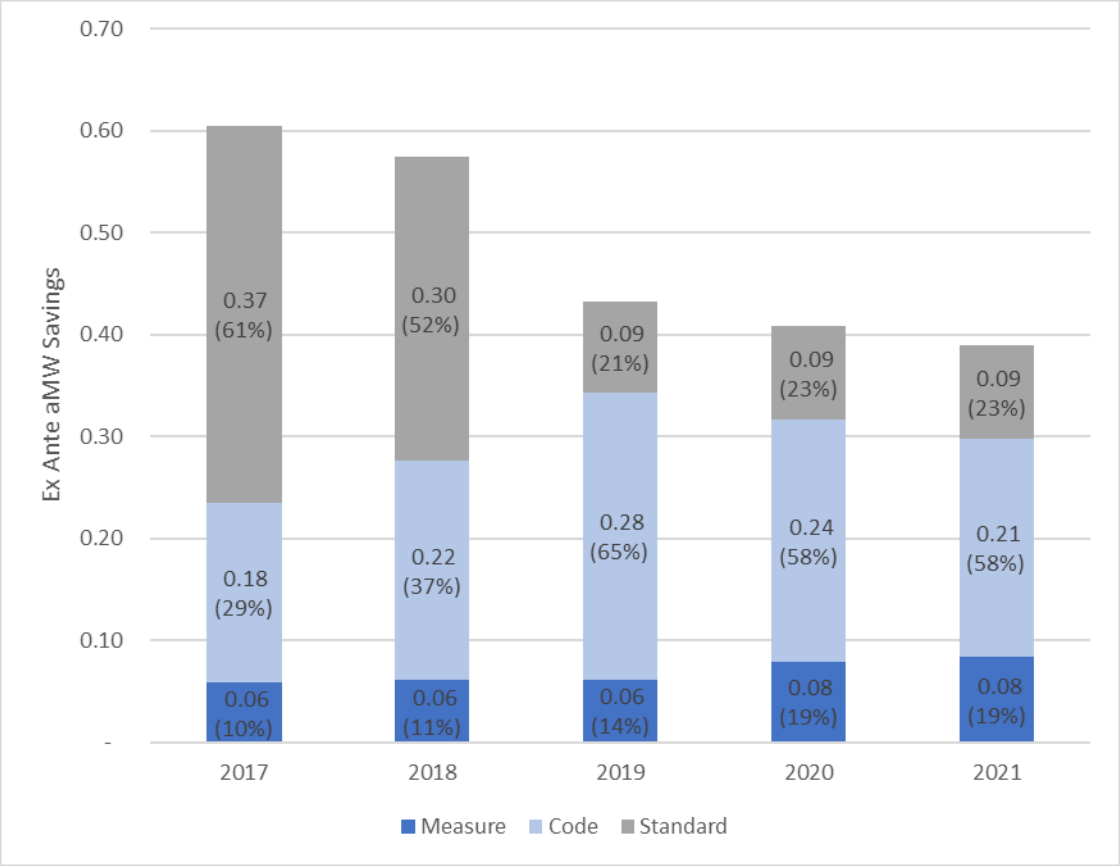
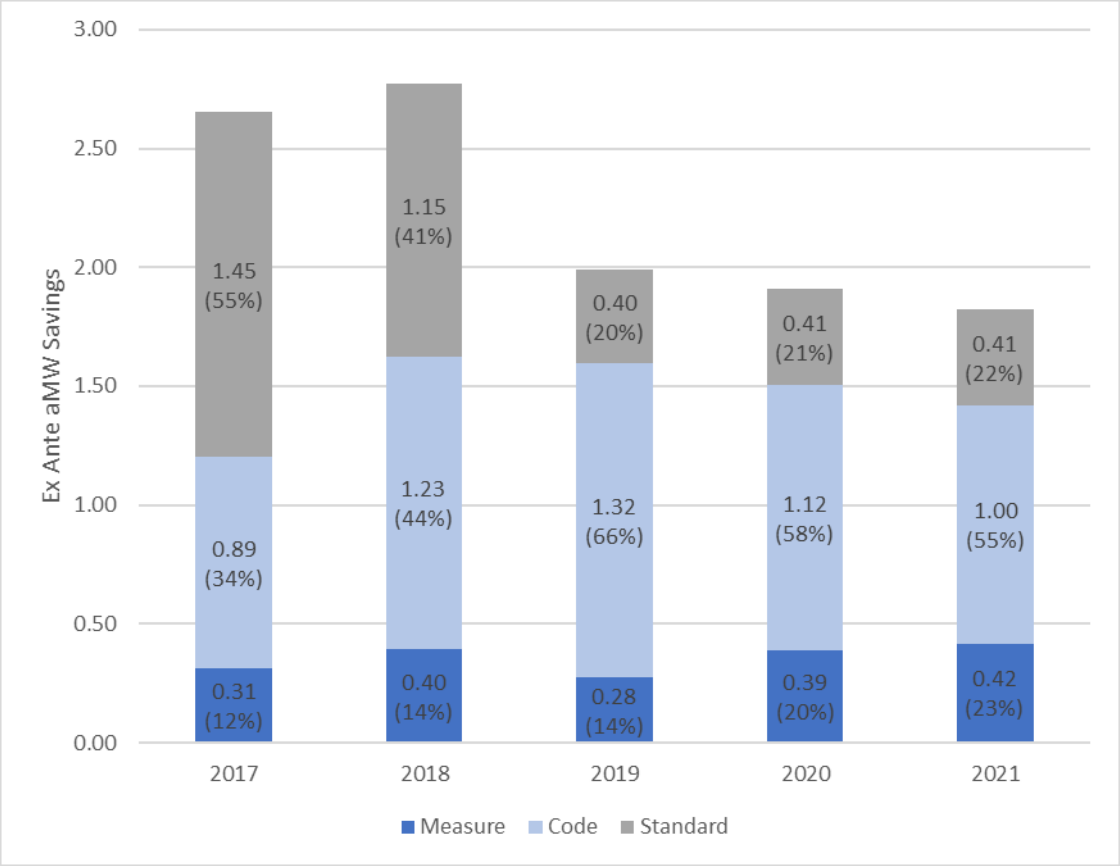


Figure 3-4: Contributions to Ex-Ante Idaho Power Idaho Electric Savings by Measures, Standards, and Codes



Although codes and standards contributions to savings are slowly decreasing over this 5-year evaluation period, the Evaluators note that a significant proportion of codes and standards savings originate from regional measure, standards, and code projects completed out-of-state. The Evaluators summarize the Ex-Ante savings categorized by state-level source of savings. The figures below depicts the total Ex-Ante savings attributed to Avista and IPC that had been accrued outside the state of Idaho under the funder share methodology versus the Ex-Post savings based on the service territory methodology.

Figure 3-5: Efficiency Measure Avista Idaho Electric Savings – WA/OR/MT Contribution to Ex-Ante (Funder Share) vs Ex-Post (Service Territory)

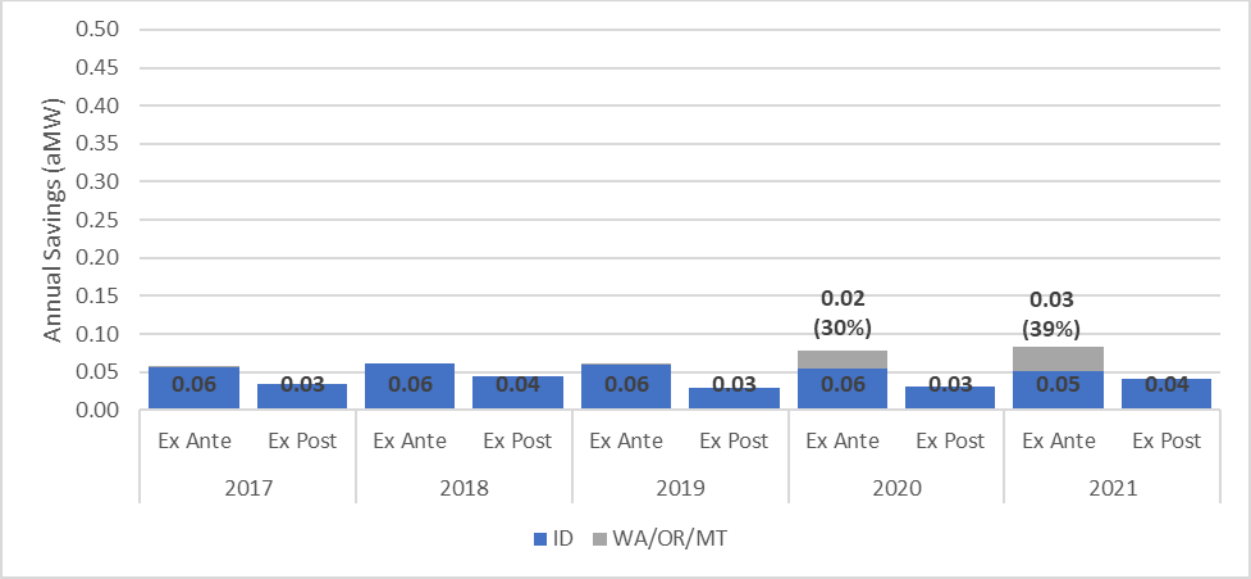


Figure 3-6: Code Avista Idaho Electric Savings – WA/OR/MT Contribution to Ex-Ante (Funder Share) vs Ex-Post (Service Territory)

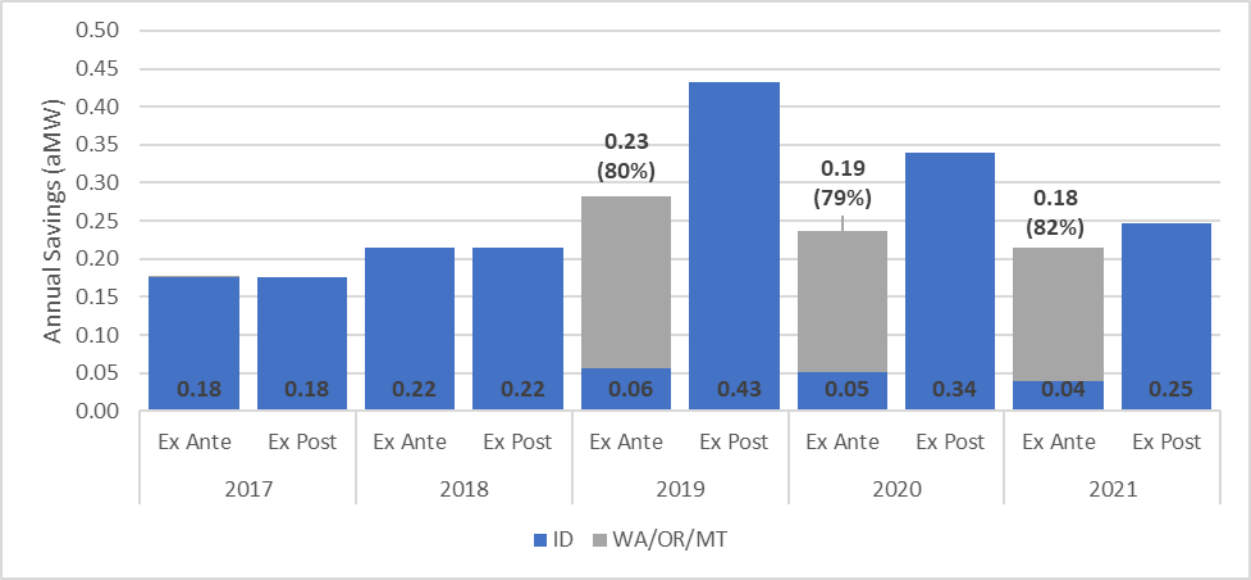


Figure 3-7: Standards Avista Idaho Electric Savings – WA/OR/MT Contribution to Ex-Ante (Funder Share) vs Ex-Post (Service Territory)

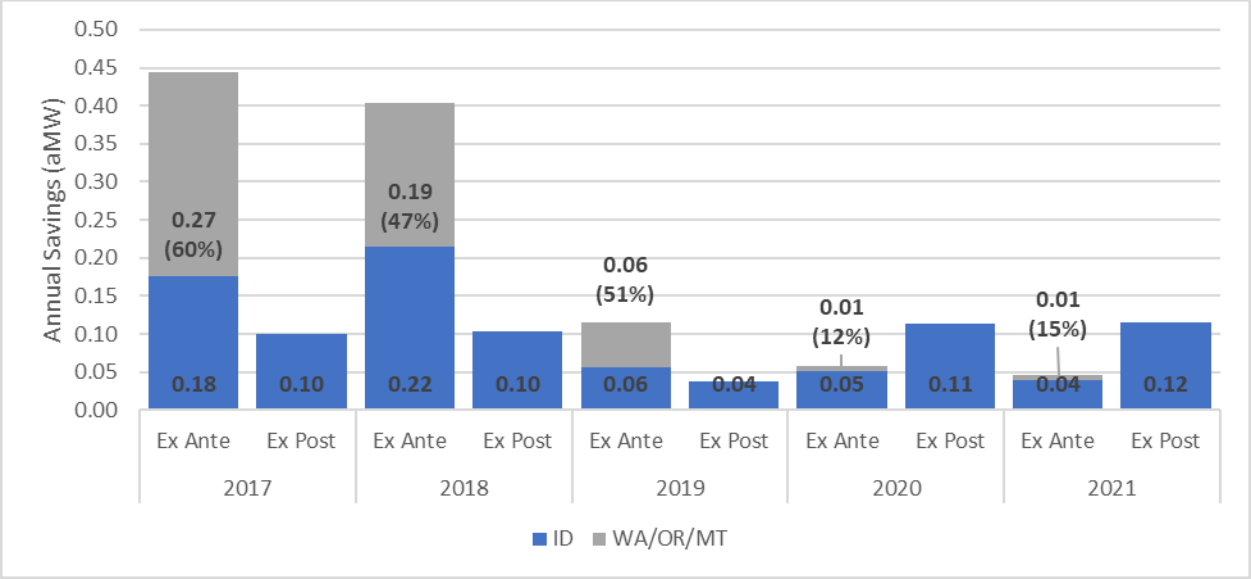


Figure 3-8: Efficiency Measure Idaho Power Idaho Electric Savings – WA/OR/MT Contribution to Ex-Ante (Funder Share) vs Ex-Post (Service Territory)

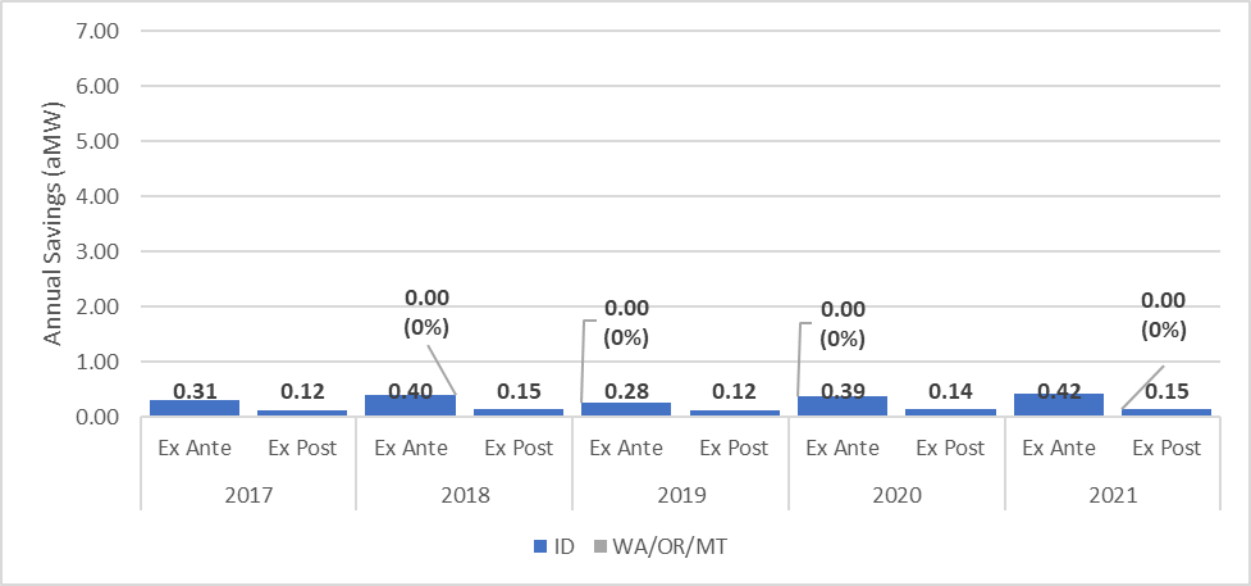


Figure 3-9: Code Idaho Power Idaho Electric Savings – WA/OR/MT Contribution to Ex-Ante (Funder Share) vs Ex-Post (Service Territory)

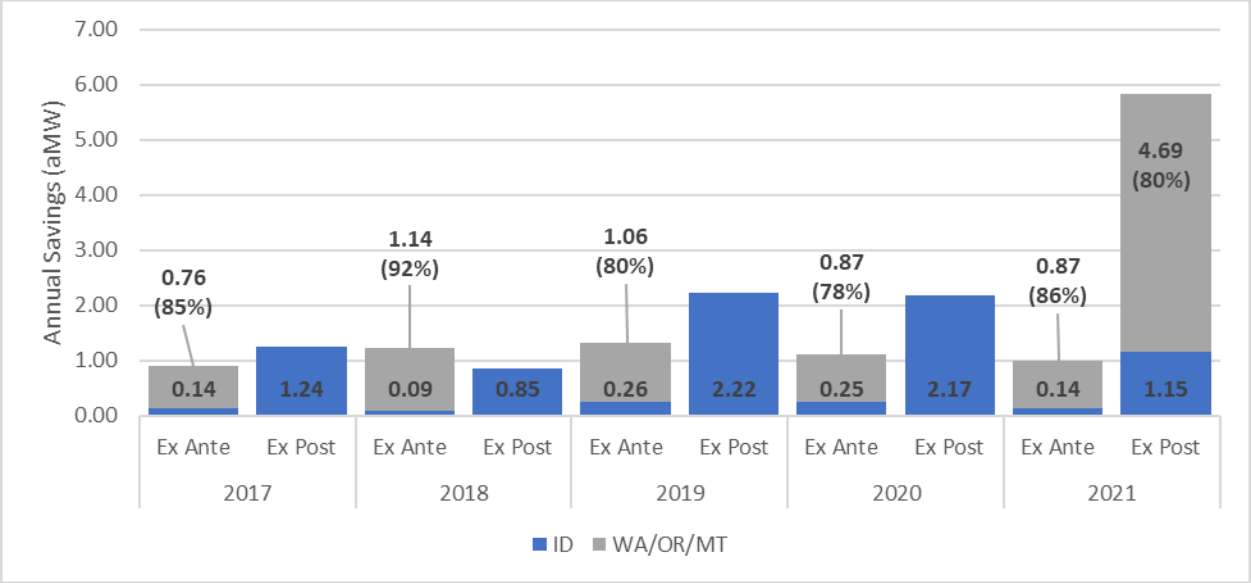


Figure 3-10: Standards Idaho Power Idaho Electric Savings – WA/OR/MT Contribution to Ex-Ante (Funder Share) vs Ex-Post (Service Territory)

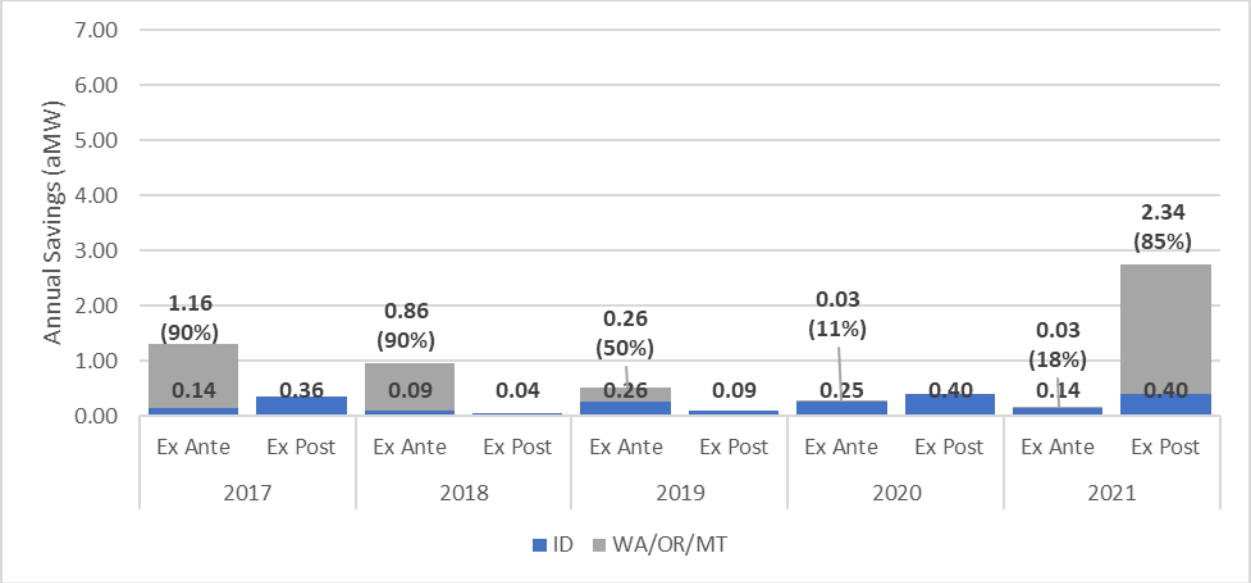


Figure 3-6 confirms that service territory allocation was utilized for 2017 and 2018 for Avista, which is portrayed by the lack of Washington, Oregon, or Montana-contributed savings towards Avista annual savings.

In addition, the proportion of code savings from out-of-state efforts are significantly higher than the proportion of measure or standards savings from out-of-state efforts. Therefore, code savings reported to Avista and IPC currently claim the majority of savings, (nearly 80% of savings) due to Washington,

Oregon, or Montana code change efforts and benefits by utilizing the funder share allocation methodology.

The trends seen in each of the figures above for each Avista and Idaho Power are similar, as expected, due to identical total regional units, total local program units, total baseline units, and total retirement units. The differences among the two utilities are determined solely through allocation methodology and values of each allocation methodology. Therefore, proportions of savings between the two should be similar, while magnitudes differ.

For Avista gas service territory in Idaho, NEEA-assigned Ex Ante savings consisted of almost entirely code savings, as seen in the figure below.

Figure 3-11: Efficiency Measure Avista Idaho Gas Savings – WA/OR/MT Contribution to Ex-Ante (Funder Share) vs Ex-Post (Service Territory)

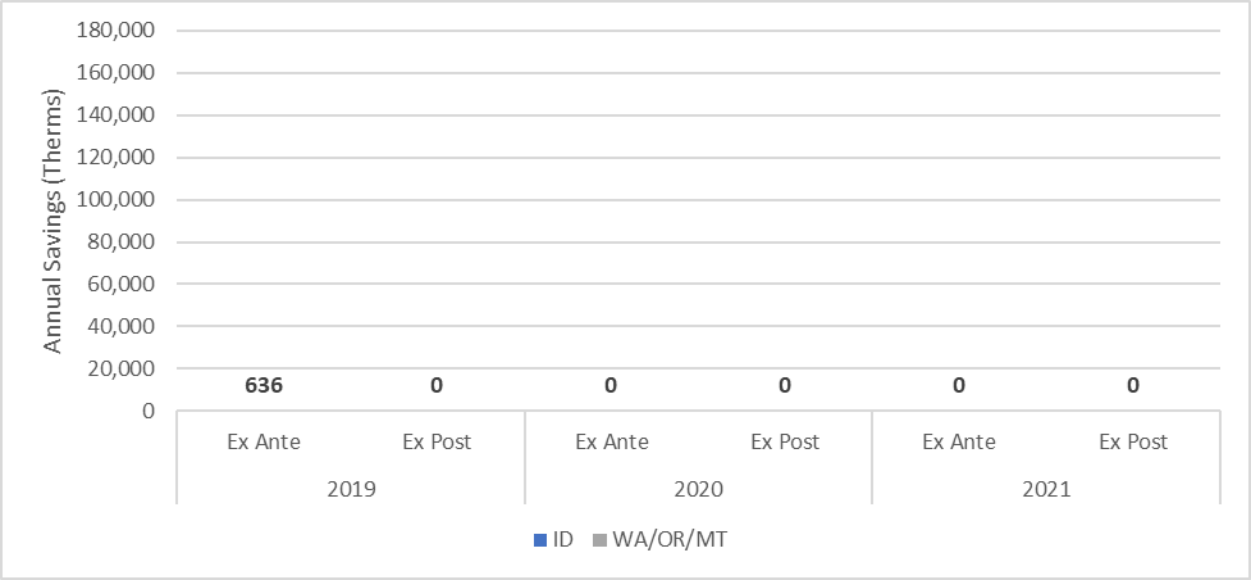
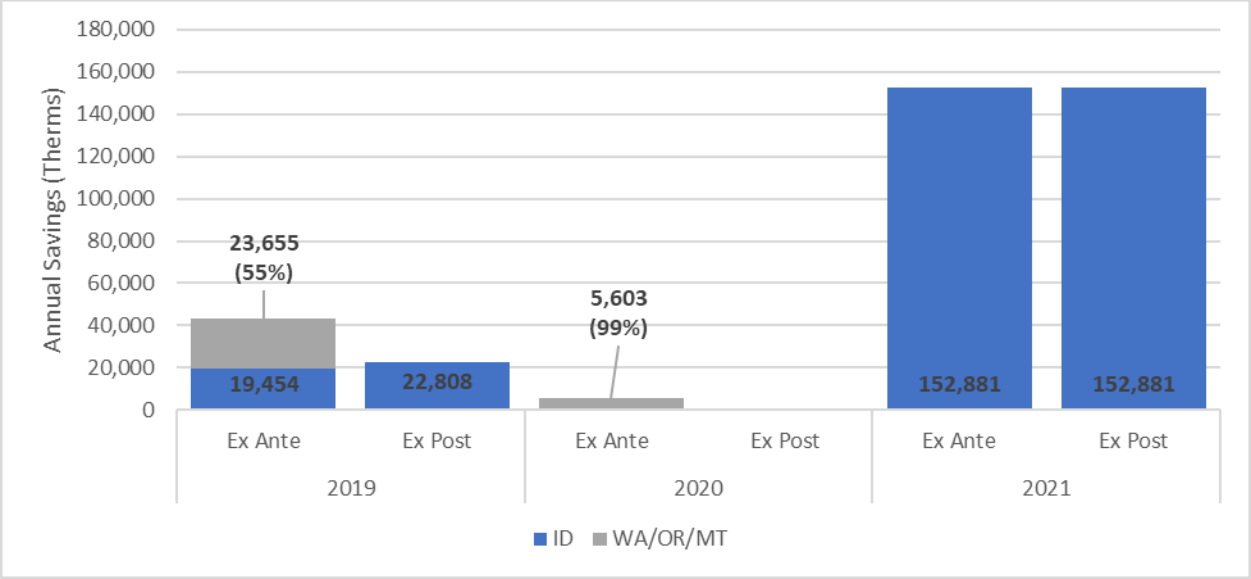


Figure 3-12: Code Avista Idaho Gas Savings – WA/OR/MT Contribution to Ex-Ante (Funder Share) vs Ex-Post (Service Territory)



The Avista gas measure savings reported by NEEA in 2019 consisted of no projects completed within the state of Idaho. Additionally, 55% and 99% of the code savings claimed consisted of projects originating outside the state of Idaho in 2019 and 2020, respectively. However, NEEA reported the 2021 annual savings via service territory methodology and therefore no savings were accrued outside the state of Idaho in 2021.

It is important to note the significant impact to savings that each the funder share methodology and service territory methodology contribute to overall savings for each of the measure, standards, and codes programs. In addition, the Evaluators note that inconsistencies among allocation methodology are seen within these two Idaho utilities, within service territories, within fuel types, and within initiatives.

3.2 Verified Ex Post Savings

In this section, the Evaluators summarize verified Ex Ante and Ex Post electric and gas savings for Avista and Idaho Power, along with realization rates across program years and NEEA initiatives.

3.2.1.1 Idaho Power Idaho Electric Verified Ex Post Savings

The Evaluators summarize the verified electric savings and realization rates for Idaho Power within the state of Idaho by program year in the table below.

Table 3-4: Summary of Idaho Power Idaho Electric Verified Ex Post Savings by Program Year

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	2.65	1.72	64.75%
2018	2.77	1.04	37.65%
2019	1.99	2.43	122.00%
2020	1.91	2.72	142.28%
2021	1.82	1.71	93.51%
Total	**11.15**	**9.61**	**86.23%**

Table 3-5 through Table 3-9 summarizes the Idaho Power Idaho verified electric savings and realization rates by initiative for each of the program years between 2017 and 2021. The Evaluators note that for the entirety of the report, the realization rates are based off more than two significant figures.

Table 3-5: PY2017 Summary of Idaho Power Electric Idaho Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Industrial	Certified Refrigeration Energy Specialist (CRES)	0.00	0.00	0.00%
Measure	Commercial	Commissioning Buildings	0.03	0.00	0.00%
Standard	Industrial	Drive Power	0.03	0.06	216.45%
Measure	Residential	Ductless Heat Pumps	0.06	0.00	6.72%
Code	Residential	Efficient Homes	0.35	0.60	172.50%
Measure	Residential	Heat Pump Water Heaters	0.10	0.01	5.68%
Measure	Commercial	Luminaire Level Lighting Controls	0.00	0.00	0.00%
Code	Commercial	Other Codes (Commercial)	0.38	0.34	90.56%
Code	Residential	Other Codes (Multifamily)	0.05	0.02	46.03%
Standard	Commercial	Other Non-Residential Standards	0.27	0.29	108.52%
Standard	Residential	Other Residential Standards	1.15	0.00	0.12%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.03	0.06	198.85%
Code	Residential	Residential New Construction/Next Step Homes	0.11	0.26	245.22%
Measure	Residential	Retail Product Portfolio	0.02	0.02	75.23%
Measure	Residential	Super-Efficient Dryers	0.05	0.02	32.89%
Measure	Residential	Televisions	0.02	0.02	103.12%
Total			**2.65**	**1.72**	**64.75%**

Table 3-6: PY2018 Summary of Idaho Power Idaho Electric Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Commercial	Building Operator Certification Expansion	0.00	0.00	0.00%
Measure	Industrial	Certified Refrigeration Energy Specialist (CRES)	0.03	0.00	0.00%
Measure	Commercial	Commissioning Buildings	0.02	0.00	0.00%
Measure	Industrial	Commissioning Buildings	0.00	0.00	0.00%
Measure	Commercial	Desktop Power Supplies	0.15	0.11	73.13%
Standard	Industrial	Drive Power	0.02	0.00	0.00%
Measure	Residential	Ductless Heat Pumps	0.03	0.00	0.00%
Code	Residential	Efficient Homes	0.38	0.81	215.05%
Measure	Residential	Heat Pump Water Heaters	0.04	0.00	0.00%
Measure	Residential	Manufactured Homes	0.00	0.00	0.00%
Code	Commercial	Other Codes (Commercial)	0.62	0.00	0.00%
Code	Residential	Other Codes (Multifamily)	0.05	0.04	73.04%
Standard	Commercial	Other Non-Residential Standards	0.08	0.02	29.61%
Standard	Industrial	Other Non-Residential Standards	0.22	0.02	8.49%
Standard	Residential	Other Residential Standards	0.82	0.00	0.16%
Measure	Industrial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.05	0.00	0.00%
Measure	Industrial	Reduced Wattage Lamp Replacement	0.01	0.00	0.00%
Code	Residential	Residential New Construction/Next Step Homes	0.18	0.00	0.00%
Measure	Residential	Retail Product Portfolio	0.02	0.01	57.04%
Measure	Residential	Super-Efficient Dryers	0.05	0.03	65.20%
Measure	Residential	Televisions	0.00	0.00	104.70%
Total			**2.77**	**1.04**	**37.65%**

Table 3-7: PY2019 Summary of Idaho Power Idaho Electric Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Commercial	Commissioning Buildings	0.03	0.00	0.00%
Measure	Industrial	Commissioning Buildings	0.00	0.00	0.00%
Measure	Commercial	Desktop Power Supplies	0.01	0.01	79.15%
Standard	Industrial	Drive Power	0.01	0.00	11.90%
Measure	Residential	Ductless Heat Pumps	0.05	0.00	1.02%
Code	Residential	Efficient Homes	0.37	0.81	217.23%
Measure	Residential	Heat Pump Water Heaters	0.04	0.00	3.74%
Measure	Commercial	Luminaire Level Lighting Controls	0.00	0.00	0.00%
Measure	Residential	Manufactured Homes	0.00	0.00	0.00%
Code	Residential	Next Step Homes	0.21	0.47	225.25%
Code	Commercial	Other Codes (Commercial)	0.69	0.92	132.61%
Code	Residential	Other Codes (Multifamily)	0.04	0.02	38.13%
Standard	Commercial	Other Non-Residential Standards	0.08	0.03	40.51%
Standard	Industrial	Other Non-Residential Standards	0.23	0.00	0.00%
Standard	Residential	Other Residential Standards	0.07	0.06	81.29%
Measure	Industrial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.04	0.04	85.46%
Measure	Industrial	Reduced Wattage Lamp Replacement	0.01	0.01	85.46%
Measure	Residential	Retail Product Portfolio	0.01	0.00	6.92%
Measure	Residential	Super-Efficient Dryers	0.08	0.06	81.85%
Measure	Residential	Televisions	0.00	0.00	0.00%
Total			**1.99**	**2.43**	**122.00%**

Table 3-8: PY2020 Summary of Idaho Power Idaho Electric Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Industrial	Certified Refrigeration Energy Specialist (CRES)	0.00	0.00	0.00%
Measure	Commercial	Commissioning Buildings	0.03	0.00	0.00%
Measure	Industrial	Commissioning Buildings	0.00	0.00	18.80%
Measure	Commercial	Desktop Power Supplies	0.01	0.00	0.00%
Standard	Industrial	Drive Power	0.00	0.00	0.00%
Measure	Residential	Ductless Heat Pumps	0.06	0.00	5.17%
Code	Residential	Efficient Homes	0.32	0.89	281.70%
Measure	Residential	Extended Motor Products	0.01	0.00	5.00%
Measure	Commercial	Extended Motor Products	0.01	0.00	28.78%
Measure	Residential	Heat Pump Water Heaters	0.08	0.00	4.17%
Measure	Commercial	Luminaire Level Lighting Controls	0.01	0.01	56.71%
Measure	Residential	Manufactured Homes	0.01	0.00	0.00%
Code	Residential	Next Step Homes	0.22	0.50	222.51%
Code	Commercial	Other Codes (Commercial)	0.54	0.77	142.92%
Code	Residential	Other Codes (Multifamily)	0.04	0.02	41.94%
Standard	Commercial	Other Non-Residential Standards	0.09	0.04	43.64%
Standard	Industrial	Other Non-Residential Standards	0.23	0.30	128.37%
Standard	Agriculture	Other Non-Residential Standards	0.00	0.00	257.68%
Standard	Residential	Other Residential Standards	0.08	0.06	75.37%
Measure	Industrial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.04	0.04	105.76%
Measure	Industrial	Reduced Wattage Lamp Replacement	0.01	0.01	105.09%
Measure	Residential	Retail Product Portfolio	0.12	0.08	65.79%
Total			**1.91**	**2.72**	**142.28%**

Table 3-9: PY2021 Summary of Idaho Power Idaho Electric Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Commercial	Desktop Power Supplies	0.01	0.00	0.00%
Measure	Residential	Ductless Heat Pumps	0.05	0.00	2.96%
Code	Residential	Efficient Homes	0.27	0.60	223.90%
Measure	Residential	Heat Pump Water Heaters	0.10	0.00	4.18%
Measure	Commercial	Luminaire Level Lighting Controls	0.01	0.00	51.59%
Measure	Residential	Manufactured Homes	0.01	0.00	0.00%
Code	Commercial	Other Codes (Commercial)	0.40	0.46	113.98%
Standard	Commercial	Other Non-Residential Standards	0.10	0.04	43.48%
Standard	Industrial	Other Non-Residential Standards	0.24	0.30	128.37%
Standard	Agriculture	Other Non-Residential Standards	0.00	0.00	257.68%
Standard	Residential	Other Residential Standards	0.07	0.06	74.00%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.02	0.02	105.99%
Measure	Industrial	Reduced Wattage Lamp Replacement	0.00	0.00	105.99%
Code	Residential	Residential New Construction	0.33	0.09	27.15%
Measure	Residential	Retail Product Portfolio	0.17	0.11	67.14%
Measure	Commercial	Window Attachments	0.00	0.00	0.00%
Measure	Residential	XMP Pumps	0.03	0.00	4.19%
Measure	Commercial	XMP Pumps	0.02	0.01	26.24%
Total			**1.82**	**1.71**	**93.51%**

3.2.1.2 Avista Idaho Electric Verified Ex Post Savings

The Evaluators summarize the verified electric savings and realization rates for Avista within the state of Idaho by program year in the table below.

Table 3-10: Summary of Avista Idaho Electric Verified Ex Post Savings by Program Year

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	0.60	0.31	51.19%
2018	0.57	0.36	63.33%
2019	0.43	0.50	115.22%
2020	0.41	0.48	118.93%
2021	0.39	0.40	103.32%
Total	**2.41**	**2.06**	**85.41%**

Table 3-11 through Table 3-15 summarizes the Avista Idaho verified electric savings and realization rates by initiative for each of the program years between 2017 and 2021.

Table 3-11: PY2017 Summary of Avista Idaho Electric Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Commercial	Commissioning Buildings	0.00	0.00	0.00%
Standard	Industrial	Drive Power	0.01	0.02	111.91%
Measure	Residential	Ductless Heat Pumps	0.01	0.00	10.20%
Code	Residential	Efficient Homes	0.09	0.09	100.00%
Measure	Residential	Heat Pump Water Heaters	0.03	0.02	68.73%
Measure	Commercial	Luminaire Level Lighting Controls	0.00	0.00	0.00%
Code	Commercial	Other Codes (Commercial)	0.07	0.07	100.00%
Code	Residential	Other Codes (Multifamily)	0.01	0.01	100.00%
Standard	Commercial	Other Non-Residential Standards	0.09	0.08	91.43%
Standard	Residential	Other Residential Standards	0.26	0.00	0.16%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.00	0.00	98.27%
Code	Residential	Residential New Construction/Next Step Homes	0.01	0.01	96.99%
Measure	Residential	Retail Product Portfolio	0.00	0.00	42.21%
Measure	Residential	Super-Efficient Dryers	0.01	0.01	94.03%
Measure	Residential	Televisions	0.01	0.01	100.00%
Total			**0.60**	**0.31**	**51.19%**

Table 3-12: PY2018 Summary of Avista Idaho Electric Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Commercial	Commissioning Buildings	0.00	0.00	0.00%
Measure	Industrial	Commissioning Buildings	0.00	0.00	0.00%
Measure	Commercial	Desktop Power Supplies	0.02	0.02	100.00%
Standard	Industrial	Drive Power	0.01	0.01	100.00%
Measure	Residential	Ductless Heat Pumps	0.01	0.00	6.02%
Code	Residential	Efficient Homes	0.11	0.11	100.00%
Measure	Residential	Heat Pump Water Heaters	0.01	0.00	57.22%
Measure	Commercial	Luminaire Level Lighting Controls	0.00	0.00	N/A
Measure	Residential	Manufactured Homes	0.00	0.00	0.00%
Code	Commercial	Other Codes (Commercial)	0.08	0.08	100.00%
Code	Residential	Other Codes (Multifamily)	0.01	0.01	100.00%
Standard	Commercial	Other Non-Residential Standards	0.02	0.01	63.92%
Standard	Industrial	Other Non-Residential Standards	0.08	0.08	100.00%
Standard	Residential	Other Residential Standards	0.19	0.00	0.22%
Measure	Commercial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.00	0.00	98.89%
Measure	Industrial	Reduced Wattage Lamp Replacement	0.00	0.00	98.89%
Code	Residential	Residential New Construction/Next Step Homes	0.01	0.01	100.00%
Measure	Residential	Retail Product Portfolio	0.00	0.00	54.86%
Measure	Residential	Super-Efficient Dryers	0.01	0.01	93.09%
Measure	Residential	Televisions	0.00	0.00	99.98%
Total			**0.57**	**0.36**	**63.33%**

Table 3-13: PY2019 Summary of Avista Idaho Electric Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Commercial	Commissioning Buildings	0.01	0.00	0.00%
Measure	Industrial	Commissioning Buildings	0.00	0.00	0.00%
Measure	Commercial	Desktop Power Supplies	0.00	0.00	79.14%
Standard	Industrial	Drive Power	0.00	0.01	293.18%
Measure	Residential	Ductless Heat Pumps	0.01	0.00	4.01%
Code	Residential	Efficient Homes	0.08	0.12	154.66%
Measure	Residential	Heat Pump Water Heaters	0.01	0.00	43.16%
Measure	Commercial	Luminaire Level Lighting Controls	0.00	0.00	0.00%
Measure	Residential	Manufactured Homes	0.00	0.00	0.00%
Code	Residential	Next Step Homes	0.05	0.11	236.51%
Code	Commercial	Other Codes (Commercial)	0.15	0.20	133.91%
Code	Residential	Other Codes (Multifamily)	0.01	0.00	42.77%
Standard	Commercial	Other Non-Residential Standards	0.02	0.01	69.19%
Standard	Industrial	Other Non-Residential Standards	0.05	0.00	0.00%
Standard	Residential	Other Residential Standards	0.02	0.02	99.67%
Measure	Industrial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.01	0.00	30.55%
Measure	Industrial	Reduced Wattage Lamp Replacement	0.00	0.00	31.71%
Measure	Residential	Retail Product Portfolio	0.00	0.00	11.15%
Measure	Residential	Super-Efficient Dryers	0.02	0.02	109.48%
Total			**0.43**	**0.50**	**115.22%**

Table 3-14: PY2020 Summary of Avista Idaho Electric Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Industrial	Certified Refrigeration Energy Specialist (CRES)	0.00	0.00	0.00%
Measure	Commercial	Commissioning Buildings	0.01	0.00	0.00%
Measure	Industrial	Commissioning Buildings	0.00	0.00	41.60%
Measure	Commercial	Desktop Power Supplies	0.00	0.00	0.00%
Standard	Industrial	Drive Power	0.00	0.00	0.00%
Measure	Residential	Ductless Heat Pumps	0.01	0.00	9.35%
Code	Residential	Efficient Homes	0.06	0.10	161.42%
Measure	Residential	Extended Motor Products	0.00	0.00	0.00%
Measure	Commercial	Extended Motor Products	0.00	0.00	0.00%
Measure	Residential	Heat Pump Water Heaters	0.01	0.00	0.00%
Measure	Commercial	Luminaire Level Lighting Controls	0.00	0.00	0.00%
Measure	Residential	Manufactured Homes	0.00	0.00	0.00%
Code	Residential	Next Step Homes	0.05	0.06	134.25%
Code	Commercial	Other Codes (Commercial)	0.12	0.17	142.74%
Code	Residential	Other Codes (Multifamily)	0.01	0.00	52.83%
Standard	Commercial	Other Non-Residential Standards	0.02	0.01	63.24%
Standard	Industrial	Other Non-Residential Standards	0.05	0.08	157.01%
Standard	Agriculture	Other Non-Residential Standards	0.00	0.00	258.22%
Standard	Residential	Other Residential Standards	0.02	0.02	92.40%
Measure	Industrial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Other Strategic Energy Management	0.00	0.00	0.00%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.01	0.00	27.67%
Measure	Industrial	Reduced Wattage Lamp Replacement	0.00	0.00	27.49%
Measure	Residential	Retail Product Portfolio	0.02	0.03	114.44%
Measure	Residential	Televisions	0.00	0.00	0.00%
Total			**0.41**	**0.48**	**118.4%**

Table 3-15: PY2021 Summary of Avista Idaho Electric Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Measure	Commercial	Commissioning Buildings	0.00	0.00	0.00%
Measure	Commercial	Desktop Power Supplies	0.00	0.00	0.00%
Measure	Residential	Ductless Heat Pumps	0.01	0.00	20.19%
Code	Residential	Efficient Homes	0.06	0.07	123.85%
Measure	Residential	Heat Pump Water Heaters	0.02	0.00	0.00%
Measure	Commercial	Luminaire Level Lighting Controls	0.00	0.00	0.00%
Measure	Residential	Manufactured Homes	0.00	0.00	0.00%
Code	Commercial	Other Codes (Commercial)	0.09	0.10	111.55%
Standard	Commercial	Other Non-Residential Standards	0.02	0.01	62.90%
Standard	Industrial	Other Non-Residential Standards	0.05	0.08	157.01%
Standard	Agriculture	Other Non-Residential Standards	0.00	0.00	258.22%
Standard	Residential	Other Residential Standards	0.02	0.02	102.71%
Measure	Commercial	Reduced Wattage Lamp Replacement	0.00	0.00	27.73%
Measure	Industrial	Reduced Wattage Lamp Replacement	0.00	0.00	27.73%
Code	Residential	Residential New Construction	0.07	0.08	112.68%
Measure	Residential	Retail Product Portfolio	0.03	0.04	112.24%
Measure	Commercial	Window Attachments	0.00	0.00	0.00%
Measure	Residential	XMP Pumps	0.01	0.00	0.00%
Measure	Commercial	XMP Pumps	0.00	0.00	0.00%
Total			**0.39**	**0.40**	**103.20%**

3.2.1.3 Avista Idaho Gas Verified Ex Post Savings

The Evaluators summarize the verified natural gas savings and realization rates for Avista within the state of Idaho by program year in the table below.

Table 3-16: Summary of Avista Idaho Gas Verified Ex Post Savings by Program Year

Year	Ex Ante Therms Savings	Ex Post Therms Savings	Realization Rate
2019	43,745	22,808	52.14%
2020	5,678	385	6.79%
2021	152,881	152,881	100.00%
Total	**202,304**	**176,074**	**87.03%**

Table 3-17 through Table 3-19 summarizes the Avista Idaho verified natural gas savings and realization rates by initiative for each of the program years between 2019 and 2021.

Table 3-17: PY2019 Summary of Avista Gas Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante Therms Savings	Ex Post Therms Savings	Realization Rate
Measure	Commercial	Condensing Rooftop Units	636	0	0.00%
Code	Residential	Next Step Homes	43,109	22,808	52.91%
Total			**43,745**	**22,808**	**52.14%**

Table 3-18: PY2020 Summary of Avista Gas Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante Therms Savings	Ex Post Therms Savings	Realization Rate
Code	Residential	Next Step Homes	5,678	385	6.79%
Total			**5,678**	**385**	**6.79%**

Table 3-19: PY2021 Summary of Avista Gas Verified Ex Post Savings by Initiative

Measure, Standard, Code	Sector	Initiative	Ex Ante Therms Savings	Ex Post Therms Savings	Realization Rate
Code	Residential	Residential New Construction	152,881	152,881	100.00%
Total			**152,881**	**152,881**	**100.00%**

3.3 Allocation Methodology Review

Allocation methodology review was a key component of this evaluation in this section. It is the method by which NEEA splits total regional net market transformation savings between each NEEA funding utility. The allocation methodology is applicable for each efficiency measure as well as for codes and standards. As described in the equations above, the allocation of savings is currently calculated using one of the following two methodologies:

- Service Territory Methodology
- Funder Share Methodology

Currently, NEEA allows the utility to choose which of the two methodologies is employed to calculate utility-level savings in the end-of-year annual reporting of savings.

Idaho Power had elected to report NEEA savings using funder share methodology, as indicated by NEEA annual reports between 2017 and 2021. Avista had elected to report NEEA savings using service territory methodology in 2017 and 2018. In 2019, Avista changed their preferred reporting to funder share methodology. However, NEEA continues to provide estimates of service territory share for each measure, despite allocation methodology chosen.

NEEA reports both the service territory allocation and the funder share allocation for each measure in each of NEEA's annual report of savings to each funder utility. During this evaluation work, the Evaluators compared service territory share to funder share allocation and ultimately used service territory allocation methodology to estimate total verified savings and cost effectiveness of efforts benefitting Idaho customers within Avista's and Idaho Power's service territories.

The Evaluators further summarize each methodology in the section below.

3.3.1 Service Territory Allocation

The service territory allocation methodology estimates the proportion of projects completed within a measure that can reasonably be allocated to a specific funding utility. This is completed by reviewing and aggregating the source data in a way that preserves the originating location of the projects, which can include zip code information, city information, county information, or state information.

The Evaluators were unable to review total regional and local program unit values reported by NEEA, as this data is provided to NEEA under individual non-disclosure agreements with local utilities, Energy Trust of Oregon, BPA, manufacturers, and market actors. However, the calculations reviewed confirm that the data NEEA aggregates for use in the annual savings reports contains fields that grant NEEA the ability to calculate service territory allocation based on either zip-code level data, county-level data, or state-level data. Therefore, it is possible to estimate net market units for smaller segments of the Northwest region, which can then be aggregated to the utility service territory for each utility that currently funds NEEA initiative efforts.

The benefit of this service territory method is that NEEA stakeholders can identify states or regions that are performing well and are cost-effective, and states or regions that are underperforming and are not cost-effective. This level of transparency assists NEEA staff and stakeholders by identifying real, unique barriers to energy efficiency in local regions. Once these areas and barriers are identified, work performed to remove these barriers benefits the entire region, while creating equitable benefits within the NEEA service territory.

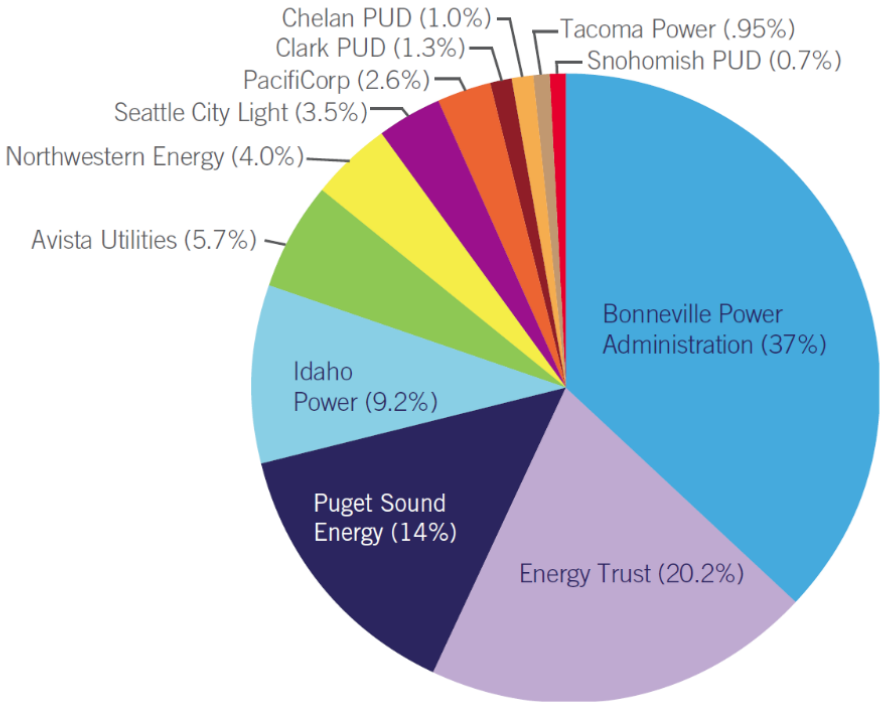
In order to report transparency of program benefits, it is necessary to estimate savings at a higher resolution than northwest regional savings. For example, it is recommended to report savings at the state-level, utility-level, or county-level, if source data permits. As the Evaluators have verified that such source data exists, the Evaluators recommend that NEEA utilize this resolution of data to more accurately estimate, track, and report savings to its stakeholders.

3.3.2 Funder Share Allocation

One of the main objectives for this evaluation was to review and validate NEEA's methodology for allocating co-created savings to Idaho Power Company and Avista Utilities. Currently, NEEA employs a "funder share" allocation method to allocate claimable savings to each Avista and IPC. NEEA staff describe the funder share allocation as a "core tenet" of how NEEA allocates savings. This funding mechanism was built 20 years ago. The following figure displays the current NEEA electric funding share by organization. It is worth noting that a large portion of the current NEEA funding share is owned by

Bonneville Power Administration, an organization that is not a utility, and therefore serves no electric customers directly. Despite lack of electric customers, this organization receives claimable energy efficiency savings through contribution to NEEA.

Figure 3-13: Current NEEA Electric Funding Share by Organization[8]



The calculation NEEA built to estimate the allocation share of funding to each utility is built on the following components and assumptions:

1. **A forecast of load growth**: Estimated load growth during funding cycle, determined by Pacific Northwest Utilities Conference Committee (PNUCC) and Northwest Power and Conservation Council.
2. **Number of retail customers**: Estimated by Energy Information Administration (EIA) Form 861 at the time of establishing funding shares for a funding period. A 12.5% weighting is applied to this value.
3. **Retail energy sales**: Native electricity sales to "bundled" retail customers as reported in the EIA Form 861. All wholesale "energy only" or "transmission only" sales are excluded. An 87.5% weighting is applied to this value.

[8] https://neea.org/resources/neea-current-funder-share-by-organization

4. **Cap on funding share increases**: To minimize the impacts to any one direct funder, a maximum 40% funder share growth cap is applied for each investor.

The funder share methodology above is founded on the following NEEA principles:

- Keep the alliance and collaboration between the funding utilities and regional market actors intact;
- Be fair and equitable to funders;
- Equitably distribute burden of cost and allocation of benefits;
- Incorporate number of utility customers and loads to address utilities dominated by few large industrial customers; and,
- Provide funding diversification.

These allocation shares are determined at the beginning of NEEA's 5-year program cycle and are invoiced to each utility on a quarterly basis. In the event that a funder is lost, the total funding amount is recalculated such that other funders' dollar amounts are unchanged and total funding is reduced. In the event that a funder is gained, the total funding amount is recalculated such that other funder's dollar amounts are unchanged and total funding is increased. The NEEA Board reviews the funder allocation methodology policy during the first year of each funding cycle.

The savings due to NEEA regional market transformation is allocated to utility stakeholders using each utility's current funding share (Washington, Oregon, Montana, and Idaho, combined). Therefore, since Avista contributed 5.7% of NEEA's funding to the total NEEA-region, Avista is allocated 5.7% of savings achieved through NEEA. To estimate Avista savings within the Avista's service territory in Idaho, NEEA allocates 30% of total Avista regional savings to Avista Idaho territory. To estimate Idaho Power savings within the Idaho Power service territory in Idaho, Idaho Power internally allocates 95% of savings to Idaho and 5% of savings to Oregon. The Evaluators followed these breakouts when allocating savings to the state of Idaho.

The following tables summarize the funder allocation share values between 2017 and 2021 assigned to Avista and Idaho to estimate savings within the state of Idaho.

Table 3-20: Avista Electric Funder Share

Business Plan	Avista Total Funding Share	Avista Idaho Funding Share*
2020-2024	5.65%	1.69%
2015-2019	5.77%	1.73%
2010-2014	5.56%	1.67%
Prior	3.95%	1.19%

*NEEA allocates 30% of overall Avista funder share to Avista service territory in Idaho

Table 3-21: Avista Gas Funder Share

Business Plan	Avista Total Funding Share	Avista Idaho Funding Share*
2019	15.63%	3.37%
2020-2021	12.04%	3.55%

*NEEA allocates 30% of overall Avista funder share to Avista service territory in Idaho

Table 3-22: Idaho Power Electric Funder Share

Business Plan	Idaho Power Total Funding Share	Idaho Power Idaho Funding Share*
2020-2024	9.23%	8.77%
2015-2019	8.01%	7.61%
2010-2014	8.67%	8.24%
Prior	6.42%	6.10%

*Idaho Power allocates 95% of overall Idaho Power funder share to the Idaho Power service territory in Idaho

The values presented in the tables above were cross verified by reviewing total annual dollars invoiced by NEEA to Avista and to IPC, as well as reviewing each NEEA annual savings report and associated funder share value attributed to each measure.

3.3.3 Allocation Methodology Findings and Recommendations

During this evaluation work, the Evaluators reviewed whether the high-level allocation strategy is reasonable for Idaho stakeholders and whether the funding share is accurately represented for each organization through documentation and invoices. Although the Evaluators were unable to cross-reference NEEA-aggregated sales and utility data due to non-disclosure agreements between NEEA and utility stakeholders in the Northwest region, we reviewed whether the funder share allocation method is reasonably estimates actual energy efficiency product uptake documented in sales data.

It is critical to understand that the funder share allocation methodology allocate a proportion of the costs of NEEA's efforts to be invoiced to the utility, despite initiative focus, initiative service, or customer/regional targeting. This means that savings from Washington are allocated to Montana, Idaho, and Oregon based on each utility's funder share. For Idaho, this methodology underestimates observed local service territory savings while simultaneously overestimating out-of-state energy savings.

In order to report transparency of initiative benefits, it is necessary to estimate savings at a higher resolution than northwest regional savings. For example, it is recommended to report savings at the state-level, utility-level, or county-level, if source data permits.

The Evaluators were unable to review total regional and local program unit values reported by NEEA, as this data is provided to NEEA under individual contract with local utilities, Energy Trust of Oregon, BPA, manufacturers, and market actors with NDA's. However, NEEA confirms that the data provided from each of these stakeholders includes data at the zip code-level resolution. Therefore, it is possible to estimate net market units by zip code, which can then be aggregated to the utility service territory for each utility that currently funds NEEA initiative efforts.

The Evaluators also estimated Idaho local program units using the service territory allocation share. This assumption assumes that the aggregated local program units from all utilities funding NEEA displays similar distribution to the total regional units distributed across the Pacific Northwest region. In the case that NEEA has utility-specific local program unit estimates, those values should be used instead.

The funder share methodology and the service territory methodology do not rely on the same inputs. For example, the funder share methodology attempts to estimate utility regional growth in demand requirements, number of customers, and retail energy sales. This is then applied to program savings, regardless of the actual observed geographic distribution of measure completes. However, the service territory methodology does not attempt to forecast future growth. Instead, it estimates the proportion of total project completions that actually occurred during the evaluation period in question by summarizing, to the highest detail possible with the data provided, the total aMW most likely to have been saved within the Idaho Power or Avista service territory for the specific program and measure in question.

Therefore, the funder share methodology and the service territory methodology do not share any relationship or interaction. The Evaluators are unable to estimate how selection of service territory allocation rather than funder share allocation would change the magnitude of savings for a program without additional information, such as the type of program being claimed, the regional distribution of measure completes in which savings are being claimed, and the utility service territory in which savings are being claimed. Each of these considerations have the ability to cause an increase or decrease in savings.

Based on the findings detailed above, the Evaluators present the following findings and recommendations based on our review of NEEA's allocation methodology:

Table 3-23: Summary of Allocation Share Findings and Recommendations

Findings	Recommendations
Finding #1: Utilities that fund NEEA can choose whether savings are reported by allocation share methodology or service territory methodology. The allocation share methodology overrepresents out-of-state and out-of-service territory savings across measures, codes, and standards while simultaneously underrepresenting in-state and in-service-territory savings across measures, codes, and standards. However, the service territory methodology accurately represents benefits directed to Avista and Idaho Power customers within the state of Idaho.	**Recommendation #1:** The Evaluators recommend Avista and Idaho request NEEA to report annual savings via the service territory methodology for each measure claimed by NEEA for Idaho Power electric, Avista electric, and Avista gas.
Finding #2: The data NEEA utilizes to estimate net market savings is available at resolutions that allow NEEA to estimate precise savings for each utility service territory.	
Finding #3: The Evaluators found that the methodology in which savings were estimated across measures were inconsistent. For some measures, service territory methodology was used, and for others, funder share allocation methodology was used.	

Findings	Recommendations
Finding #4: NEEA prioritizes cost-effective savings in terms of regional benefit. Therefore, savings and cost-effectiveness are distributed across the region evenly, despite observed distribution of savings across states. Although this philosophy has merit, more precise estimates of utility-level and program-level savings help NEEA's stakeholders relay relevant savings and cost-effectiveness results to their respective regulatory commissions. This remains critical, due to some state-level commission orders to pursue all cost-effective energy efficiency efforts.	**Recommendation #2:** The Evaluators recommend that Avista and Idaho Power request annual savings reports to include estimates of administrative costs, incentive costs, and non-incentive costs by service territory. This will allow each utility to calculate more accurate cost-effectiveness tests for each initiative to determine whether extension of funding is a viable option within each utility's regulatory environment.

Based on the findings and recommendations of allocation methodology above, the remainder of the report estimates Ex Post electric and natural gas savings for NEEA efforts using the *service territory methodology*. The service territory allocation values are estimated by NEEA using confidential program and sales data from various organizations within the Pacific Northwest. Although the Evaluators are unable to review or replicate these values, the Evaluators have reviewed NEEA's service territory allocation methodology and find the steps to be reasonable.

3.4 Cost Effectiveness Methodology Review

Although the Evaluators calculated cost effectiveness for this evaluation work independently from NEEA's cost effectiveness procedures and assumptions, the Evaluators provide in this section a comparison of cost effectiveness methodology between NEEA and Idaho Power and Avista.

In response to a request for cost effectiveness methodology documentation, NEEA delivered the following information:

- NEEA's 2021 portfolio cost effectiveness analysis
- NEEA's Electric Cost Effectiveness Operational Guidelines
- 2022 Q1 and Q2 Cost Effectiveness Advisory Committee PowerPoints summarizing NEEA introduction to savings and cost effectiveness procedures

Within NEEA's Electric Cost Effectiveness Operational Guidelines document, NEEA states:

> "NEEA's purpose is to look at the total societal impact of transforming a market to ensure that the regional investment is an appropriate use of funds for the long term. Working under this perspective NEEA considers all incremental quantifiable costs and benefits of the total regional savings achieved through transformation, regardless of who accrues them. Ultimately, NEEA, as a regional organization, is attempting to answer the question: "will costs to society be reduced relative to an alternate resource?"

The Evaluators note that NEEA's procedures to include total regional savings in NEEA's cost effectiveness calculations is in direct opposition to the RTF's Guidelines in which "costs and benefits should reflect the

differences between the efficient and baseline cases."[9] This methodology does not accurately represent the cost effectiveness of NEEA activities, rather, the cost effectiveness of NEEA activities in combination with naturally occurring baseline as well as locally incented measures through local utilities. NEEA's current cost effectiveness methodology essentially estimates the cost effectiveness of total current gross, non-incremental energy savings for the entire Northwest region, effectively double counting the benefits and costs already attributed to utilities. The Evaluators conclude that NEEA's current methodology for calculating cost effectiveness does not accurately reflect NEEA contributions.

In addition to the difference in methodology summarized above, the Evaluators compare and contrast NEEA's and Idaho Power and Avista cost effectiveness methodology in the table below. The NEEA Cost Effectiveness Methodology column indicates the methodology NEEA employs to calculate portfolio cost effectiveness for each planning period. The Idaho Power/Avista Cost Effectiveness Methodology column indicates the methodology the Evaluators employed to estimate cost effectiveness for NEEA-related activities in the Idaho Power and Avista service territories for this work.

Table 3-24: NEEA and IPC/Avista Cost Effectiveness Methodology Comparison

Input	NEEA Cost Effectiveness Methodology	Idaho Power/Avista Cost Effectiveness Methodology[10]
Cost Test	TRC	UCT
Benefits Included	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation, transmission, and distribution ■ Additional resource savings (non-energy benefits) ■ 10% conservation adder	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation, transmission, and distribution
Costs Included	■ Program overhead costs ■ Program installation costs ■ Incremental measure costs	■ Program overhead costs ■ Utility/program administrator incentive costs
Source of Avoided Costs	6th or 7th Power Plan	Avoided costs from each utility IRP
Scope of Costs/Benefits	Total Regional: includes gross costs and benefits within the total region, regardless of who accrues it, or how it is accrued. This includes units categorized as naturally occurring baseline units and local program units.	Net Market: includes net costs and benefits accrued by the utility's tracked. This includes only local program units with naturally occurring baseline removed.

[9] https://rtf.nwcouncil.org/rtf-operative-guidelines/

[10] Idaho Power and Avista methodology in regards to this evaluation.

Input	NEEA Cost Effectiveness Methodology	Idaho Power/Avista Cost Effectiveness Methodology[10]
Programs Included in Portfolio	Formally analyzed for each market transformation initiative in the Market Development phase, listed below (codes and standards are not included in NEEA cost effectiveness portfolio testing) 1. Efficiency Measures: a. Manufactured Homes b. Luminaire Level Lighting Controls c. Heat Pump Water Heaters d. Retail Product Portfolio	Analyzed for each measure, standard, or code in which net market effect savings are claimed, listed below: 1. Efficiency Measures 2. Standards 3. Codes
Period of Analysis	Calculated based on estimated portfolio savings during the 20-year planning horizon.	Calculated based on unit/savings achieved for each calendar year evaluated, separately.

As seen in the table above, the methodology employed by NEEA significantly differs from the methodology the Evaluators employed for both Idaho Power and Avista. The Evaluators aligned cost effectiveness methodology for Idaho and Avista to the procedures the utilities employ to report cost effectiveness of the utility portfolio to Idaho Commission each year. These methodologies portray large differences in inputs, scope of costs and benefit, definition of 'portfolio', and period of analysis. Because these large differences exist, the Evaluators recommend that Idaho Power and Avista continue to evaluate cost effectiveness of NEEA impacts internally, and separate from NEEA cost effectiveness results.

3.5 Utility Staff Interview Results

As part of this work, the Evaluators met with representatives from Idaho Power, Avista, and NEEA to discuss NEEA's market transformation work. The Evaluators also spoke with each of the Idaho utilities to gather additional information for the motivations for the evaluation of NEEA's initiatives. The conversations with the utility staff largely focused on:

- Utility staffs' concerns towards NEEA's services and methodology;
- Utility staffs' understanding of NEEA's current savings allocation and cost effectiveness models; and,
- Utility staffs' perceived benefits of NEEA's regional market transformation efforts.

The conversations with NEEA sought to better understand NEEA's operations; their baseline savings, savings allocation, and cost effectiveness models; as well as their opinions of the current market climate. This section summarizes the key findings from these interviews, highlighting areas of gaps in agreement or understanding across the three parties.

3.5.1 Cost Effectiveness Advisory Committee

Before summarizing the results of the staff interviews, the Evaluators find it necessary to outline the Cost-Effectiveness Advisory Committee (CEAC). The CEAC is a committee consisting of NEEA funding stakeholders with the objective of reviewing and advising NEEA staff on methods, data sources, and inputs for use in NEEA's cost-effectiveness analysis and savings reporting. The Committee, composed of NEEA funders and additional regional stakeholders, meets quarterly to track and review components of planned and completed market research and evaluation work. CEAC's responsibilities include:

1. Review and advise regarding NEEA cost-effectiveness and savings information to inform annual reporting
2. Review and advise regarding market transformation cost and savings measurement and estimation methods
3. Review evaluation findings that affect cost and savings information to inform annual regional tracking and reporting purposes
4. Work with your organization to provide NEEA staff with relevant incentive data for regional tracking and reporting purposes
5. Review and advise regarding new market research and evaluation methodologies

Avista staff and Idaho Power staff participate in the quarterly CEAC meetings.

NEEA provided the following documentation regarding the purpose of the CEAC and content of the CEAC meetings:

- **Cost Effectiveness Advisory Committee Charter:** Describes CEAC's purpose, responsibilities, membership, meeting schedule, and charter review schedule
- **Q1 and Q2 2022 CEAC meeting slides**

In addition, the Evaluators asked NEEA Staff, Avista staff, and Idaho Power staff to describe the purpose of CEAC, the content of CEAC meetings, the frequency of CEAC meetings, and thoughts as to how CEAC meetings can be improved.

The Cost Effectiveness Advisory Committee Charter document provided by NEEA supports NEEA's perspective regarding the purpose of CEAC meetings to be focused on reviewing and advising NEEA cost effectiveness and savings information towards annual reporting. In addition, the first slides in each of the 2022 CEAC meeting slides reiterate the direct responsibilities of the CEAC to review and advise NEEA on cost effectiveness and savings information used towards annual reporting. However, the slides following summarize year-over-year program market progress, forecasted number of units vs. actual number of units, and overall market growth for each measure, and co-created savings rather than the specific inputs and assumptions included in those values. The Evaluators reviewed each document for reference to codes and standards assumptions, however, mention of these topics were not included at detail greater than forecasted savings.

Although the Evaluators did not review all CEAC meeting slides from 2017 through 2022, the Evaluators asked NEEA and utility staff to describe CEAC's purpose and the content of CEAC meetings to build a

more complete narrative of CEAC understanding. Through these in-depth interviews, NEEA staff indicated that the meetings are provided to allow utilities to question and provide recommendations for assumptions, inputs, and results. However, the Evaluator found that utility staff described the CEAC meetings as informative.

3.5.2 Evaluation Motivation

Idaho Power and Avista launched an evaluation to test the cost-effectiveness of NEEA's market transformation services. Idaho Commission staff have noticed that an increasing portion of the shared savings the Idaho utilities receive from NEEA's efforts stem from Washington and Oregon based codes and standard changes. As a result, commission staff "*is concerned that NEEA claims savings it is not directly responsible for" and that "to support the continued funding of NEEA, an independent EM&V should be conducted to clarify the savings NEEA claimed plus the allocation and cost effectiveness of those savings to its member utilities based on the utilities' DSM avoided cost*" (IPUC Order Nos. 35129 and 35270). Utility staff noted that a large portion of their energy efficiency-related budget is devoted to NEEA – one that is continually increased year after year-- and "*if NEEA is no longer cost-effective after an independent EM&V is conducted, the [companies] should reexamine its continued participation*" (IPUC Order Nos. 35129 and 35270).

Both sets of utility staff stated that they recognize the value and importance of NEEA's regionally-focused philosophy and acknowledge that NEEA's model depends on collaboration from as many utilities as possible within the region to succeed. The utility staff noted that NEEA began as a regional effort that sought to increase the market power of the four states through an alliance; it was founded on the notion that *"if it's good for one area, it's good for all the areas and therefore the savings, the benefit of the program should be recognized regionally rather than to a specific jurisdiction or state"* (utility staff). According to NEEA staff, when combined into a four-state region, the Pacific Northwest represents 5% of the national US market; they emphasize that although 5% may seem low, *"with a consolidated, aggregated voice in that marketplace, it's pretty amazing what we've been able to ask from the national market actors"* (NEEA staff). Utility staff cited the residential and commercial building stock assessments and other regional research efforts NEEA manages are useful in their initiatives and analyses. However, utility staff indicated they are skeptical of NEEA's customer-focused initiatives, noting that these initiatives overlap with their own programs. Utility staff explained they would prefer NEEA to focus more on upstream programs and the manufacturer and distributor levels of the supply chain. In general, utility staff recognize NEEA's value and the importance of regional collaboration, and see to ensure Idaho residents are directly benefitting from NEEA's efforts.

3.5.3 NEEA's Market Transformation Model

NEEA staff explained that NEEA stemmed from the recognition that "*utility programs are seeking to influence consumer behavior, ultimately, which includes the whole supply chain that deliver those products and services to consumers. And if we're going to do that, we need to understand better what are the mechanisms that bring those products and services to market. What are the things that consumers think about when they're deciding to buy those things and what are the sort of other dimensions to the problem?"* (NEEA staff).

At its inception, NEEA achieved funding from various utilities from four states in the Pacific Northwest – Washington, Oregon, Idaho, and Montana – as well as support from those states' regulatory commissions, consumer groups, and trade associations. Since NEEA's original three-year pilot phase in the late 1990s, it has received approval and funding on a five-year cycle. NEEA depends on this longer funder circle, as market transformation work takes time (typically viewed on a 20-year cycle), therefore the benefits are not seen immediately.

When explaining their model, NEEA staff use a traditional S-curve to demonstrate the "diffusion of innovation theory" in which a new technology enters the market at the bottom end of the spectrum, is first adopted by a specific set of people known as "innovators," followed by "early adopters," and eventually hits the mainstream market and becomes standardized via code and standards changes. NEEA staff explain that their role is to accelerate market adoption and get new technologies into the mainstream market stage of the S-curve quicker. When NEEA conducts market transformation work, they focus in on what it will take *"to make market adopt [this product] at a high rate?...[we're] doing market characterization work, [we're] doing market test studies to see what kind of things [we] can do to help overcome barriers to market adoption"* (NEEA staff).

When forecasting their baseline market transformation calculations, NEEA works with third-party evaluators to collect data on current adoption rates and market trends. NEEA staff noted that they develop a baseline picture for every initiative in their portfolio and use this data to determine which initiative to move forward with. NEEA staff explained that throughout each five-year funding cycle they focus on a variety of technologies in all stages of the market transformation S-curve, noting that different technologies move through the curve, and ultimately the market adoption process, at varying speeds. Once NEEA decides which "energy savings opportunities" to focus on, they *"spend a lot of time and effort often getting the [measure] ready for market adoption in the mainstream market adoption, sort of the middle of the S-curve. But once the market takes off, [their] basic theory is that the market itself will drive that adoption because [they] have readied the market to do that"* (NEEA).

3.5.4 Defining Savings

Utility staff explained that NEEA uses a funder share savings model to allocate savings. Under this model, the utilities receive a proportion of savings equal to their share of NEEA's overall budget. Funder share amounts are determined by each utility's electric load, with higher load utilities contributing more money than lower load utilities. Funder share amounts are reviewed and approved each funding cycle by NEEA's CEAC.

Under NEEA's funder share and savings allocation model, it does not matter where the savings were garnered, and thus Idaho may receive savings that resulted from codes and standard changes that occurred in Washington or Oregon and not Idaho. Although the Idaho utilities staff understand why NEEA has structured their savings model in this way, they expressed concern that Idaho residents are not directly benefitting as much from NEEA's work, and simultaneously are funding efforts that are benefitting customers out-of-state rather than within Idaho, and as a result, NEEA may not be cost effective for Idaho. In IPUC Order No. 35270, Idaho Power "s*tated it believed customers benefited from its participation in NEEA but expressed that it had mentioned similar concerns to Staff's concerns in a past case, including its concerns about savings attributed to codes and standards, the allocation method*

of savings to customers, and cost effectiveness impacts from declining avoided cost in the current NEEA cycle;" this sentiment was echoed by Avista in IPUC Order No. 35129. Staff from both utilities noted that NEEA provides detailed data about where all their savings are coming from. Utility staff indicated that NEEA are very organized, and that each year, the utilities are provided an annual spreadsheet with detailed megawatt hour calculations and rolled up savings for each category. However, utility staff noted that there is a less transparency regarding how NEEA operationalizes their efforts and subsequently calculates those efforts into savings. Moreover, utility staff do not always agree with some of the assumptions NEEA includes in their cost-effectiveness models. For example, NEEA relies on winter capacity benefits for heat pumps, even though Idaho Power is a summer peaking utility. Additionally, NEEA uses total regional savings that includes baseline numbers, rather than net market effects.

Lastly, although Idaho Power and Avista staff are members of NEEA's CEAC, neither utility's staff feel empowered to question NEEA's cost effectiveness calculations during those meetings. Utility staff described the committee's quarterly meetings as a basic report out of their activities over the past few months, rather than an opportunity to discuss the models and assumptions. This sentiment contradicts NEEA's perception of the Cost Effectiveness Advisory Committee meetings. NEEA staff indicated that CEAC meetings are an opportunity for member utilities, regulators, and other stakeholders to review and question NEEA's saving assumptions:

> *"Every year every single input assumption to every savings claim that's reported to the utilities is reviewed by CEAC. That's a lot of work so I won't represent that everybody on the CEAC looks at every single assumption, but in theory, everything is open and available for comment and adjustment as needed."* (NEEA staff)

3.5.5 Emphasis on Codes & Standards

Referencing the Idaho Public Utilities Commission Order Nos. 35129 and 35270, one of the main impetuses of this evaluation has been the perceived shift away from measures and equipment upgrade programs towards codes and standards changes. When asked about this perceived shift, NEEA staff explained that their budget has remained consistent across their efforts and that codes and standards are one of the minority investments when comparing against all other NEEA efforts. One theory that could explain the disconnect between Idaho utilities' perception that there has been increased focus on codes and standards, rather than efficiency measures and emerging technologies, is the notion that much of the time and effort invested into the early stages of market transformation work does not result is substantial savings. It is feasible, that NEEA continues to invest the bulk of budget on the earlier stages of the market transformation S-curve, but that these savings are not realized until the codes and standards stage. When asked how they prioritize projects, NEEA staff noted that they consider the potential market transformation pathway for all proposed "energy savings opportunities" and prioritize those opportunities with clear paths. They explained that codes and standards changes are the clearest indicator of market transformation success, as codes and standards make the energy savings opportunities standard practice. Thus, NEEA tends to focus their work on energy savings opportunities that can ultimately result in codes and standards changes.

In addition to concerns that NEEA's work has shifted more towards codes and standards changes, the Idaho utilities expressed the most trepidation over the fact that much of NEEA's codes and standards

work is located outside of Idaho. As stated in the IPUC Order No. 35270, commission staff is "*concerned that NEEA claim[s] savings it was not directly responsible for producing"* and stated *"if savings from codes and standards are removed, NEEA would not be cost-effective.*" NEEA staff indicated *"[they] pay attention to what [they] call "regional equity", how do [they] have a balanced portfolio that has a chance of really delivering the allocation of savings back to the states, not down to the service territory"* (NEEA staff). They went on to explain that they focus on state and regional efforts, rather than service territory efforts, because markets are not that different between the states and there's a lot "*self-referencing between [their] states*" (NEEA staff).

Although NEEA's regional lens makes sense to the Idaho utility staff in theory, utility staff noted that this theory often falls short in practice. Idaho utility staff emphasized the contrasting political climate of their state versus that of Washington, Oregon, and Montana, noting that what works in one state may not work in another state.

When asked about the political differences across the state, NEEA recognized the varying political climates across their four member states and acknowledged the hesitancy towards codes and regulation environment currently present in Idaho. However, NEEA staff went on to explain that current political climate does not worry them, as politics constantly change and evolve: "*those political winds blow irrespective of kind of the code environment and the building construction industry"* (NEEA staff). Because of their future forward visioning and five-year cycle planning, NEEA focuses more on long-term engagement and relationship building among the construction and manufacturing industries, assuming that politics will eventually catch up with market demands. NEEA staff indicated that much of this long-term engagement and relationship building with construction and manufacturing industries involves training and education, meeting with builders, manufacturers, and enforcement personnel.

NEEA admitted that tracking and quantifying their code-based activities – like training, education, and outreach – is challenging. They noted "*it's an evolving piece*" and they have engaged third party evaluators to help them develop better and more effective metrics for these activities that focus more on actual behavioral changes that resulted from their activities, rather than just raw attendance and participation numbers.

3.5.6 Interview Findings and Recommendations

It is evident from these interviews that there is a disconnect between the Idaho utilities and NEEA's understanding of the purpose and expectations of NEEA's market transformation work.

> *"This disconnect between when NEEA's budget is being applied to the market and when we're seeing the benefits and being unable to report those benefits is one really key distinction between a traditional efficiency acquisition program and what we do in market transformation."* (NEEA staff)

The Evaluators present the following findings and recommendations based on our review of NEEA's allocation methodology:

Table 3-25: Summary of Allocation Share Findings and Recommendations

Findings	Recommendations
Finding #5: The interviews revealed that although the three parties fundamentally want to improve energy efficiency and increase market adoption of emerging technologies, their preferred approaches to this shared goal vary. Unlike the utilities, who strive to demonstrate the cost-effectiveness of their initiatives and investments on an annual or bi-annual cycle, NEEA operates on a five-year funding cycle, which is different than the typical annual or biannual utility planning cycle.	**Recommendation #3**: The Evaluators recommend that NEEA work with utilities to best serve each state's current regulatory environment and utility's localized concerns.
Finding #6: NEEA's programs are designed with a broader constituency in mind than that of its member utilities. While the Idaho utilities' programs are targeted to produce benefits for their ratepayers, – NEEA is tasked with developing programs that need to consider what is best for the entire four-state region. At its core, NEEA's ethos assumes that changes made in one state will eventually spillover into another state and that in the long run, regional change will be realized.	**Recommendation #4**: The Evaluators recommend that NEEA track progress for each code change relative to administrative dollars spent towards state-level codes and associated energy savings accrued by each state-level code. With the 20-year market transformation in mind, the service-territory-level savings will still accrue over the 20-year horizon, however, using this methodology, actual market transformation effects of co-created savings will be more accurately tracked.
Finding #7: NEEA currently allocates code savings via funder share methodology, which estimates a proportion of total NEEA funding to each utility based on number of electric retail customers and overall load. Therefore, savings from code adoption in Washington State are in-part assigned to Idaho. The Evaluators found that out-of-state code building savings are currently being attributed to Idaho utilities. The Evaluators are skeptical that spillover from out-of-state code changes result in energy savings within the state of Idaho. Although the barriers to code adoption from one state to the next may be similar, there is no evidence to suggest that these learnings transfer to observable and measurable savings. NEEA has stated that starting in 2022, code savings will be allocated via service territory allocation.	
Finding #8: The NEEA Cost Effectiveness Advisory Committee (CEAC) meets quarterly with the NEEA objectives to provide space for discussion around results of recently completed evaluation, progress of field studies, relevant updates to programs, and acceptance or questioning of NEEA methodology towards calculation of savings.	

The remainder of this report delivers the quantitative analysis of NEEA's claimable savings within the state of Idaho along with the associated cost effectiveness tests. The Evaluators balanced acknowledgments that NEEA's regional efforts provide intangible, and often difficult to quantify benefits to its member states, along with the recognition that the Idaho utilities want to invest their efforts into activities that are best for their customers within their service territories.

3.6 Impact Evaluation Results

In this section, the Evaluators summarize the verified savings for each Idaho Power and Avista for each program year between 2017 and 2021, summarized by:

- Efficiency measures
- Standards
- Codes

3.6.1 Efficiency Measures

The Evaluators reviewed savings attributed to the efficiency measures in each of the 2017 through 2021 annual NEEA reports to each Idaho Power and Avista. In the table below, the Evaluators summarize the energy efficiency measure initiatives NEEA has claimed savings for between 2017 and 2021.

Table 3-26: NEEA Code Initiatives

Sector	Initiative	Measures
Residential	Ductless Heat Pumps	Ductless heat pumps
	Heat Pump Water Heaters	Heat pump water heaters
	Retail Product Portfolio	Air purifiers Clothes washers Freezers Soundbars Televisions Window AC
	Super-Efficient Dryers	Clothes dryers
	Televisions	Televisions
	Manufactured Homes	HUD code/NEEM 2
	Residential Lighting	CFL bulb in existing LED bulb in existing
	Extended Motor Products	Residential hydronic heating circulation w/ EE ECM Residential circulator pumps with EE ECM/motor
	XMP Pumps	DHW ECM circulator
Commercial	Commissioning Buildings	Nonresidential new construction commissioning Retro commissioning commercial existing

Sector	Initiative	Measures
	Luminaire Level Lighting Controls	Luminaire level lighting controls
	Reduced Wattage Lamp Replacement	25W 4ft T8s 28W 4ft T8s
	Building Operator Certification Expansion	Building operator certification
	Desktop Power Supplies	ENERGY STAR desktop
	Other Strategic Energy Management	Strategic energy management
	Extended Motor Products	Commercial hydronic heating circulation w/ EE ECM Commercial circulator pumps with EE ECM/motor Commercial variable speed clean water pump
	Window Attachments	Commercial secondary windows
	XMP Pumps	DHW ECM circulator
Industrial	Certified Refrigeration Energy Specialist (CRES)	Savings from projects submitted by Certified Refrigeration Energy Specialists
	Commissioning Buildings	Nonresidential new construction commissioning Retro commissioning industrial existing
	Other Strategic Energy Management	Strategic energy management
	Reduced Wattage Lamp Replacement	25W 4ft T8s 28W 4ft T8s

NEEA claimed efficiency measure savings for measures completed in Washington, Oregon, Montana, and Idaho. Instead of claiming 100% savings for all efficiency measures completed in the region, NEEA nets out the number of measures completed through local utilities and naturally occurring baseline.

To calculate verified savings, the Evaluators verified local program units and baseline units were netted out correctly. Where discrepancies were identified, the Evaluators updated the Ex-Post formulas to correctly account for NEEA influence values.

The Evaluators also removed non-Idaho federal measure savings from all standards initiatives to estimate savings that benefit Idaho customers directly. Therefore, this section reports verified efficiency measure savings accrued within the state of Idaho only. The Evaluators summarize verified savings and cost effectiveness results in the tables below using service territory allocation methodology.

The sections below detail the reviews completed to estimate verified savings through NEEA code efforts:

- Impact methodology review
- Cost effectiveness results
- Findings and recommendations

3.6.1.1 Impact Methodology Review

In this section, the Evaluators summarize findings and recommendations for each of the following components towards verified impact results of NEEA's energy efficiency measures:

- Database and document review (Section 3.6.1.1.1)
- UES review (Section 3.6.1.1.2)
- Market transformation baseline review (Section 3.6.1.1.3)
- Funder share methodology review (Section 3.6.1.1.4)

3.6.1.1.1 Database and Document Review

The Evaluators reviewed the 2017-2021 annual savings reports for Avista electric, Avista gas, and Idaho Power electric to identify and address any inconsistencies with data tracking methods and opportunities to improve year-over-year tracking of NEEA efforts.

The Evaluators found during database review that a variety of fields are empty across measure types (for example, service territory share, UES, or comment, due to lack of savings claimed for the measure). This makes verification of values difficult and complicates tracking of a measure progress over time. The Evaluators summarize the missing values further in Appendix D. The Evaluators recommend that measure-level values are detailed as accurately as possible, and that each field is completed in the workbook, whether or not regional net units exist. This allows for year-over-year tracking of regional units, baseline units, retirement units, and unit energy savings values over time.

Additionally, the Evaluators found that for some measures, the net regional unit calculations were completed incorrectly. Therefore, the local program units, baseline units, and retirement units were incorrectly netted out of total regional net savings. For some measures, this change resulted in lower savings, and for others, this change resulted in higher savings.

The Evaluators also note that the distribution of baseline and retirement units differ across total regional units and local program units. That is, for some measures, NEEA estimates that a large proportion of local program units are baseline. The Evaluators raise concern for this assumption, as local program units are incentivized, and free ridership of programs is also tracked by local utilities. It is unreasonable to assume that locally incentivized, rebated measures display the same free ridership as non-incentivized measures in the region. Therefore, the Evaluators calculated verified net energy savings assuming that distribution of baseline units is equal, proportionally to each total regional units and local units. The Evaluators recommend, however, that NEEA integrate more accurate assumptions regarding free ridership to estimate baseline units within locally incentivized units.

3.6.1.1.2 UES Review

The Evaluators reviewed the following documents and spreadsheets for this evaluation work:

- 2017-2021 annual savings reports for Avista electric, Avista gas, and Idaho Power electric
- Regional Technical Forum (RTF) UES workbooks
- Consumer products UES methodology documentation
- Field studies completed
- Engineering algorithms utilized by NEEA

The Evaluators reviewed each document listed above in order to identify and address any inconsistencies in UES value application and engineering algorithms employed by NEEA to estimate total regional savings.

The Evaluators found that for the efficiency measures, the majority of measure UES are referenced from the RTF workbooks, weighted to regional climate zones, average household heating type, and average square footage. The majority of measure savings are also reviewed by third-party evaluators in order to verify correct per-unit savings allocation. Due to the high-level of third-party evaluator reviews conducted for each of the claimed efficiency measures, the Evaluators focused on the application of the UES values within the annual workbook rather than the validity of the UES themselves.

3.6.1.1.3 Market Transformation Baseline Review

Calculates a naturally occurring baseline for each initiative in order to track the market transformation of each product in order to follow the market transformation S-curve displayed in Figure 3-2. NEEA models the counterfactual scenario of market potential that demonstrates how the market would have progressed without NEEA and utility intervention. NEEA accomplishes this by conducting market characterization studies early in program design, conducting large customer survey efforts, and collecting data which identifies trends of current level of practice.

In the case that an event has occurred which has changed the market transformation of a product, for instance, a federal standard is implemented which updates the product's minimum efficiency, NEEA reconfigures the model which forecasts naturally occurring baseline.

The Evaluators found that third-party evaluations are completed for the majority of modeled measure market transformation baselines. The Evaluators reviewed the evaluation reports and concluded that the market transformation baseline is thoroughly reviewed and defended. Therefore, the Evaluators focused on how the market transformation baselines are integrated to the annual savings workbook rather than investigating the assumptions involved in the creation of the baseline itself.

3.6.1.1.4 Funder Share Methodology Review

As described in Section 3.3, the Evaluators calculated verified savings using the service territory allocation methodology. The service territory values were calculated by NEEA using confidential datasets from NEEA stakeholders. The Evaluators were unable to review the data or replicate the service territory values because the originating data is delivered to NEEA with non-disclosure agreements. The Evaluators used the service territory values as displayed in the NEEA annual workbooks.

The Evaluators note that NEEA calculated Ex Ante savings for energy efficiency measures using a mix of service territory share and funder share allocation for the measures it claims savings for. The rationality behind using one methodology over the other is unclear.

As described previously, the Evaluators conclude that the funder share methodology does not accurately reflect benefits claimed by Idaho utility customers. Therefore, the results displayed in this report reflect service territory savings. Additionally, the Evaluators recommend that Avista and Idaho Power request NEEA utilize service territory methodology for future NEEA annual savings reports in order to calculate energy savings and cost-effectiveness testing for the Commission.

3.6.1.2 Verified Ex Post Savings

The Evaluators summarize verified Ex Post efficiency measure savings results by utility, fuel type, and program year in the tables below. The Evaluators provide initiative-level savings in Appendix A.

Table 3-27: Summary of Idaho Power Idaho Electric Verified Ex Post Efficiency Measure Savings by Program Year

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	0.31	0.12	39.20%
2018	0.40	0.15	38.34%
2019	0.28	0.12	43.78%
2020	0.39	0.14	37.32%
2021	0.42	0.15	36.93%
Total	**1.78**	**0.69**	**38.78%**

The overall verified realization rate for Idaho Power measure efforts due to NEEA was 39%. The discrepancy between Ex Ante and Ex Post savings are largely due to the difference between funder share allocation and service territory share among measures. Funder share allocation for Idaho Power ranged between 6.42% and 9.23%, as displayed in Table 3-22. In contrast, the service territory allocation share ranged between 0% and 16% for individual measures. The overall impact of this change resulted in a low realization rate, indicating that the majority of claimed measure savings accrue outside the state of Idaho.

Table 3-28: Summary of Avista Idaho Electric Verified Ex Post Efficiency Measure Savings by Program Year

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	0.06	0.03	57.68%
2018	0.06	0.04	73.37%
2019	0.06	0.03	46.97%
2020	0.08	0.03	39.76%
2021	0.08	0.04	48.21%
Total	**0.34**	**0.18**	**52.11%**

The overall verified realization rate for Avista electric measure efforts due to NEEA was 52%. Similarly, the discrepancy between Ex Ante and Ex Post savings are also due to the difference between funder share allocation and service territory share among measures. Funder share allocation for Idaho Power ranged between 1.19% and 1.73%, as displayed in Table 3-22. In contrast, the service territory allocation share ranged between 0% and 19% for individual measures. The overall impact of this change resulted in a low realization rate, indicating that the majority of claimed measure savings accrue outside the state of Idaho.

Table 3-29: Summary of Avista Idaho Gas Verified Ex Post Efficiency Measure Savings by Program Year

Year	Ex Ante Therms Savings	Ex Post Therms Savings	Realization Rate
2019	636	0	0.00%
2020	0	0	N/A
2021	0	0	N/A
Total	**636**	**0**	**0.00%**

NEEA allocated natural gas savings to Avista within the Idaho region for the program year 2019. Program years 2020 and 2021 did not claim savings for any measure initiatives for Avista Idaho gas measures. In 2019, the only initiative NEEA claimed energy savings for was the condensing rooftop unit initiative. The condensing rooftop units initiative estimated 636 Therms allocated to Avista Idaho via the funder share methodology. However, the associated service territory allocation for these measure completes was zero, and therefore, 0 Therms savings are verified to have benefitted Idaho customers for this initiative.

3.6.1.3 Cost Effectiveness Results

The Evaluators found that NEEA calculates cost-effectiveness of its portfolio using the total regional savings rather than the net market effects. NEEA's rationality for this is the following:

> *"We use the Total Resource Cost test (TRC) to assess the cost effectiveness of a product. As mentioned in the guidelines, NEEA's purpose is to look at the total societal impact in a market to ensure that the regional investment is an appropriate use of funds for the long term. Working under this perspective, NEEA considers all incremental quantifiable costs and benefits of the total regional savings achieved through transformation, regardless of where or how they are accrued. This is achieved through a total, regional framework. As a result, we include data from naturally occurring baseline in order to capture the full spectrum of costs and benefits for society. Note that the savings rates and costs we use do account for pre-market intervention baseline estimates, similar to the approach the Regional Technical Forum uses."* (NEEA staff)

The Evaluators determined that this methodology raises concern, and the NEEA cost-effectiveness tests currently account for all measure, standard, and code completions across the entire region, effectively double counting local program savings and simultaneously claiming naturally occurring baseline savings. The Evaluators recommend that Avista and Idaho Power do not implement this methodology, and instead calculate cost effectiveness using the reported net market effects (which nets out local program savings and naturally occurring baseline savings).

Additionally, NEEA calculates cost-effectiveness using the current Power Plan, as stated in Section 2.7. The Evaluators calculated cost-effectiveness using Avista and Idaho Power avoided costs, rather than the avoided costs presented in the Power Plan

The Evaluators summarize verified cost effectiveness results in the tables below. Further detail of measure-level cost-effectiveness is provided in Appendix B.

Table 3-30: Idaho Power Electric Idaho Efficiency Measures Cost Effectiveness by Program Year

Program Year	UCT Costs	UCT Benefits	UCT
2017	$2,186,140.38	$466,619.15	0.21
2018	$2,151,016.22	$463,122.26	0.22
2019	$2,150,393.15	$448,341.19	0.21
2020	$2,215,102.95	$610,854.65	0.28
2021	$2,342,622.29	$602,148.92	0.26
Total	**$11,045,275.00**	**$2,591,086.18**	**0.23**

Table 3-31: Avista Electric Idaho Efficiency Measures Cost Effectiveness by Program Year

Program Year	UCT Costs	UCT Benefits	UCT
2017	$497,315	$166,784	0.37
2018	$489,324	$145,951	0.30
2019	$440,264	$140,466	0.32
2020	$366,823	$152,948	0.42
2021	$407,558	$166,540	0.41
Total	**$2,201,284**	**$772,688**	**0.35**

Table 3-32: Avista Gas Idaho Efficiency Measures Cost Effectiveness by Program Year

Program Year	UCT Costs	UCT Benefits	UCT
2019	$152,294	$0	0.00
2020	$126,061	$0	0.00
2021	$142,512	$0	0.00
Total	**$420,867**	**$0**	**0.00**

Although NEEA provided gas efficiency measure efforts in the form of condensing rooftop units and efficient gas water heaters, the Evaluators found that none of the savings were allocated within the Idaho service territory. Therefore, the costs for each program year were distributed entirely towards code savings, and efficiency measure cost effectiveness for Avista gas Idaho NEEA efforts is not applicable.

As seen in the tables above, all efficiency measure efforts were found to be not cost effective using Idaho Power's and Avista's avoided costs and updated verified Ex Post savings within the state of Idaho, as displayed by the annual measure UCT values ranging between 0.00 and 0.41.

3.6.1.4 Findings and Recommendations

Overall, the efficiency measures Ex Ante savings claimed savings for measures completed in Washington, Oregon, and Montana – therefore, some measures underestimated Idaho-specific savings,

while others overestimated out-of-state savings. The overall effect of this change resulted in a lower than 100% realization rate.

Based on the findings detailed above, the Evaluators present the following findings and recommendations based on our review of NEEA's efficiency measures:

Table 3-33: Summary of Efficiency Measure Findings and Recommendations

Findings	Recommendations
Finding #9: The Evaluators estimated verified Ex Post aMW for the efficiency measures to display 39%, 52%, and 0% realization rates for Idaho Power electric, Avista electric, and Avista gas savings within the state of Idaho, respectively. The difference in claimed savings and verified savings is due to the change to using service territory allocation rather than funder share allocation. The efficiency measures category Ex Ante savings included savings for measures completed in Washington, Oregon, and Montana – therefore, some measures underestimated Idaho-specific savings, while others overestimated out-of-state savings. The overall effect of this change resulted in a lower than 100% realization rate.	The Evaluators reference **Recommendation #1**: The Evaluators recommend Avista and Idaho request NEEA to report annual savings via the service territory methodology for each measure claimed by NEEA for each Idaho Power electric, Avista electric, and Avista gas.
Finding #10: The database review revealed that a variety of fields (measure life, UES) were empty across measure types due to lack of savings claimed for the measure, which made verification of values difficult and complicates tracking of a measure progress over time.	**Recommendation #5:** The Evaluators recommend that measure-level values are detailed as accurately as possible, and that each field is completed in the workbook to allow for year-over-year tracking of regional units, baseline units, retirement units, and unit energy savings values over time.
Finding #11: The database review revealed that NEEA's current method for distribution of modeled naturally occurring baseline units between local program and NEEA efforts is not reasonable. A portion of energy efficient technology sales are due to naturally occurring baseline. NEEA nets out modeled naturally occurring baseline in order to avoid claiming savings for units that would have been sold had no program or NEEA-effort been provided within the market. However, the method in which these baseline units are netted out is not distributed equitably. For some measures, NEEA estimates that a large proportion of local program units are baseline, and therefore a larger proportion of the remaining net market effects is assigned to NEEA efforts. The Evaluators raise concern for this assumption, as it is unlikely locally incentivized, rebated measures display the same free ridership as non-incentivized measures in the region.	**Recommendation #6:** The Evaluators recommend, that NEEA distribute naturally occurring baseline units more equitable between local program units and total regional units.
Finding #12: The Evaluators reviewed the utilized UES via the Regional Technical Forum (RTF) workbooks, field	

study data, and simulation analysis findings and note no large concerns with NEEA UES methodology or market baseline assumptions.	
Finding #13: The Evaluators found that NEEA calculates cost-effectiveness of its portfolio using the total regional savings rather than the net market effects. The Evaluators determined that this methodology raises concern, and the NEEA cost-effectiveness tests currently account for all measure, standard, and code completions across the entire region, effectively double counting local program savings and simultaneously claiming naturally occurring baseline savings. Because Avista and Idaho Power calculate their own internal cost effectiveness tests, this finding does not impact Idaho Power or Avista reporting. However, the Evaluators highlight this finding, as NEEA savings allocation and cost allocation methods are not currently consistent with regulatory requirements.	**Recommendation #7**: In the case that cost effectiveness tests are completed using NEEA-reported savings, the Evaluators recommend that Avista and Idaho Power calculate cost-effectiveness using net market effects rather than total regional savings, as is consistent with current regulatory requirements.

3.6.2 Standards

In the table below, the Evaluators summarize the federal standards NEEA has claimed savings for within Avista Idaho and Idaho Power Idaho annual reports between 2017 and 2021.

Table 3-34: NEEA Standards Initiatives

Sector	Initiative	Measure
Residential	Other Residential Standards	Battery chargers Clothes dryers Central AC Furnace fans Heat pumps Fluorescent lamp ballasts
Commercial	Other Non-Residential Standards	Air compressors Beverage vending machines Ceiling fan light kits Ceiling fans Commercial fryers Commercial PRSVs Commercial refrigeration equipment Commercial unitary ACs Electric motors External power supply Rooftop units Small electric motors Steam cookers Walk-in coolers/freezers Pumps Fluorescent lamp ballasts
Industrial	Drive Power	Motors
Industrial	Other Non-Residential Standards	Air compressors Pumps
Agriculture	Other Non-Residential Standards	Pumps

NEEA claimed federal standard savings for measures completed in Washington, Oregon, Montana, and Idaho. Instead of claiming 100% savings for all federal standard equipment measures completed in the region, NEEA completes an influence evaluation in which a third-party evaluator estimates the qualitative and quantitative influence NEEA contributed towards these federal standard updates. The quantitative value represents the percent of savings from the federal standard update that was influenced by NEEA. This value is incorporated in NEEA Ex-Ante calculations to estimate the baseline units. Therefore, if the influence evaluation concludes that NEEA contributed 3% of the code update energy savings, NEEA estimates that 97% of the total regional units for that measure is equivalent to the baseline regional units for the measure. The Evaluators reviewed and verified that these values were integrated correctly in NEEA workbooks. Where discrepancies were identified, the Evaluators updated the Ex-Post formulas to correctly account for NEEA influence values.

The Evaluators also removed non-Idaho federal standards savings from all standards initiatives to estimate savings that benefit Idaho customers directly. Therefore, this section reports verified federal standards savings accrued within the state of Idaho only.

The sections below summarize the reviews completed to estimate verified savings through NEEA code efforts:

- Impact methodology review
- Staff interview conclusions
- Cost effectiveness results
- Findings and recommendations

3.6.2.1 Impact Methodology Review

In this section, the Evaluators summarize findings and recommendations for each of the following components towards verified impact results of NEEA's federal standards:

- Database and document review (Section 3.6.2.1.1)
- UES review (Section 3.6.2.1.2)
- Market transformation baseline review (Section 3.6.2.1.3)
- Funder share methodology review (Section 3.6.2.1.4)

3.6.2.1.1 Database and Document Review

The Evaluators reviewed each of the supplemental documents provided by NEEA, which included the following:

- 2017-2021 annual savings reports for Avista electric, Avista gas, and Idaho Power electric
- Completed influence evaluations

The Evaluators reviewed each of the documents above to identify and address any inconsistencies with data tracking methods and opportunities to improve year-over-year tracking of NEEA efforts.

The Evaluators found during database review that a variety of fields are empty across code tracking data, similar to our finding for efficiency measure database review. The Evaluators summarize the missing values further in Appendix D. The Evaluators recommend that measure-level values are detailed as completely as possible.

The Evaluators found that naturally occurring baseline is calculated through "influence evaluations" completed by third-party evaluations (summarized in the following sections). The Evaluators found that the influence evaluation findings were not properly integrated into each standard savings estimate, thereby underestimating baseline units and overestimating overall net market effects.

3.6.2.1.2 UES Review

The Evaluators reviewed each of the unit energy savings (UES) values assigned to each federal standard in which savings are claimed by NEEA. NEEA utilizes UES values determined by third-party evaluators for each of the measures claimed. Each measure unit-level savings is weighted by heating and cooling zone across three housing types (single family, multifamily, and manufactured home), if applicable. These values are then multiplied by the net market units for each measure after netting out baseline units for each measure, described in further detail in 3.6.2.1.3.1. The Evaluators summarize the measure-level standards and UES methodologies employed by NEEA between 2017 and 2021 in the table below.

Due to the thorough third-party evaluations and estimates of UES verified for use by NEEA, the Evaluators do not note any concern for discrepancies with the standards UES values applied to estimate NEEA savings. Instead, the Evaluators focused on the rationality of NEEA's high-level application of regional units, baseline methodology, allocation methodology, and overall calculations for each Avista and Idaho Power.

3.6.2.1.3 Market Transformation Baseline Review

This section summarizes NEEA's methodology for estimating naturally occurring baseline for federal standards in which NEEA contributed.

NEEA does employ baseline models for federal standards updates. Alternatively, an "influence evaluation" is completed by a third-party evaluator, which summarizes NEEA's overall qualitative and quantitative influence towards federal standards updates, which result in energy savings. NEEA uses the quantitative assessment from each of these evaluations to estimate the proportion of total regional units to categorize towards naturally occurring baseline. Therefore, NEEA nets out any units that would have occurred in the absence of NEEA efforts towards increasing the energy efficiency of measures through standard updates.

In the section below, the Evaluators provide further detail of the integration of influence evaluations towards estimation of federal standards baseline units.

3.6.2.1.3.1 Influence Evaluation Review

The Evaluators reviewed third party independent evaluations of NEEA's "influence" towards updates in measure standards. The table below summarizes the third-party standards "influence evaluations" provided by NEEA.

Table 3-35: Summary of NEEA Standards Influence Evaluations

Standard	Third Party	Evaluation Completed	Qualitative Assessment	Quantitative Assessment
Beverage Vending Machines Standard Evaluation	TRC	2019	NEEA achieved most of the activities identified in NEEA's Codes & Standards logic mode. NEEA submitted comments in the public review process, including written comments and participation in public meetings.	20%
Ceiling Fan Standard Evaluation Report	TRC	2019	TRC found that NEEA engaged in most of the activities identified in NEEA's Codes and Standards. NEEA focused particularly on submitting comments in the public review process and participating in public meetings.	9%
Commercial and Industrial Pumps Standard Evaluation Report	TRC	2021	TRC found that NEEA engaged in most of the activities identified in NEEA's Codes & Standards logic model. NEEA participated in the Working Group, comments submitted in the public review process, including written comments and participation in public meetings.	24%
Commercial Pre-	TRC	2021	TRC found that NEEA engaged in most of the	4%

Standard	Third Party	Evaluation Completed	Qualitative Assessment	Quantitative Assessment
Rinse Spray Valves Standard Evaluation			activities identified in NEEA's Codes & Standards logic model. NEEA submitted comments in the public review process, including written comments and participation in public meetings.	
Commercial Refrigeration Equipment Evaluation	TRC	2018	TRC found that NEEA played a moderate role in the development and adoption of this standard. In the early stages of the standard development process, NEEA submitted independent comments on the test procedure.	15%
Commercial Unitary Air Conditioners Evaluation	TRC	2018	TRC found that NEEA engaged in several activities prescribed in the codes and standards logic model, particularly through the NEEA staff member's participation in the ASRAC Working Group.	19%
Electric Motors Evaluation	Cadmus	2016	The Motor Coalition, of which NEEA was a key member, heavily influenced the rulemaking, recommending expansion of the scope of the standard to cover all motors except specifically defined exceptions. NEEA was found to provide technical expertise to the Motor Coalition and served as a trusted voice in a negotiation process that has been contentious historically.	First year: 100% After first year: 61%
External Power Supply Evaluation	TRC	2017	Overall, TRC found that NEEA played a small role in the development and adoption of this standard. This is because there were a few barriers to this standard once the DOE removed battery chargers for separate regulation, manufacturer opposition to the EPS standard was minimal. In addition, NEEA's contribution to the federal process is generally to provide technical comments or analysis, but there were few technical needs for this standard.	2.60%
Fluorescent Lamp Ballasts Evaluation	TRC	2016	TRC believes that efficiency stakeholders had a "moderate to low" effect on this standard, and TRC translates this influence of all efficiency stakeholder efforts into a range between 12% and 24% of all energy savings from the standard.	23%
Residential Furnace Fans Evaluation	TRC	2018	TRC found that NEEA played a moderate role in the development and adoption of this standard. However, in the development of the test procedure, NEEA played a significant role.	15%
Small Electric	Cadmus	2016	The majority of the responding	33%

Standard	Third Party	Evaluation Completed	Qualitative Assessment	Quantitative Assessment
Motors Evaluation			manufacturer interviewees (5 of 6) said NEEA was "somewhat effective" or "very effective" in supporting the small motors standard adoption.	
Walk In Coolers Freezers Evaluation	TRC	2019	For the 2014 standard, TRC found that NEEA engaged in several activities prescribed in the codes and standards logic model, particularly through comments submitted in the public review process. For the 2017 standard, TRC found that NEEA engaged in several activities prescribed in the codes and standards logic model, particularly through comments submitted in the public review process.	2014: 12% 2017: 20%

As described above, NEEA makes use of the quantitative assessments from each of these evaluations as follows:

Equation 3-5: Standards Baseline Units Estimation

$$Baseline\ Units_{Standard} = Total\ Regional\ Units_{Standard} * Quantitative\ Assessment_{Standard}$$

First, NEEA uses the quantitative assessment percentage to estimate regional baseline units. Then, NEEA calculates net market units for the standard by netting out baseline units from the total regional units for the standard.

Equation 3-6: Net Market Units Estimation

$$Net\ Market\ Units_{Standard} = Total\ Regional\ Units_{Standard} - Baseline\ Units_{Standard}$$

This methodology ensures that NEEA only claims electric or gas savings towards a standard update resulted due to their participation and efforts in standard update meetings, proposals, and comments.

The Evaluators carefully reviewed each of the third-party evaluation reports above in order to identify whether these evaluations result in independent and reasonable quantitative assessments for estimating claimed savings. We considered the following key topics in our analysis:

- Evaluation indicated that NEEA staff attended standards update meetings
- Evaluation conducted interviews with NEEA Staff
- Evaluation conducted interviews with other parties participating in standards update meetings
- Evaluation reviewed NEEA-specific proposed changes to standards
- Evaluation reviewed and estimated NEEA-specific energy-savings changes dependent on NEEA-specific proposed changes only
- Evaluation qualitative assessment concluded that NEEA contributed a decent amount of effort towards standards updates
- Evaluation quantitative assessment estimated the percentage of savings contributed by each individual NEEA-specific change, supported by documentation that NEEA submitted as proposed changes to the standard
- Each evaluation is conducted consistently and thoroughly

Through careful review, the Evaluators determined that each of the influence evaluations were adequately conducted and that the resulting quantitative assessment for each standard is a sufficient way to estimate NEEA contributions and therefore claimable savings towards each measure. The Evaluators recommend that NEEA continue to complete independent third-party evaluations of NEEA influence towards standards.

The Evaluators note that 13 of the 25 federal standard measures lacked influence evaluations. The Evaluators summarize the federal standard measures in which a third-party evaluation has not been completed to estimate NEEA's quantitative influence towards updates in the table below.

Table 3-36: NEEA Measure-Level Standards

Sector	Initiative	Federal Standard
Residential	Other Residential Standards	Ceiling Fan Kits Residential Central AC Residential Heat Pumps Residential Heat Pump Water Heaters New Construction Heat Pump Water Heaters Battery Chargers Clothes Dryers
Commercial	Other Non-Residential Standards	Ceiling Fans Ceiling Fan Light Kits Commercial Air Compressors Steam Cookers Commercial Fryers
Industrial	Other Non-Residential Standards	Industrial Air Compressors

The Evaluators provide a summary of the contributions to standards and overall portfolio Ex-Ante and Ex-Post savings for the standards in which an influence evaluation was conducted vs. standards in which an influence evaluation was not conducted.

Table 3-37: Idaho Power Electric Standards Ex-Ante Savings by Influence Evaluation Completion

Program Year	Ex-Ante Standard Savings (aMW)	Ex-Ante Portfolio Savings (aMW)	Ex-Ante Standard Savings of Standards with Influence Evaluation (aMW)	Ex-Ante Standard Savings of Standards without Influence Evaluation (aMW)	Ex-Ante Standard Savings of Standards with Influence Evaluation (as % of Standards)	Ex-Ante Standard Savings of Standards without Influence Evaluation (as % of Standards)	Ex-Ante Standard Savings of Standards with Influence Evaluation (as % of Total)	Ex-Ante Standard Savings of Standards without Influence Evaluation (as % of Total)
2017	1.45	2.65	0.31	1.14	21%	79%	12%	43%
2018	1.15	2.77	0.35	0.80	30%	70%	13%	29%
2019	0.40	1.99	0.40	0.00	100%	0%	20%	0%
2020	0.41	1.91	0.41	0.00	100%	0%	21%	0%
2021	0.41	1.82	0.41	0.00	100%	0%	22%	0%
Total	**3.81**	**11.15**	**1.87**	**1.94**	**49%**	**51%**	**17%**	**17%**

Table 3-38: Idaho Power Electric Standards Ex-Post Savings by Influence Evaluation Completion

Program Year	Ex-Post Standard Savings (aMW)	Ex-Post Portfolio Savings (aMW)	Ex-Post Standard Savings of Standards with Influence Evaluation (aMW)	Ex-Post Standard Savings of Standards without Influence Evaluation (aMW)	Ex-Post Standard Savings of Standards with Influence Evaluation (as % of Standards)	Ex-Post Standard Savings of Standards without Influence Evaluation (as % of Standards)	Ex-Post Standard Savings of Standards with Influence Evaluation (as % of Total)	Ex-Post Standard Savings of Standards without Influence Evaluation (as % of Total)
2017	0.36	1.72	0.34	0.02	95%	5%	20%	1%
2018	0.04	1.04	0.04	0.00	100%	0%	4%	0%
2019	0.09	2.43	0.09	0.00	100%	0%	4%	0%
2020	0.40	2.72	0.40	0.00	100%	0%	15%	0%
2021	0.40	1.71	0.40	0.00	100%	0%	23%	0%
Total	**1.29**	**9.61**	**1.28**	**0.02**	**99%**	**1%**	**13%**	**0%**

Table 3-39: Avista Electric Standards Ex-Ante Savings by Influence Evaluation Completion

Program Year	Ex-Ante Standard Savings (aMW)	Ex-Ante Portfolio Savings (aMW)	Ex-Ante Standard Savings of Standards with Influence Evaluation (aMW)	Ex-Ante Standard Savings of Standards without Influence Evaluation (aMW)	Ex-Ante Standard Savings of Standards with Influence Evaluation (as % of Standards)	Ex-Ante Standard Savings of Standards without Influence Evaluation (as % of Standards)	Ex-Ante Standard Savings of Standards with Influence Evaluation (as % of Total)	Ex-Ante Standard Savings of Standards without Influence Evaluation (as % of Total)
2017	0.37	0.60	0.11	0.26	29%	70%	18%	43%
2018	0.30	0.57	0.12	0.18	39%	61%	20%	32%
2019	0.09	0.43	0.09	(0.00)	100%	0%	21%	0%
2020	0.09	0.41	0.09	0.00	100%	0%	23%	0%
2021	0.09	0.39	0.09	0.00	98%	2%	23%	0%
Total	**0.94**	**2.41**	**0.49**	**0.44**	**52%**	**47%**	**21%**	**18%**

Table 3-40: Avista Electric Standards Ex-Post Savings by Influence Evaluation Completion

Program Year	Ex-Post Standard Savings (aMW)	Ex-Post Portfolio Savings (aMW)	Ex-Post Standard Savings of Standards with Influence Evaluation (aMW)	Ex-Post Standard Savings of Standards without Influence Evaluation (aMW)	Ex-Post Standard Savings of Standards with Influence Evaluation (as % of Standards)	Ex-Post Standard Savings of Standards without Influence Evaluation (as % of Standards)	Ex-Post Standard Savings of Standards with Influence Evaluation (as % of Total)	Ex-Post Standard Savings of Standards without Influence Evaluation (as % of Total)
2017	0.10	0.31	0.09	-	95%	0%	31%	0%
2018	0.10	0.36	0.10	-	100%	0%	29%	0%
2019	0.04	0.50	0.04	-	100%	0%	7%	0%
2020	0.11	0.48	0.11	0.00	100%	0%	23%	0%
2021	0.12	0.40	0.11	0.00	98%	2%	28%	1%
Total	**0.47**	**2.06**	**0.46**	**0.00**	**98%**	**1%**	**22%**	**0%**

The Evaluators conclude that standards in which no influence evaluation was completed for contributed 1.94 aMW (51%) of total evaluation period Ex-Ante savings towards standards Idaho Power electric, which is equivalent to 17% of total Ex-Ante measure, code, and standards savings combined. The Evaluators conclude that standards in which no influence evaluation was completed for contributed 0.49 aMW (47%) of total evaluation period Ex-Ante savings towards standards for Avista electric, which is equivalent to 18% of total Ex-Post measure, code, and standards savings combined. No savings from standards were claimed for Avista gas measures.

However, after removing savings accrued in Oregon, Montana, and Washington by using the service territory allocation methodology, standards savings in which no influence evaluation was completed contributed less than 0.02 aMW (less than 1%) towards total Ex-Post savings for Idaho Power Electric, and 0.0 aMW (0%) towards Ex-Post savings for Avista electric.

This demonstrates that the standards that lack influence evaluations contributes the majority (over 50%) of standards Ex-Ante savings and that the integration of influence evaluations for the standards which lack them could drastically reduce savings for standards overall.

In order to ensure that only energy savings above market baseline is claimed by NEEA, the Evaluators recommend that third-party evaluations are completed for the federal standards claimed by NEEA in the table above, as well as any federal standards that NEEA claims savings for in the future. It is unreasonable to claim 100% of savings due to a federal standard update. Unless an evaluation is completed to quantify and validate NEEA influence towards federal standards updates, the savings should be categorized as naturally occurring baseline.

3.6.2.1.4 Funder Share Methodology Review

As described in Section 3.3, the Evaluators calculated verified savings using the service territory allocation methodology. The service territory values were calculated by NEEA using confidential datasets from NEEA stakeholders. The Evaluators were unable to review the data or replicate the service territory values because the originating data is delivered to NEEA with non-disclosure agreements. The Evaluators used the service territory values as-displayed in the NEEA annual workbooks.

The Evaluators note that NEEA calculated Ex-Ante savings for federal standards using funder share allocation. As described previously, the Evaluators conclude that the funder share methodology does not accurately reflect benefits claimed by Idaho utility customers. Therefore, the results displayed in this report reflect service territory savings. Additionally, the Evaluators recommend that Avista and Idaho Power request NEEA utilize service territory methodology for future NEEA annual savings reports in order to calculate energy savings and cost-effectiveness testing for the Commission.

3.6.2.2 Verified Ex Post Savings

The Evaluators summarize verified Ex Post federal standards savings results by utility, fuel type, and program year in the tables below. The Evaluators provide initiative-level savings in Appendix A.

Table 3-41: Summary of Idaho Power Idaho Electric Verified Ex Post Standards Savings by Program Year

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	1.45	0.36	24.70%
2018	1.15	0.04	3.88%
2019	0.40	0.09	23.49%
2020	0.41	0.40	97.88%
2021	0.41	0.40	98.46%
Total	**3.81**	**1.29**	**34.01%**

The overall verified realization rate for Idaho Power standards efforts due to NEEA was 34%. The Evaluators conclude this realization rate is due to two reasons: first, the Evaluators used the service territory allocation share to estimate Idaho savings. Second, the Evaluators identified and corrected any standards that lacked integration of influence evaluation quantitative estimates towards baseline units.

Table 3-42: Summary of Avista Idaho Electric Verified Ex Post Standards Savings by Program Year

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	0.37	0.10	26.87%
2018	0.30	0.10	34.85%
2019	0.09	0.04	41.00%
2020	0.09	0.11	124.51%
2021	0.09	0.12	125.13%
Total	**0.94**	**0.47**	**49.71%**

The overall verified realization rate for Avista electric standards efforts due to NEEA was 50%.

Table 3-43: Summary of Avista Idaho Gas Verified Ex Post Standards Savings by Program Year

Year	Ex Ante Therms Savings	Ex Post Therms Savings	Realization Rate
2019	0	0	N/A
2020	0	0	N/A
2021	0	0	N/A
Total	**0**	**0**	**N/A**

NEEA did not claim any standards gas initiatives in this timeframe.

3.6.2.3 Cost Effectiveness Results

The Evaluators summarize verified cost effectiveness results in the tables below. The Evaluator allocated 14% of electric costs to codes and standards for 2017-2019 and 15% of electric costs to codes and standards for 2020-2021. The Evaluator allocated 1% of gas costs to codes and standards for 2019 and 9% of gas costs to codes and standards for 2020-2021. The distribution of costs aligns with NEEA's

reported actual spending towards codes and standards. Further detail of measure-level cost-effectiveness is provided in Appendix B and further detail of NEEA cost breakdown is provided in Appendix C.

Table 3-44: Idaho Power Electric Idaho Standard Cost Effectiveness by Program Year

Program Year	UCT Costs	UCT Benefits	UCT
2017	$77,800.13	$1,173,841.02	15.09
2018	$17,010.57	$270,271.44	15.89
2019	$13,790.76	$529,252.85	38.38
2020	$61,513.62	$2,433,071.48	39.55
2021	$108,258.31	$2,168,234.69	20.03
Total	**$278,373.40**	**$6,574,671.48**	**23.62**

Table 3-45: Avista Electric Idaho Standard Cost Effectiveness by Program Year

Program Year	UCT Costs	UCT Benefits	UCT
2017	$28,374	$717,397	25.28
2018	$25,286	$708,443	28.02
2019	$5,458	$283,445	51.94
2020	$16,403	$871,386	53.12
2021	$23,256	$623,376	26.81
Total	**$98,777**	**$3,204,048**	**32.44**

NEEA does not provide any gas standards efforts in the Northwest region and therefore there is no cost-effectiveness testing completed for Avista Gas Idaho standards. As seen in the tables above, all standards efforts remained cost-effective using Idaho Power's and Avista's avoided costs and updated verified Ex Post savings within the state of Idaho.

3.6.2.4 Findings and Recommendations

Similar to the efficiency measures findings, NEEA claimed savings for measures completed in Washington, Oregon, and Montana – therefore, some measures underestimated Idaho-specific savings, while others overestimated out-of-state savings. The overall effect of this change resulted in a lower than 100% realization rate.

Based on the findings detailed above, the Evaluators present the following findings and recommendations based on our review of NEEA's federal standards measures:

Table 3-46: Summary of Federal Standards Findings and Recommendations

Findings	Recommendations
Finding #14: The Evaluators estimated verified Ex Post aMW for the standards efforts to display 34% and 50% realization rates for Idaho Power electric and Avista electric savings within the state of Idaho, respectively. The difference between claimed savings and verified savings is due to the change to using service territory allocation rather than funder share allocation. A minor cause of discrepancy is due to corrected baseline units using influence evaluation values.	The Evaluators reference **Recommendation #1**: The Evaluators recommend Avista and Idaho request NEEA to report annual savings via the service territory methodology for each measure claimed by NEEA for each Idaho Power electric, Avista electric, and Avista gas.
Finding #15: NEEA contracts third-party evaluators to conduct "influence evaluations" for each standard, which summarizes NEEA's overall qualitative and quantitative influence towards federal standards updates. NEEA uses the quantitative assessment as an estimate of federal standards naturally occurring baseline. The Evaluators found that some of these influence scores were not integrated properly to estimate baseline units. The Evaluators also found more than half (13 of 25) federal standard measures lack influence evaluations.	**Recommendation #8:** The Evaluators recommend that third-party evaluations are completed for the federal standards claimed by NEEA, as well as any federal standards in which NEEA hopes to claim savings for in the future. Using the quantitative estimate of NEEA influence, the Evaluators recommend that NEEA calculate a naturally occurring baseline for each standard.

3.6.3 Codes

In the table below, the Evaluators summarize the codes and new construction initiatives NEEA has claimed savings for within Avista Idaho and Idaho Power Idaho annual reports between 2017 and 2021.

Table 3-47: NEEA Code Initiatives Claimed in 2017-2021

Sector	Initiative	WA	OR	MT	ID
Residential	Efficient Homes	2009 WSEC 2012 WSEC 2015 WSEC	2009 Specialty 2011 Specialty 2012 Specialty	2003 IECC w MT amend. 2009 IECC w MT amend. 2012 IECC w MT amend.	2006 IECC 2009 IECC 2012 IECC w ID amend. 2006 WSEC 2009 WSEC 2012 WSEC
Residential	Next Step Homes	Above code SF/MF building ENERGY STAR MF Next Step Homes SF	Above code SF building ENERGY STAR SF/MF Next Step Homes SF	Above code SF/MF building ENERGY STAR SF 2018 IECC	Above code SF building ENERGY STAR SF/MF
Residential	Residential New Construction	WSEC 2015 MF WSEC 2018 MF WSEC 2018 SF	2011 Specialty SF 2011 Specialty MF 2017 Specialty MF	2018 IECC SF 2012 IECC w MT amend. MF 2018 IECC MF	2018 IECC SF ID HERS ID National ENERGY STAR Homes 2009 IECC MF 2012 IECC w Idaho amend. MF 2018 IECC MF
Residential	Other Codes (Multifamily)	2006 WSEC 2015 WSEC	2008 Or. Res Specialty 2011 Or. Res Specialty 2012 Or. Res Specialty 2017 Or. Res Specialty	2009 IECC 2012 IECC	2006 IECC 2009 IECC 2012 IECC
Commercial	Commercial Code Enhancement	2018 WSEC	N/A	N/A	N/A
Commercial	Other Codes (Commercial)	2012 WSEC 2015 WSEC 2018 WSEC	2019 OZERCC 2021 OZERCC	2012 IECC 2018 IECC	2006 IECC 2009 IECC 2012 IECC 2015 IECC

As displayed in the table above, NEEA claimed codes and new construction savings for new construction single family and multifamily homes constructed in Washington, Oregon, Montana, and Idaho. The Evaluators are unable to reasonably assign out-of-state savings to Idaho without an evaluation verifying that out-of-state code updates lead to market transformation effects in Idaho.

Additionally, the Evaluators recommend that influence evaluations are completed for each code update in order to estimate the proportion of savings NEEA may claim for its efforts towards building code updates, similarly to the NEEA influence evaluations completed for federal standards. It is likely that savings attributed to NEEA is currently being significantly overestimated, assuming that it is likely that

similar code updates would have naturally occurred without NEEA participation in code update meetings.

However, without NEEA influence evaluations completed for these code updates, the Evaluators assumed 100% code savings due to NEEA influence. The Evaluators did, however, remove non-Idaho code savings from all code initiatives to estimate savings that benefit Idaho customers directly. Therefore, this section reports verified code savings accrued within the state of Idaho only.

The sections below summarize the reviews completed to estimate verified savings through NEEA code efforts:

- Impact methodology review
- Cost effectiveness results
- Findings and recommendations

3.6.3.1 Impact Methodology Review

In this section, the Evaluators summarize findings and recommendations for each of the following components towards verified impact results of NEEA's code updates:

- Database and document review (Section 3.6.3.1.1)
- UES review (Section 3.6.3.1.2)
- Market transformation baseline review (Section 3.6.3.1.3)
- Funder share methodology review (Section 3.6.3.1.4)

3.6.3.1.1 Database and Document Review

The Evaluators reviewed each of the supplemental documents provided by NEEA, which included the following:

- 2017-2021 annual savings reports for Avista electric, Avista gas, and Idaho Power electric
- 2015 Idaho IECC UEC residential calculation approach
- 2018 Idaho IECC UEC commercial calculation approach
- Codes program logic model evaluations
- Codes and standards contracts, including NEEA employee roles and responsibilities towards the codes program
- Idaho energy code collaborative 5-year strategic plan
- 2018 Idaho field study
- Residential commercial codes logic models
- Codes program market progress evaluation reports

The Evaluators reviewed each of the documents above to identify and address any inconsistencies with data tracking methods and opportunities to improve year-over-year tracking of NEEA efforts.

The Evaluators found during database review that a variety of fields are empty across code tracking data, similar to our finding for efficiency measure database review. The Evaluators summarize the

missing values further in Appendix D. The Evaluators recommend that measure-level values are detailed as completely as possible.

Most importantly, the Evaluators found that NEEA claims 100% of code-built home and facility savings 10 years after the code is implemented. Although NEEA integrates a compliance rate referenced from recent field studies, the Evaluators conclude that it is unreasonable to claim that 100% of code-built homes occur due to NEEA and stakeholder efforts. Code development and progress also displays a naturally occurring baseline. However, NEEA does not estimate a market baseline for code initiatives.

In response to a data request for documents supporting code savings, NEEA delivered the following documentation:

- **Codes contracts:** A workbook summarizing each of the contracts in progress and completed in relation to code education and training, code proposals, code analysis, code sponsorship, and code reporting for the 2017 through 2021 years.
- **Market progress evaluation reports (MPER):** Reports summarizing the effectiveness of training and education activities and its associated outcomes
- **Savings methodology:** Documentation regarding IECC unit energy calculations approach for newly updates codes
- **Code development:** The history of Idaho's code adoptions of IECC over the last twenty years, an overview of code proposals NEEA funded or coordinated to have submitted, documentation of the process NEEA followed to prepare code proposals for 2018 IECC, including details of how NEEA commonly works with contractors to analyze and prepare code proposals that will benefit the Northwest, and documentation for how NEEA used the results of 2018 code proposals to prepare for the 2021 IECC code.
- **Field studies:** The 2015 Idaho residential field study report

The delivered documentation adequately summarizes NEEA's approach to collecting and submitting proposed changes to IECC codes, NEEA's scope for training and education within the region, estimation of total code-to-code savings, and compliance rates in the region.

The above documents support NEEA claimed savings for Idaho code changes by estimating gross energy savings differences between previously implemented IECC code and newly implemented IECC code, as well as estimating regional compliance rates for new construction. However, the documentation provided does not provide details or support NEEA's policy for claiming 100% of code savings as NEEA-generated savings, nor does it provide any evaluation requests or estimation of NEEA-specific quantitative contributions to code savings.

The Evaluators requested information, supporting documents, and/or evaluations of NEEA's contributions to support NEEA's policy to claim 100% of code savings. NEEA staff responded by stating the following:

> "[We claim] 100% of the amount of savings that we can measure through our code compliance studies. We have an ongoing building practices measurement where we go out into the field and find out how much of the code is being complied with. We don't assume 100% compliance. The

agreement for NEEA to be 100% attributable was a settlement between the 4 states about 10 years ago. This was decided upon by the Cost Effectiveness Advisory Committee. Where we are today is a direct result of the settlement. NEEA has played such a large role in the code making process that CEAC decided this was a reasonable way to address NEEA's part in the code making process. This was a stipulated agreement between NEEA and state regulators." (NEEA Staff)

The Evaluators asked NEEA staff how frequently this agreement is revisited and/or voted on. NEEA staff indicated that "every year, every single input assumption to every single savings claim is reviewed by CEAC. In theory, everything is open for comment and adjustment as needed. Which includes this 100% code savings factor."

The Evaluators conclude that although compliance rate is integrated into claimed savings, it is likely that code savings are significantly overestimated due to this lack of baseline value, assuming that it is likely that similar code updates would not have been made without NEEA participation in code update meetings. The Evaluators highlight this lack of support as a large concern moving forward for claiming code savings. However, without proper evaluation work completed, and without prior similar work to reference for literature review, the Evaluators assume 100% savings for this evaluation work, with the expectation and recommendation for NEEA to integrate a baseline for code savings through evaluation of NEEA contributions in future program years.

The Evaluators therefore recommend that an evaluation is completed for each code update to estimate NEEA's qualitative and quantitative influence towards the code update, which is currently completed for federal standard updates. This evaluation work will enable NEEA to estimate a baseline of homes that would have occurred without NEEA intervention in code meetings and updates. However, without NEEA influence evaluations completed for these code updates, the Evaluators assumed 100% code savings due to NEEA influence.

Finally, as previously stated, the Evaluators conclude that out-of-state code buildings are currently being attributed to Idaho utilities. The Evaluators are skeptical that spillover from out-of-state code changes result in energy savings within the state of Idaho. The Evaluators recommend that if NEEA continue to allocate out-of-state code savings to Idaho utilities, an evaluation is completed that defends such assumptions.

3.6.3.1.2 UES Review

The Evaluators reviewed each of the supplemental documents provided by NEEA, which included the following:

- 2017-2021 annual savings reports for Avista electric, Avista gas, and Idaho Power electric
- 2015 Idaho IECC UEC residential calculation approach
- 2018 Idaho IECC UEC commercial calculation approach
- 2018 Idaho field study
- Codes program market progress evaluation reports

The Evaluators reviewed each of the unit energy savings (UES) values assigned to each code update in which savings are claimed by NEEA. NEEA utilizes UES values determined by third-party evaluators for each of the code updates claimed. Each measure unit-level savings is weighted by heating and cooling zone across three housing types (single family, multifamily, and manufactured home), and across facility types for nonresidential code updates. These values are then multiplied by the net market units for each measure after netting out baseline units for each measure, described in further detail in 3.6.2.1.3.1.

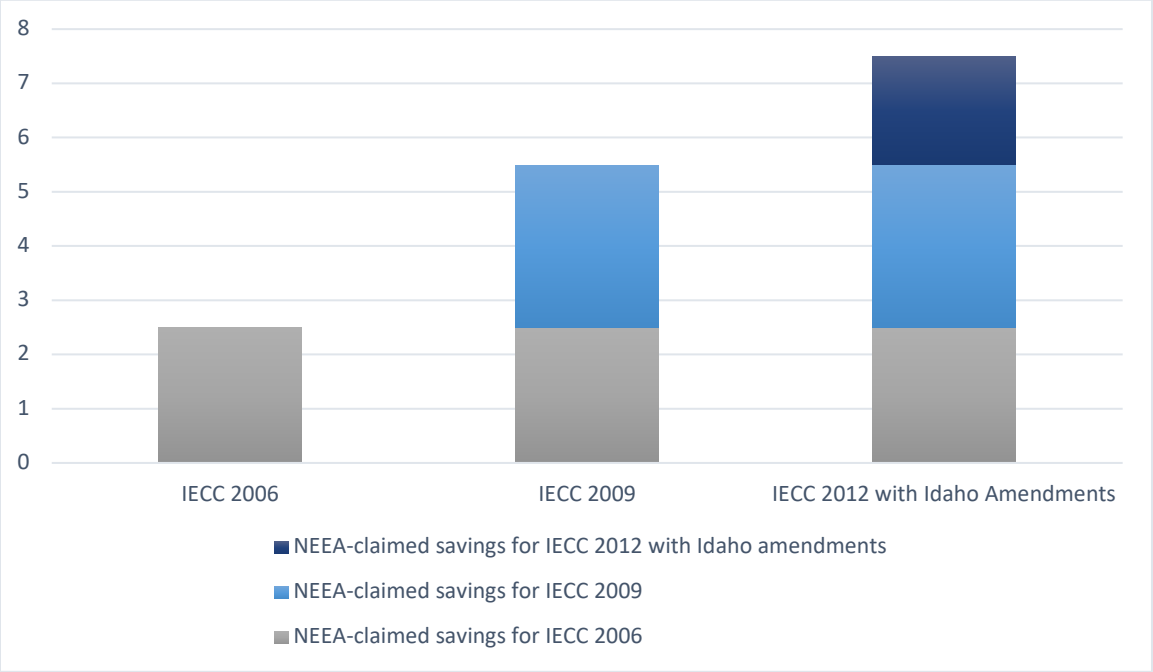
NEEA gathers the electric use, natural gas use, and total building area values developed by third-party evaluators to calculate the difference in energy use per square foot of building between code changes in IECC-code-built buildings.

Due to the thorough third-party evaluations and estimates of UES verified for use by NEEA, the Evaluators do not note any concern or discrepancies with the code's energy per square-foot values applied to estimate NEEA savings for code-built buildings. Instead, the Evaluators focused on the rationality of NEEA's high-level application of regional units, baseline methodology, allocation methodology, and overall allocation of savings for each Avista and Idaho Power.

3.6.3.1.3 Market Transformation Baseline Review

As described previously, NEEA claims savings for each IECC standard in Washington, Montana, Idaho, and Oregon. The current baseline for each of the IECC codes is the previously implemented IECC code. Therefore, to claim savings for residential buildings completed to meet IECC 2009 in Idaho, NEEA estimates the regional baseline as the total number of households built to prior code (IECC 2006). Similarly, to claim savings for residential buildings completed to meet IECC 2012 in Idaho with Idaho amendments, NEEA estimates the baseline regional units as the total number of households built to IECC 2009 code. The Evaluators provide the following figure to summarize NEEA's general methodology for claiming savings for code-built households in the Northwest region.

Figure 3-14: Example of Single-Family Code Savings Claimed by NEEA



*Proportions in figure above are not indicative of actual incremental savings

The Evaluators note that NEEA does not assume 100% compliance rate. NEEA savings calculations integrate observed code compliance rates for each state based on code compliance studies, which are completed every one or two years. Therefore, each of the IECC code update savings are weighted by actual compliance within each state using the most recent, third party-evaluated, state-level field study. Currently, NEEA currently assumes a compliance rate of 75% for Idaho. The Evaluators agree with this approach and recommend continuing to include compliance rates in order to prevent claiming savings from homes that are not 100% compliant.

The Evaluators note concern about specific code savings methodologies and policies currently implemented by NEEA:

- Currently, NEEA does not complete third-party evaluations of NEEA "influence" towards codes updates as is currently done for federal standards updates. Therefore, NEEA currently claims 100% savings for code-built homes. As summarized in the standards influence evaluations summarized in Table 3-35, NEEA influence towards standards ranges between 2.6% and 61%. If codes are evaluated similarly, and portray a similar range of influence, NEEA code savings could be significantly overrepresenting savings.
- NEEA's current policy is to report 100% of code-built residential and commercial building savings (while integrating compliance rates) for 10 years after the effective code update date. Currently, NEEA does not maintain a model to estimate naturally occurring baseline over time, as it does for its energy efficiency measures. Essentially, the current NEEA methodology assumes that there would be a 10-year lag in current residential and commercial building code if NEEA did not participate in code update efforts.
- NEEA currently allocates out-of-state code compliance savings to Idaho utilities. Similarly, NEEA currently allocates Idaho code compliance savings to out-of-state utilities. However, NEEA has

stated that starting in 2022, code savings will be allocated via service territory allocation. If this NEEA converts all code savings calculations to utilize service territory methodology, state-level code savings will be claimed only by utilities within the state. However, if NEEA continues to utilize funder share methodology for code savings, the Evaluators recommend that NEEA complete an evaluation which can demonstrate energy savings from out-of-state code updates can be realized across states, and specifically, within Idaho.

3.6.3.1.4 Funder Share Methodology Review

As described in Section 3.3, the Evaluators calculated verified savings using the service territory allocation methodology. The service territory values were calculated by NEEA using confidential datasets from NEEA stakeholders. The Evaluators were unable to review the data or replicate the service territory values because the originating data is delivered to NEEA with non-disclosure agreements. The Evaluators used the service territory values as displayed in the NEEA annual workbooks.

The Evaluators note that NEEA calculated Ex-Ante savings for code measures using a mix of service territory share and funder share allocation for the measures it claims savings for. The rationale behind using one methodology over the other is unclear.

As described previously, the Evaluators conclude that the funder share methodology does not accurately reflect benefits claimed by Idaho utility customers. Therefore, the results displayed in this report reflect service territory savings. Additionally, the Evaluators recommend that Avista and Idaho Power request NEEA utilize service territory methodology for future NEEA annual savings reports in order to calculate energy savings and cost-effectiveness testing for the Commission.

3.6.3.2 Verified Ex Post Savings

The Evaluators summarize verified Ex Post code savings results by utility, fuel type, and program year in the tables below. The Evaluators provide initiative-level savings in Appendix A.

Table 3-48: Summary of Idaho Power Idaho Electric Verified Ex Post Code Savings by Program Year

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	0.89	1.24	138.75%
2018	1.23	0.85	68.91%
2019	1.32	2.22	168.03%
2020	1.12	2.17	194.85%
2021	1.00	1.15	115.07%
Total	**5.56**	**7.63**	**137.25%**

The Evaluators emphasize that the savings from codes are likely overestimated due to lack of influence evaluations. The Evaluators pose that it is unreasonable to claim 100% of code savings due to NEEA participation in code update meetings. As stated previously, the Evaluators recommend that influence evaluations are completed for all code updates NEEA claims savings for. The resulting influence score will then be used to allocate a *portion* of total code savings towards NEEA efforts.

The overall verified realization rate for Idaho Power code efforts due to NEEA was 137%. Although the Evaluators zeroed out non-Idaho code savings, the Idaho service territory allocation share for Idaho code new construction completes outweighed the deficit created by out-of-state new construction completes. The funder share methodology overestimated out-of-state code savings while underestimating Idaho code savings.

The overall effect of this was a larger savings effect than estimated using the funder share allocation methodology. However, the Evaluators note again that these code savings are likely still overestimated due to lack of influence evaluation towards a naturally occurring baseline for code updates.

Table 3-49: Summary of Avista Idaho Electric Verified Ex Post Code Savings by Program Year

Year	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
2017	0.18	0.18	99.88%
2018	0.22	0.22	100.00%
2019	0.28	0.43	153.74%
2020	0.24	0.34	143.02%
2021	0.21	0.25	115.20%
Total	**1.13**	**1.41**	**125.40%**

The overall verified realization rate for Avista electric code efforts due to NEEA was 125%, also for the reasons listed above.

Table 3-50: Summary of Avista Idaho Gas Verified Ex Post Code Savings by Program Year

Year	Ex Ante Therms Savings	Ex Post Therms Savings	Realization Rate
2019	43,109	22,808	52.91%
2020	5,678	385	6.79%
2021	152,881	152,881	100.00%
Total	**201,667**	**176,074**	**87.31%**

The overall verified realization rate for Avista gas code efforts due to NEEA was 87%, also for the reasons listed above. A large portion of Ex Ante code savings accrued in 2019 and the large majority of Ex Ante code savings accrued 2020 due to Washington, Oregon, and Montana new construction projects. In 2021, NEEA claimed savings only for Idaho code updates. The overall realization rate across these program years for code gas saving is less than 100%.

3.6.3.3 Cost Effectiveness Results

The Evaluators summarize verified cost effectiveness results in the tables below. The Evaluator allocated 14% of electric costs to codes and standards for 2017-2019 and 15% of electric costs to codes and standards for 2020-2021. The Evaluator allocated 1% of gas costs to codes and standards for 2019 and

9% of gas costs to codes and standards for 2020-2021. The distribution of costs aligns with NEEA's reported actual spending towards codes and standards. Further detail of measure-level cost-effectiveness is provided in Appendix B and further detail of NEEA cost breakdown is provided in Appendix C.

Table 3-51: Idaho Power Electric Idaho Code Cost Effectiveness by Program Year

Program Year	UCT Costs	UCT Benefits	UCT
2017	$268,851.90	$11,734,281.85	43.65
2018	$324,071.89	$9,167,250.01	28.29
2019	$327,192.90	$17,177,751.00	52.50
2020	$335,567.24	$17,595,234.34	52.43
2021	$311,681.75	$8,321,577.44	26.70
Total	**$1,567,365.68**	**$63,996,094.65**	**40.83**

Table 3-52: Avista Electric Idaho Code Cost Effectiveness by Program Year

Program Year	UCT Costs	UCT Benefits	UCT
2017	$50,484	$2,156,341	42.71
2018	$52,305	$3,425,488	65.49
2019	$79,600	$7,331,020	92.10
2020	$49,354	$4,212,726	85.36
2021	$49,803	$2,618,611	52.58
Total	**$281,545**	**$19,744,185**	**70.13**

Table 3-53: Avista Gas Idaho Code Cost Effectiveness by Program Year

Program Year	UCT Costs	UCT Benefits	UCT
2019	$1,967	$315,142	160.23
2020	$13,147	$6,048	0.46
2021	$14,863	$2,491,877	167.66
Total	$29,977	$2,813,068	93.84

As seen in the tables above, all code efforts remained cost-effective using the Idaho Power and Avista avoided costs and updated verified Ex Post savings within the state of Idaho.

3.6.3.4 Findings and Recommendations

Similar to the efficiency measures findings, NEEA claimed savings for measures completed in Washington, Oregon, and Montana – therefore, some measures underestimated Idaho-specific savings, while others overestimated out-of-state savings. The overall effect of this change resulted in a higher than 100% realization rate.

Based on the findings detailed above, the Evaluators present the following findings and recommendations based on our review of NEEA's code initiatives:

Table 3-54: Summary of Code Findings and Recommendations

Findings	Recommendations
Finding #16: The Evaluators estimated verified Ex Post aMW for the code efforts to display 137%, 125%, and 87% realization rates for Idaho Power electric, Avista electric, and Avista gas savings within the state of Idaho, respectively. The difference between claimed savings and verified savings is due to the change to using service territory allocation rather than funder share allocation. Overall, the funder share allocation underestimated Idaho-specific code savings using the current NEEA practice of claiming 100% code savings for 10 years after code is implemented.	The Evaluators reference **Recommendation #1**: The Evaluators recommend Avista and Idaho request NEEA to report annual savings via the service territory methodology for each measure claimed by NEEA for each Idaho Power electric, Avista electric, and Avista gas.
The Evaluators reference **Finding #10** also applies for the codes review: The database review revealed that a variety of fields (measure life, UES) were empty across measure types due to lack of savings claimed for the measure, which made verification of values difficult and complicates tracking of a measure progress over time	The Evaluators reference **Recommendation #6:** The Evaluators recommend that measure-level values are detailed accurately and that each field is completed in the workbook to allow for year-over-year tracking of regional units, baseline units, retirement units, and unit energy savings values over time.
Finding #17: Currently, NEEA does not complete third-party evaluations of NEEA "influence" towards codes updates as is currently done for federal standards updates. Therefore, NEEA currently claims 100% savings for code-built homes. As summarized in the standards influence evaluations summarized in Table 3-35, NEEA influence towards standards ranges between 2.6% and 61%. If codes are evaluated similarly, and portray a similar range of influence, NEEA code savings could be significantly overrepresenting savings. NEEA's current policy is to report 100% of code-built residential and commercial building savings (while integrating compliance rates) for 10 years after the effective code update date. Currently, NEEA does not maintain a model to estimate naturally occurring baseline over time, as it does for its energy efficiency measures. Essentially, the current NEEA methodology assumes that there would be a 10-year lag in current residential and commercial building code if NEEA did not participate in code update efforts.	**Recommendation #9:** The Evaluators recommend an evaluation is completed for each code update to estimate NEEA's qualitative and quantitative influence towards the code update.
Finding #18: The Evaluators reviewed simulation	

Findings	Recommendations
model methodology used by NEEA to estimate code savings and found that UES methodology for code savings do not present any concerns.	

4 Appendix A: Verified Ex Post Savings by Initiative

This section summarizes the Evaluator's verified Ex Post savings for each Avista electric, Avista gas, and Idaho Power electric, parsed by program year, and initiative.

4.1 Efficiency Measures

This section summarizes the realization rates for efficiency measure savings.

4.1.1 Idaho Power Electric

This section summarizes the realization rates for Idaho Power electric measure verified savings.

Table 4-1: PY2017 Summary of Idaho Power Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Certified Refrigeration Energy Specialist (CRES)	0.00	0.00	0.00%
Commissioning Buildings	0.03	0.00	0.00%
Ductless Heat Pumps	0.06	0.00	6.72%
Heat Pump Water Heaters	0.10	0.01	5.68%
Luminaire Level Lighting Controls	0.00	0.00	0.00%
Reduced Wattage Lamp Replacement	0.03	0.06	198.85%
Retail Products Portfolio	0.02	0.02	75.23
Super-Efficient Dryers	0.05	0.02	32.89%
Televisions	0.02	0.02	103.12%
Total	**0.31**	**0.12**	**39.20%**

Table 4-2: PY2018 Summary of Idaho Power Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Building Operator Certification Expansion	0.00	0.00	0.00%
Certified Refrigeration Energy Specialist (CRES)	0.03	0.00	0.00%
Commissioning Buildings – Commercial	0.02	0.00	0.00%
Commissioning Buildings – Industrial	0.00	0.00	0.00%
Desktop Power Supplies	0.15	0.11	73.13%
Ductless Heat Pumps	0.03	0.00	0.00%
Heat Pump Water Heaters	0.04	0.00	0.00%
Other Strategic Energy Management – Industrial	0.00	0.00	0.00%
Other Strategic Energy Management - Commercial	0.00	0.00	0.00%
Reduced Wattage Lamp Replacement – Commercial	0.05	0.00	0.00%
Reduced Wattage Lamp Replacement - Industrial	0.01	0.00	0.00%
Retail Product Portfolio	0.02	0.01	57.04%
Super-Efficient Dryers	0.05	0.03	65.20%
Televisions	0.00	0.00	104.70%
Total	**0.40**	**0.15**	**38.34%**

Table 4-3: PY2019 Summary of Idaho Power Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Commissioning Buildings – Commercial	0.03	0.00	0.00%
Commissioning Buildings - Industrial	0.00	0.00	0.00%
Desktop Power Supplies	0.01	0.01	79.15%
Ductless Heat Pumps	0.05	0.00	1.02%
Heat Pump Water Heaters	0.04	0.00	3.74%
Luminaire Level Lighting Controls	0.00	0.00	0.00%
Manufactured Homes	0.00	0.00	0.00%
Other Strategic Energy Management – Industrial	0.00	0.00	0.00%
Other Strategic Energy Management - Commercial	0.00	0.00	0.00%
Reduced Wattage Lamp Replacement - Commercial	0.04	0.04	85.46%
Reduced Wattage Lamp Replacement - Industrial	0.01	0.01	85.46%
Retail Product Portfolio	0.01	0.00	6.92%
Super-Efficient Dryers	0.08	0.06	81.85%
Televisions	0.00	0.00	0.00%
Total	**0.28**	**0.12**	**43.78%**

Table 4-4: PY2020 Summary of Idaho Power Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Certified Refrigeration Energy Specialist (CRES)	0.00	0.00	0.00%
Commissioning Buildings - Commercial	0.03	0.00	0.00%
Commissioning Buildings - Industrial	0.01	0.00	18.80%
Desktop Power Supplies	0.01	0.00	0.00%
Ductless Heat Pumps	0.06	0.00	5.17%
Extended Motor Products - Residential	0.01	0.00	5.00%
Extended Motor Products - Commercial	0.01	0.00	28.78%
Heat Pump Water Heaters	0.08	0.00	4.17%
Luminaire Level Lighting Controls	0.01	0.01	56.71%
Manufactured Homes	0.01	0.00	0.00%
Other Strategic Energy Management – Commercial	0.00	0.00	0.00%
Other Strategic Energy Management - Industrial	0.00	0.00	0.00%
Reduced Wattage Lamp Replacement - Commercial	0.04	0.04	105.76%
Reduced Wattage Lamp Replacement - Industrial	0.01	0.01	105.09%
Retail Product Portfolio	0.12	0.08	65.79%
Total	**0.39**	**0.14**	**37.32%**

Table 4-5: PY2021 Summary of Idaho Power Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Commissioning Buildings	0.00	0.00	0.00%
Desktop Power Supplies	0.01	0.00	0.00%
Ductless Heat Pumps	0.05	0.00	2.96%
Heat Pump Water Heaters	0.10	0.00	4.18%
Luminaire Level Lighting Controls	0.01	0.00	51.59%
Manufactured Homes	0.01	0.00	0.00%
Reduced Wattage Lamp Replacement - Commercial	0.02	0.02	105.99%
Reduced Wattage Lamp Replacement - Industrial	0.00	0.00	105.99%
Retail Product Portfolio	0.17	0.11	67.14%
Window Attachments	0.00	0.00	0.00%
XMP Pumps – Residential	0.03	0.00	4.19%
XMP Pumps – Industrial	0.02	0.01	26.24%
Total	**0.42**	**0.15**	**36.93%**

4.1.2 Avista Electric

This section summarizes the realization rates for Avista electric measure verified savings.

Table 4-6: PY2017 Summary of Avista Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Commissioning Buildings	0.00	0.00	0.00%
Ductless Heat Pumps	0.01	0.00	10.20%
Heat Pump Water Heaters	0.03	0.02	68.73%
Luminaire Level Lighting Controls	0.00	0.00	0.00%
Reduced Wattage Lamp Replacement	0.00	0.00	98.27%
Retail Product Portfolio	0.00	0.00	42.21%
Super-Efficient Dryers	0.01	0.01	94.03%
Televisions	0.01	0.01	100.00%
Total	**0.06**	**0.03**	**57.68%**

Table 4-7: PY2018 Summary of Avista Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Commissioning Buildings - Commercial	0.00	0.00	0.00%
Commissioning Buildings - Industrial	0.00	0.00	0.00%
Desktop Power Supplies	0.02	0.02	100.00%
Ductless Heat Pumps	0.01	0.00	6.02%
Heat Pump Water Heaters	0.01	0.00	57.22%
Manufactured Homes	0.00	0.00	0.00%
Other Strategic Energy Management – Commercial	0.00	0.00	0.00%
Reduced Wattage Lamp Replacement – Commercial	0.00	0.00	98.89%
Reduced Wattage Lamp Replacement – Industrial	0.00	0.00	98.89%
Retail Product Portfolio	0.00	0.00	54.86%
Super-Efficient Dryers	0.01	0.01	93.09%
Televisions	0.00	0.00	99.98%
Total	**0.06**	**0.04**	**73.37%**

Table 4-8: PY2019 Summary of Avista Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Commissioning Buildings – Commercial	0.01	0.00	0.00%
Commissioning Buildings – Industrial	0.00	0.00	0.00%
Desktop Power Supplies	0.00	0.00	79.14%
Ductless Heat Pumps	0.01	0.00	4.01%
Heat Pump Water Heaters	0.01	0.00	43.16%
Luminaire Level Lighting Controls	0.00	0.00	0.00%
Manufactured Homes	0.00	0.00	0.00%
Other Strategic Energy Management – Industrial	0.00	0.00	0.00%
Other Strategic Energy Management – Commercial	0.00	0.00	0.00%
Reduced Wattage Lamp Replacement – Commercial	0.01	0.00	30.55%
Reduced Wattage Lamp Replacement – Industrial	0.00	0.00	31.71%

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Retail Product Portfolio	0.00	0.00	11.15%
Super-Efficient Dryers	0.02	0.02	109.48%
Total	**0.06**	**0.03**	**46.97%**

Table 4-9: PY2020 Summary of Avista Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Certified Refrigeration Energy Specialist (CRES)	0.00	0.00	0.00%
Commissioning Buildings – Commercial	0.01	0.00	0.00%
Commissioning Buildings – Industrial	0.00	0.00	41.60%
Desktop Power Supplies	0.00	0.00	0.00%
Ductless Heat Pumps	0.01	0.00	9.35%
Extended Motor Products – Residential	0.00	0.00	0.00%
Extended Motor Products – Commercial	0.00	0.00	0.00%
Heat Pump Water Heaters	0.01	0.00	0.00%
Luminaire Level Lighting Controls	0.00	0.00	0.00%
Manufactured Homes	0.00	0.00	0.00%
Other Strategic Energy Management – Industrial	0.00	0.00	0.00%
Other Strategic Energy Management – Commercial	0.00	0.00	0.00%
Reduced Wattage Lamp Replacement – Commercial	0.01	0.00	27.67%
Reduced Wattage Lamp Replacement – Industrial	0.00	0.00	27.49%
Retail Product Portfolio	0.02	0.03	114.44%
Televisions	0.00	0.00	0.00%
Total	**0.08**	**0.03**	**39.76%**

Table 4-10: PY2021 Summary of Avista Idaho Electric Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Commissioning Buildings – Commercial	0.00	0.00	0.00%
Desktop Power Supplies	0.00	0.00	0.00%
Ductless Heat Pumps	0.01	0.00	20.19%
Heat Pump Water Heaters	0.02	0.00	0.00%
Luminaire Level Lighting Controls	0.00	0.00	0.00%
Manufactured Homes	0.00	0.00	0.00%
Reduced Wattage Lamp Replacement – Commercial	0.00	0.00	27.73%
Reduced Wattage Lamp Replacement – Industrial	0.00	0.00	27.73%
Retail Product Portfolio	0.03	0.04	112.24%
Window Attachments	0.00	0.00	0.00%
XMP Pumps – Residential	0.01	0.00	0.00%
XMP Pumps – Commercial	0.00	0.00	0.00%
Total	**0.08**	**0.04**	**48.21%**

4.1.3 Avista Gas

This section summarizes the realization rates for Avista gas measure verified savings.

Table 4-11: PY2019 Summary of Avista Idaho Gas Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante Therm Savings	Ex Post Therm Savings	Realization Rate
Condensing Rooftop Units	636	0	0.00%
Total	**636**	**0**	**0.00%**

Table 4-12: PY2020 Summary of Avista Idaho Gas Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante Therm Savings	Ex Post Therm Savings	Realization Rate
Condensing Rooftop Units	0	0	N/A
Efficient Gas Water Heaters	0	0	N/A
Total	**0**	**0**	**N/A**

Table 4-13: PY2021 Summary of Avista Idaho Gas Verified Ex Post Efficiency Measure Savings by Initiative

Initiative	Ex Ante Therm Savings	Ex Post Therm Savings	Realization Rate
Efficient Gas Water Heaters	0	0	N/A
Efficient Rooftop Units	0	0	N/A
Total	**0**	**0**	**N/A**

4.2 Standards

This section summarizes the realization rates for standards savings.

4.2.1 Idaho Power Electric

This section summarizes the realization rates for Idaho Power electric standards verified savings.

Table 4-14: PY2017 Summary of Idaho Power Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Drive Power	0.03	0.06	216.45%
Other Non-Residential Standards	0.27	0.29	108.52%
Other Residential Standards	1.15	0.00	0.12
Total	**1.45**	**0.36**	**24.70%**

Table 4-15: PY2018 Summary of Idaho Power Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Drive Power	0.02	0.00	0.00%
Other Non-Residential Standards – Commercial	0.08	0.02	29.61%
Other Non-Residential Standards – Industrial	0.22	0.02	8.49%
Other Residential Standards	0.82	0.00	0.16%
Total	**1.15**	**0.04**	**3.88%**

Table 4-16: PY2019 Summary of Idaho Power Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Drive Power	0.01	0.00	11.90%
Other Non-Residential Standards – Commercial	0.08	0.03	40.51%
Other Non-Residential Standards – Industrial	0.23	0.00	0.00%
Other Residential Standards	0.07	0.06	81.29%
Total	**0.40**	**0.09**	**23.49%**

Table 4-17: PY2020 Summary of Idaho Power Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Drive Power	0.00	0.00	0.00%
Other Non-Residential Standards – Commercial	0.09	0.04	43.64%
Other Non-Residential Standards – Industrial	0.23	0.30	128.37%
Other Non-Residential Standards – Agricultural	0.00	0.00	257.68%
Other Residential Standards	0.08	0.06	75.37%
Total	**0.41**	**0.40**	**97.88%**

Table 4-18: PY2020 Summary of Idaho Power Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Other Non-Residential Standards – Commercial	0.10	0.04	43.48%
Other Non-Residential Standards – Industrial	0.24	0.30	128.37%
Other Non-Residential Standards – Agricultural	0.00	0.00	257.68%
Other Residential Standards	0.07	0.06	74.00%
Total	**0.41**	**0.40**	**98.46%**

4.2.2 Avista Electric

This section summarizes the realization rates for Avista electric standards verified savings.

Table 4-19: PY2017 Summary of Avista Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Drive Power	0.01	0.02	111.91%
Other Non-Residential Standards	0.09	0.08	91.43%
Other Residential Standards	0.26	0.00	0.16%
Total	**0.37**	**0.10**	**26.87%**

Table 4-20: PY2018 Summary of Avista Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Drive Power	0.01	0.01	100.00%
Other Non-Residential Standards – Commercial	0.02	0.01	63.92%
Other Non-Residential Standards – Industrial	0.08	0.08	100.00%
Other Residential Standards	0.19	0.00	0.22%
Total	**0.29**	**0.10**	**34.85%**

Table 4-21: PY2019 Summary of Avista Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Drive Power	0.00	0.01	293.18%
Other Non-Residential Standards – Commercial	0.02	0.01	69.19%
Other Non-Residential Standards – Industrial	0.05	0.00	0.00%
Other Residential Standards	0.02	0.02	99.67%
Total	**0.09**	**0.04**	**41.00%**

Table 4-22: PY2020 Summary of Avista Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Drive Power	0.00	0.00	0.00%
Other Non-Residential Standards – Commercial	0.02	0.01	63.24%
Other Non-Residential Standards – Industrial	0.05	0.08	157.01%
Other Non-Residential Standards – Agricultural	0.00	0.00	258.22%
Other Residential Standards	0.02	0.02	92.40%
Total	**0.09**	**0.11**	**122.33%**

Table 4-23: PY2021 Summary of Avista Idaho Electric Verified Ex Post Standards Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Drive Power	0.00	0.00	N/A
Other Non-Residential Standards – Commercial	0.02	0.01	62.90%
Other Non-Residential Standards – Industrial	0.05	0.08	157.01%
Other Non-Residential Standards – Agricultural	0.00	0.00	258.22%
Other Residential Standards	0.02	0.02	102.71%
Total	**0.09**	**0.12**	**125.13%**

4.2.3 Avista Gas

NEEA did not claim any standards update savings for gas measures.

4.3 Codes

This section summarizes the realization rates for code savings. As stated in Section 3.6.3, the following results are presented with a caveat: currently, NEEA does not conduct influence evaluations for code updates. It is likely that these code savings are overestimated since a naturally occurring baseline is not integrated. However, without NEEA influence evaluations completed for these code updates, and with no literature to reference on similar code-based evaluations, the Evaluators assumed 100% code savings due to NEEA influence.

4.3.1 Idaho Power Electric

This section summarizes the realization rates for Idaho Power electric code verified savings.

Table 4-24: PY2017 Summary of Idaho Power Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.35	0.60	172.50%
Other Codes (Commercial)	0.38	0.34	90.56%
Other Codes (Multifamily)	0.05	0.02	46.03%
Residential New Construction/Next Step Homes	0.11	0.26	245.22%
Total	**0.89**	**1.24**	**138.75%**

Table 4-25: PY2018 Summary of Idaho Power Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.38	0.81	215.05%
Other Codes (Commercial)	0.62	0.00	0.00%
Other Codes (Multifamily)	0.05	0.04	73.04%

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Residential New Construction/Next Step Homes	0.18	0.00	0.00%
Total	**1.23**	**0.85**	**68.91%**

Table 4-26: PY2019 Summary of Idaho Power Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.37	0.81	217.23%
Next Step Homes	0.21	0.47	225.25%
Other Codes (Commercial)	0.69	0.92	132.61%
Other Codes (Multifamily)	0.04	0.02	38.13%
Total	**1.32**	**2.22**	**168.03%**

Table 4-27: PY2020 Summary of Idaho Power Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.32	0.89	281.70%
Next Step Homes	0.22	0.50	222.51%
Other Codes (Commercial)	0.54	0.77	142.92%
Other Codes (Multifamily)	0.04	0.02	41.94%
Total	**1.12**	**2.17**	**194.85%**

Table 4-28: PY2021 Summary of Idaho Power Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.27	0.60	223.90%
Other Codes (Commercial)	0.40	0.46	113.98%
Residential New Construction	0.33	0.09	27.15%
Total	**1.00**	**1.15**	**115.07%**

4.3.2 Avista Electric

This section summarizes the realization rates for Avista electric code verified savings.

Table 4-29: PY2017 Summary of Avista Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.09	0.09	100.00%
Other Codes (Commercial)	0.07	0.07	100.00%
Other Codes (Multifamily)	0.01	0.01	100.00%
Residential New Construction/Next Step Homes	0.01	0.01	96.99%
Total	**0.18**	**0.18**	**99.88%**

Table 4-30: PY2018 Summary of Avista Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.11	0.11	100.00%
Other Codes (Commercial)	0.08	0.08	100.00%
Other Codes (Multifamily)	0.01	0.01	100.00%
Residential New Construction/Next Step Homes	0.01	0.01	100.00%
Total	**0.22**	**0.22**	**100.00%**

Table 4-31: PY2019 Summary of Avista Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.08	0.12	154.66%
Next Step Homes	0.05	0.11	236.51%
Other Codes (Commercial)	0.15	0.20	133.91%
Other Codes (Multifamily)	0.01	0.00	42.77%
Total	**0.28**	**0.43**	**153.74%**

Table 4-32: PY2020 Summary of Avista Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.06	0.10	161.42%
Next Step Homes	0.05	0.06	134.25%
Other Codes (Commercial)	0.12	0.17	142.74%
Other Codes (Multifamily)	0.01	0.00	52.83%
Total	**0.24**	**0.34**	**143.02%**

Table 4-33: PY2021 Summary of Avista Idaho Electric Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante aMW Savings	Ex Post aMW Savings	Realization Rate
Efficient Homes	0.06	0.07	123.85%
Other Codes (Commercial)	0.09	0.10	111.55%
Residential New Construction	0.07	0.08	112.68%
Total	**0.21**	**0.25**	**115.20%**

4.3.3 Avista Gas

This section summarizes the realization rates for Avista electric code verified savings.

Table 4-34: PY2019 Summary of Avista Idaho Gas Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante Therm Savings	Ex Post Therm Savings	Realization Rate
Next Step Homes	43,109	22,808	52.91%
Total	**43,109**	**22,808**	**52.91%**

Table 4-35: PY2020 Summary of Avista Idaho Gas Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante Therm Savings	Ex Post Therm Savings	Realization Rate
Next Step Homes	5,678	385	6.79%
Total	**5,678**	**385**	**6.79%**

Table 4-36: PY2021 Summary of Avista Idaho Gas Verified Ex Post Code Savings by Initiative

Initiative	Ex Ante Therm Savings	Ex Post Therm Savings	Realization Rate
Residential New Construction	152,881	152,881	100.00%
Other Codes (Commercial)	0.00	0.00	N/A
Total	**152,881**	**152,881**	**100.00%**

5 Appendix B: Cost Effectiveness Results

5.1 Efficiency Measures

This section summarizes the cost effectiveness tests for efficiency measure savings.

5.1.1 Idaho Power Electric

This section summarizes the cost effectiveness results for Idaho Power electric measures.

Table 5-1: PY2017 Idaho Power Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Building Operator Certification Expansion - Commercial - Large	$0	$0	0.00
Certified Refrigeration Energy Specialist (CRES) - industrial	$0	$0	0.00
Commissioning Buildings - Commercial - Large	$0	$0	0.00
Ductless Heat Pumps - Residential	$76,441	$17,513	0.23
Heat Pump Water Heaters - Residential	$101,261	$28,386	0.28
Luminaire Level Lighting Controls - Commercial - Large	$0	$0	0.00
Reduced Wattage Lamp Replacement - Commercial - Large	$1,155,809	$235,198	0.20
Residential Lighting - Residential	$0	$0	0.00
Retail Product Portfolio - Residential	$273,673	$61,990	0.23
Super-Efficient Dryers - Residential	$275,738	$72,602	0.26
Televisions - Residential	$303,217	$50,931	0.17
Total	**$2,186,140**	**$466,619**	**0.21**

Table 5-2: PY2018 Idaho Power Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Building Operator Certification Expansion - Commercial - Large	$0	$0	0.00
Certified Refrigeration Energy Specialist (CRES) - Industrial	$0	$0	0.00
Commissioning Buildings - Commercial - Large	$0	$0	0.00
Commissioning Buildings - Industrial	$0	$0	0.00
Desktop Power Supplies - Commercial - Large	$1,537,781	$241,160	0.16
Ductless Heat Pumps - Residential	$0	$0	0.00
Heat Pump Water Heaters - Residential	$0	$0	0.00
Manufactured Homes - Residential	$0	$0	0.00
Other Strategic Energy Management - Industrial	$0	$0	0.00
Other Strategic Energy Management - Commercial - Large	$0	$0	0.00
Reduced Wattage Lamp Replacement - Commercial - Large	$0	$0	0.00
Reduced Wattage Lamp Replacement - Industrial	$0	$0	0.00
Retail Product Portfolio - Residential	$121,903	$58,449	0.48
Super-Efficient Dryers - Residential	$453,479	$155,218	0.34
Televisions - Residential	$37,852	$8,294	0.22

Total	**$2,151,016**	**$463,122**	**0.22**

Table 5-3: PY2019 Idaho Power Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Building Operator Certification Expansion - Commercial - Large	$0	$0	0.00
Certified Refrigeration Energy Specialist (CRES) - Industrial	$0	$0	0.00
Commercial Code Enhancement - Commercial - Large	$0	$0	0.00
Commissioning Buildings - Commercial - Large	$0	$0	0.00
Commissioning Buildings - Industrial	$0	$0	0.00
Desktop Power Supplies - Commercial - Large	$159,989	$17,355	0.11
Ductless Heat Pumps - Residential	$9,673	$1,973	0.20
Heat Pump Water Heaters - Residential	$23,768	$6,127	0.26
Luminaire Level Lighting Controls - Commercial - Large	$0	$0	0.00
Manufactured Homes - Residential	$0	$0	0.00
Other Strategic Energy Management - Industrial	$0	$0	0.00
Other Strategic Energy Management - Commercial - Large	$0	$0	0.00
Reduced Wattage Lamp Replacement - Commercial - Large	$675,913	$123,236	0.18
Reduced Wattage Lamp Replacement - Industrial	$167,547	$30,548	0.18
Residential Lighting - Residential	$0	$0	0.00
Retail Product Portfolio - Residential	$8,693	$2,510	0.29
Super-Efficient Dryers - Residential	$1,104,808	$266,593	0.24
Televisions - Residential	$0	$0	0.00
Total	**$2,150,393**	**$448,341**	**0.21**

Table 5-4: PY2020 Idaho Power Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Building Operator Certification Expansion - Commercial - Large	$0	$0	0.00
Certified Refrigeration Energy Specialist (CRES) - Industrial	$0	$0	0.00
Commercial Code Enhancement - Commercial - Large	$0	$0	0.00
Commissioning Buildings - Commercial - Large	$0	$0	0.00
Commissioning Buildings - Industrial	$13,915	$1,780	0.13
Desktop Power Supplies - Commercial - Large	$0	$0	0.00
Ductless Heat Pumps - Residential	$48,160	$11,844	0.25
Extended Motor Products - Residential	$8,254	$2,381	0.29
Extended Motor Products - Commercial - Large	$61,653	$23,976	0.39

Heat Pump Water Heaters - Residential	$48,619	$14,973	0.31
Luminaire Level Lighting Controls - Commercial - Large	$82,678	$25,433	0.31
Manufactured Homes - Residential	$0	$0	0.00
Other Strategic Energy Management - Industrial	$0	$0	0.00
Other Strategic Energy Management - Commercial - Large	$0	$0	0.00
Reduced Wattage Lamp Replacement - Commercial - Large	$584,542	$126,571	0.22
Reduced Wattage Lamp Replacement - Industrial	$143,053	$30,975	0.22
Residential Lighting - Residential	$0	$0	0.00
Retail Product Portfolio - Residential	$1,224,230	$372,922	0.30
Super-Efficient Dryers - Residential	$0	$0	0.00
Televisions - Residential	$0	$0	0.00
Total	**$2,215,103**	**$610,855**	**0.28**

Table 5-5: PY2021 Idaho Power Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Commissioning Buildings - Commercial - Large	$0	$0	0.00
Desktop Power Supplies - Commercial - Large	$0	$0	0.00
Ductless Heat Pumps - Residential	$23,906	$6,085	0.25
Heat Pump Water Heaters - Residential	$61,897	$16,483	0.27
Luminaire Level Lighting Controls - Commercial - Large	$65,807	$16,850	0.26
Manufactured Homes - Residential	$0	$0	0.00
Reduced Wattage Lamp Replacement - Commercial - Large	$309,492	$51,618	0.17
Reduced Wattage Lamp Replacement - Industrial	$61,851	$10,316	0.17
Retail Product Portfolio - Residential	$1,713,122	$465,264	0.27
Window Attachments - Commercial - Large	$0	$0	0.00
XMP Pumps - Residential	$17,362	$4,294	0.25
XMP Pumps - Commercial - Large	$89,185	$31,239	0.35
Total	**$2,342,622**	**$602,149**	**0.26**

5.1.2 Avista Electric

This section summarizes the cost effectiveness results for Avista electric measures.

Table 5-6: PY2017 Avista Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Commissioning Buildings - Commercial - Large	$0	$0	
Ductless Heat Pumps - Residential	$18,720	$10,772	0.58

Heat Pump Water Heaters - Residential	$257,390	$99,636	0.39
Luminaire Level Lighting Controls - Commercial - Large	$0	$0	
Reduced Wattage Lamp Replacement - Commercial - Large	$22,674	$4,869	0.21
Retail Product Portfolio - Residential	$25,272	$5,313	0.21
Total	**$324,057**	**$120,589**	**0.37**

Table 5-7: PY2018 Avista Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Building Operator Certification Expansion - Commercial - Large	$0	$0	
Certified Refrigeration Energy Specialist (CRES) - Industrial	$0	$0	
Commissioning Buildings - Commercial - Large	$0	$0	
Commissioning Buildings - Industrial	$0	$0	
Desktop Power Supplies - Commercial - Large	$270,624	$39,975	0.15
Ductless Heat Pumps - Residential	$5,821	$3,998	0.69
Heat Pump Water Heaters - Residential	$54,146	$26,752	0.49
Luminaire Level Lighting Controls - Commercial - Large	$0	$0	
Manufactured Homes - Residential	$0	$0	
Other Strategic Energy Management - Industrial	$0	$0	
Other Strategic Energy Management - Commercial - Large	$0	$0	
Reduced Wattage Lamp Replacement - Commercial - Large	$24,912	$6,871	0.28
Reduced Wattage Lamp Replacement - Industrial	$6,532	$1,801	0.28
Residential Lighting - Residential	$0	$13,096	
Retail Product Portfolio - Residential	$21,719	$7,552	0.35
Super-Efficient Dryers - Residential	$96,709	$43,964	0.45
Televisions - Residential	$8,861	$1,943	0.22
Total	**$489,324**	**$145,951**	**0.30**

Table 5-8: PY2019 Avista Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Building Operator Certification Expansion - Commercial - Large	$0	$0	
Certified Refrigeration Energy Specialist (CRES) - Industrial	$0	$0	
Commissioning Buildings - Commercial - Large	$0	$0	
Commissioning Buildings - Industrial	$0	$0	
Desktop Power Supplies - Commercial - Large	$31,059	$3,631	0.12
Ductless Heat Pumps - Residential	$7,380	$3,902	0.53

Heat Pump Water Heaters - Residential	$53,241	$20,220	0.38
Luminaire Level Lighting Controls - Commercial - Large	$0	$0	
Manufactured Homes - Residential	$0	$0	
Other Strategic Energy Management - Industrial	$0	$0	
Other Strategic Energy Management - Commercial - Large	$0	$0	
Reduced Wattage Lamp Replacement - Commercial - Large	$46,915	$9,968	0.21
Reduced Wattage Lamp Replacement - Industrial	$12,068	$2,564	0.21
Residential Lighting - Residential	$0	$0	
Retail Product Portfolio - Residential	$2,721	$1,029	0.38
Super-Efficient Dryers - Residential	$286,880	$99,151	0.35
Televisions - Residential	$0	$0	
Total	**$440,264**	**$140,466**	**0.32**

Table 5-9: PY2020 Avista Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Building Operator Certification Expansion - Commercial - Large	$0	$0	
Certified Refrigeration Energy Specialist (CRES) - Industrial	$0	$0	
Commissioning Buildings - Commercial - Large	$4,566	$588	0.13
Commissioning Buildings - Industrial	$0	$0	
Desktop Power Supplies - Commercial - Large	$0	$0	
Ductless Heat Pumps - Residential	$15,135	$9,700	0.64
Extended Motor Products - Residential	$0	$0	
Extended Motor Products - Commercial - Large	$0	$0	
Heat Pump Water Heaters - Residential	$0	$0	
Luminaire Level Lighting Controls - Commercial - Large	$0	$0	
Manufactured Homes - Residential	$0	$0	
Other Strategic Energy Management - Industrial	$0	$0	
Other Strategic Energy Management - Commercial - Large	$0	$0	
Reduced Wattage Lamp Replacement - Commercial - Large	$33,048	$8,262	0.25
Reduced Wattage Lamp Replacement - Industrial	$0	$0	
Residential Lighting - Residential	$0	$0	
Retail Product Portfolio - Residential	$314,074	$134,398	0.43
Super-Efficient Dryers - Residential	$0	$0	
Televisions - Residential	$0	$0	
Total	**$366,823**	**$152,948**	**0.42**

Table 5-10: PY2021 Avista Electric Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Certified Refrigeration Energy Specialist (CRES) - Industrial	$0	$0	
Commissioning Buildings - Commercial - Large	$0	$0	
Commissioning Buildings - Industrial	$0	$0	
Desktop Power Supplies - Commercial - Large	$0	$0	
Ductless Heat Pumps - Residential	$24,660	$15,454	0.63
Heat Pump Water Heaters - Residential	$0	$0	
Luminaire Level Lighting Controls - Commercial - Large	$0	$0	
Manufactured Homes - Residential	$0	$0	
Other Strategic Energy Management - Industrial	$0	$0	
Other Strategic Energy Management - Commercial - Large	$0	$0	
Reduced Wattage Lamp Replacement - Commercial - Large	$12,254	$2,801	0.23
Reduced Wattage Lamp Replacement - Industrial	$2,449	$560	0.23
Retail Product Portfolio - Residential	$368,195	$147,725	0.40
Window Attachments - Commercial - Large	$0	$0	
XMP Pumps - Residential	$0	$0	
XMP Pumps - Commercial - Large	$0	$0	
Total	**$407,558**	**$166,540**	**0.41**

5.1.3 Avista Gas

This section summarizes the cost effectiveness results for Avista gas measures.

Table 5-11: PY2019 Avista Gas Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Condensing Rooftop Units	$152,294	$0	0.00
Efficient Gas Water Heaters	$0	$0	N/A
Total	**$152,294**	**$0**	**0.00**

Table 5-12: PY2020 Avista Gas Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Condensing Rooftop Units	$126,061	$0	0.00
Efficient Gas Water Heaters	$0	$0	N/A
Total	**$126,061**	**$0**	**0.00**

Table 5-13: PY2021 Avista Gas Idaho Efficiency Measure Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Condensing Rooftop Units	$21,077	$0	0.00

Efficient Gas Water Heaters	$121,435	$0	0.00
Total	**$142,512**	**$0**	**0.00**

5.2 Standards

This section summarizes the cost effectiveness tests for standards savings.

5.2.1 Idaho Power Electric

This section summarizes the cost effectiveness results for Idaho Power standards.

Table 5-14: PY2017 Idaho Power Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Drive Power - Industrial	$14,017	$238,156	16.99
Other Non-Residential Standards - Commercial - Large	$63,494	$929,391	14.64
Other Residential Standards - Residential	$289	$6,294	21.76
Total	**$77,800**	**$1,173,841**	**15.09**

Table 5-15: PY2018 Idaho Power Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Drive Power - Industrial	$0	$0	0.00
Other Non-Residential Standards - Commercial - Large	$9,238	$129,369	14.00
Other Non-Residential Standards - Industrial	$7,263	$134,391	18.50
Other Residential Standards - Residential	$510	$6,512	12.76
Total	**$17,011**	**$270,271**	**15.89**

Table 5-16: PY2019 Idaho Power Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Drive Power - Industrial	$238	$5,290	22.21
Other Non-Residential Standards - Commercial - Large	$5,014	$155,648	31.04
Other Non-Residential Standards - Industrial	$0	$0	0.00
Other Residential Standards - Residential	$8,538	$368,315	43.14
Total	**$13,791**	**$529,253**	**38.38**

Table 5-17: PY2020 Idaho Power Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Drive Power - Industrial	$0	$0	0.00

Other Non-Residential Standards - Commercial - Large	$6,395	$194,435	30.40
Other Non-Residential Standards - Industrial	$46,092	$1,859,240	40.34
Other Non-Residential Standards - Commercial - Small	$50	$1,567	31.37
Other Residential Standards - Residential	$8,977	$377,830	42.09
Total	**$61,514**	**$2,433,071**	**39.55**

Table 5-18: PY2021 Idaho Power Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Other Non-Residential Standards - Commercial - Large	$11,346	$168,080	14.81
Other Non-Residential Standards - Industrial	$81,969	$1,682,475	20.53
Other Non-Residential Standards - Commercial - Small	$0	$0	0.00
Other Residential Standards - Residential	$14,943	$317,680	21.26
Total	**$108,258**	**$2,168,235**	**20.03**

5.2.2 Avista Electric

This section summarizes the cost effectiveness results for Avista standards.

Table 5-19: PY2017 Avista Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Drive Power - Industrial	$4,526	$53,952	11.92
Other Non-Residential Standards - Commercial - Large	$23,730	$661,032	27.86
Other Residential Standards - Residential	$118	$2,413	20.46
Total	**$28,374**	**$717,397**	**25.28**

Table 5-20: PY2018 Avista Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Drive Power - Industrial	$2,878	$37,923	13.18
Other Non-Residential Standards - Commercial - Large	$2,859	$64,760	22.65
Other Non-Residential Standards - Industrial	$19,449	$603,853	31.05
Other Residential Standards - Residential	$101	$1,907	18.97
Total	**$25,286**	**$708,443**	**28.02**

Table 5-21: PY2019 Avista Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Drive Power - Industrial	$1,149	$26,591	23.15
Other Non-Residential Standards - Commercial - Large	$1,913	$70,589	36.90

Other Non-Residential Standards - Industrial	$0	$0	
Other Residential Standards - Residential	$2,396	$186,265	77.75
Total	**$5,458**	**$283,445**	**51.94**

Table 5-22: PY2020 Avista Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Drive Power - Industrial	$0	$0	
Other Non-Residential Standards - Commercial - Large	$14,047	$695,980	49.55
Other Non-Residential Standards - Industrial	$0	$0	
Other Non-Residential Standards - Commercial - Small	$0	$0	
Other Residential Standards - Residential	$2,356	$175,406	74.45
Total	**$16,403**	**$871,386**	**53.12**

Table 5-23: PY2021 Avista Electric Idaho Standards Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Drive Power - Industrial	$0	$0	
Other Non-Residential Standards - Commercial - Large	$2,722	$47,891	17.59
Other Non-Residential Standards - Industrial	$17,002	$489,978	28.82
Other Non-Residential Standards - Commercial - Small	$16	$338	20.60
Other Residential Standards - Residential	$3,515	$85,169	24.23
Total	**$23,256**	**$623,376**	**26.81**

5.2.3 Avista Gas

There were no gas standards efforts completed by NEEA between 2017 and 2021.

5.3 Codes

This section summarizes the cost effectiveness tests for code savings.

As stated in Section 3.6.3, the following results are presented with a caveat: currently, NEEA does not conduct influence evaluations for code updates. It is likely that these code savings are overestimated since a naturally occurring baseline is not integrated. However, without NEEA influence evaluations completed for these code updates, and with no literature to reference on similar code-based evaluations, the Evaluators assumed 100% code savings due to NEEA influence.

5.3.1 Idaho Power Electric

This section summarizes the cost effectiveness results for Idaho Power codes.

Table 5-24: PY2017 Idaho Power Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Efficient Homes - Residential	$131,145	$6,357,207	48.47
Other Codes (Commercial) - Commercial - Large	$74,954	$2,335,114	31.15
Other Codes (Multifamily) - Residential	$5,311	$257,465	48.47
Residential New Construction/Next Step Homes - Residential	$57,442	$2,784,496	48.47
Total	**$268,852**	**$11,734,282**	**43.65**

Table 5-25: PY2018 Idaho Power Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Efficient Homes - Residential	$309,663	$8,759,652	28.29
Other Codes (Commercial) - Commercial - Large	$0	$0	0.00
Other Codes (Multifamily) - Residential	$14,409	$407,598	28.29
Residential New Construction/Next Step Homes - Residential	$0	$0	0.00
Total	**$324,072**	**$9,167,250**	**28.29**

Table 5-26: PY2019 Idaho Power Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Efficient Homes - Residential	$119,241	$7,245,659	60.76
Next Step Homes - Residential	$69,869	$4,245,586	60.76
Other Codes (Commercial) - Commercial - Large	$135,576	$5,534,205	40.82
Other Codes (Multifamily) - Residential	$2,506	$152,301	60.76
Total	**$327,193**	**$17,177,751**	**52.50**

Table 5-27: PY2020 Idaho Power Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Efficient Homes - Residential	$137,603	$8,160,111	59.30
Next Step Homes - Residential	$76,718	$4,549,508	59.30
Other Codes (Commercial) - Commercial - Large	$118,840	$4,742,908	39.91
Other Codes (Multifamily) - Residential	$2,406	$142,707	59.30
Total	**$335,567**	**$17,595,234**	**52.43**

Table 5-28: PY2021 Idaho Power Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Efficient Homes - Residential	$163,529	$5,047,965	30.87
Other Codes (Commercial) - Commercial - Large	$123,982	$2,527,467	20.39
Residential New Construction - Residential	$24,171	$746,146	30.87
Total	**$311,682**	**$8,321,577**	**26.70**

5.3.2 Avista Electric

This section summarizes the cost effectiveness results for Avista codes.

Table 5-29: PY2017 Avista Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Efficient Homes - Residential	$24,720	$1,300,997	52.63
Other Codes (Commercial) - Commercial - Large	$21,355	$623,326	29.19
Other Codes (Multifamily) - Residential	$2,490	$131,049	52.63
Residential New Construction/Next Step Homes - Residential	$1,919	$100,969	52.63
Total	**$50,484**	**$2,156,341**	**42.71**

Table 5-30: PY2018 Avista Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Efficient Homes - Residential	$26,671	$2,295,012	86.05
Other Codes (Commercial) - Commercial - Large	$19,900	$637,087	32.01
Other Codes (Multifamily) - Residential	$2,902	$249,716	86.05
Residential New Construction/Next Step Homes - Residential	$2,832	$243,673	86.05
Total	**$52,305**	**$3,425,488**	**65.49**

Table 5-31: PY2019 Avista Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Commercial Code Enhancement - Commercial - Large	$0	$0	
Efficient Homes - Residential	$17,357	$1,956,279	112.71
Next Step Homes - Residential	$16,810	$1,895,989	112.79
Other Codes (Commercial) - Commercial - Large	$29,567	$1,638,091	55.40
Other Codes (Multifamily) - Residential	$619	$69,796	112.71
Total	**$64,354**	**$5,560,155**	**86.40**

Table 5-32: PY2020 Avista Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Commercial Code Enhancement - Commercial - Large	$0	$0	
Efficient Homes - Residential	$15,245	$1,770,866	116.16
Next Step Homes - Residential	$9,239	$1,073,163	116.16
Other Codes (Commercial) - Commercial - Large	$24,233	$1,294,717	53.43
Other Codes (Multifamily) - Residential	$637	$73,981	116.16
Total	**$49,354**	**$4,212,726**	**85.36**

Table 5-33: PY2021 Avista Electric Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Efficient Homes - Residential	$14,341	$772,522	53.87
Other Codes (Commercial) - Commercial - Large	$20,011	$1,013,693	50.66
Residential New Construction - Residential	$15,452	$832,395	53.87
Total	**$49,807**	**$2,618,614**	**52.57**

5.3.3 Avista Gas

This section summarizes the cost effectiveness results for Avista gas codes.

Table 5-34: PY2019 Avista Gas Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Next Step Homes	$1,967	$315,142	160.23
Total	**$1,967**	**$315,142**	**160.23**

Table 5-35: PY2020 Avista Gas Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Next Step Homes	$13,147	$6,048	0.46
Total	**$13,147**	**$6,048**	**0.46**

Table 5-36: PY2020 Avista Gas Idaho Codes Cost Effectiveness by Initiative

Initiative	UCT Costs	UCT Benefits	UCT
Residential New Construction - Residential	$14,863	$2,491,877	167.66
Other Codes (Commercial) - Commercial - Large	$0	$0	N/A
Total	**$14,863**	**$2,491,877**	**167.66**

6 Appendix C: NEEA-Allocated Costs

This section summarizes the total NEEA budget for the 5-year 2015-2019 and the 2020 to 2024 business plans. The proportion of NEEA-allocated funds is used to distribute Avista- and Idaho Power-provided NEEA funding between the efficiency measures, codes, and standards.

6.1.1 2014-2019 Business Plan

This section summarizes the actual costs reported by NEEA for the 2014 to 2019 5-year business plan.

Table 6-1: 2014 – 2019 5-Year Actual NEEA Costs

Primary Strategies	5-Year Electric Actual Costs	5-Year Natural Gas Actual Costs
Emerging technology	$10,534,740.00	$2,364,765.00
Effective Portfolio Execution	**$25,762,239.00**	**$3,619,888.00**
Building Envelope	**$698,671.00**	
Consumer Products	**$12,785,010.00**	**$394,407.00**
HVAC	**$6,702,005.00**	**$1,777,354.00**
Lighting	**$3,188,446.00**	
Motor-Driven Systems	**$1,525,470.00**	
New Construction	**$8,772,362.00**	**$400,000.00**
Water Heating	**$19,665,505.00**	**$1,777,800.00**
Enabling Infrastructure	**$10,819,593.00**	
LTMT	**$10,725,919.00**	
Codes & Standards	**$15,959,117.00**	**$102,923.00**
Market Intelligence	$9,518,708.00	$606,019.00
Convene and Collaborate	$9,149,857.00	$0.00
Administration	$21,276,009.00	$0.00
Allocate Shared Services	($3,012,494.00)	$2,533,527.00
Total	**$164,071,157.00**	**$13,576,683.00**

Highlighted in orange in the table above represents the total costs allocated to efficiency measures. Highlighted in light blue in the table above represents the total costs allocated to codes & standards. Based on the table provide above, the Evaluators distributed costs using the following methodology:

- Electric costs:
  - Efficiency measures capture 86% of shared category
  - Codes & Standards capture 14% of shared category
- Natural gas costs:
  - Efficiency measures capture 99% of shared category
  - Codes & Standards capture 1% of shared category

NEEA codes and standards contribute a minority of total funding from NEEA, however, based on the impact evaluation, codes and standards provides the majority of claimable savings by NEEA.

6.1.2 2020-2024 Business Plan

This section summarizes the actual costs reported by NEEA between 2020 and 2022 for the 2020 to 2024 5-year business plan.

Table 6-2: 2020-2022 Actual NEEA Costs

Primary Strategies	2020-2022 Electric Actual Costs	2020-2022 Natural Gas Actual Cost
Emerging Technology	$9,566.00	$1,958.00
Effective Portfolio Execution	**$74,149.00**	**$8,361.00**

Codes & Standards	**$13,292.00**	**$872.00**
Market Intelligence	$5,122.00	$488.00
Convene and Collaborate	$7,700.00	$0.00
Administration	$21,858.00	$0.00
Allocate Shared Services	-$4,715.00	$3,136.00
Total Core Activities	**$126,972.00**	**$14,815.00**

Highlighted in orange in the table above represents the total costs allocated to efficiency measures. Highlighted in light blue in the table above represents the total costs allocated to codes & standards. Based on the table provide above, the Evaluators distributed costs using the following methodology:

- Electric costs:
  - Efficiency measures capture 85% of shared category
  - Codes & Standards capture 15% of shared category
- Natural gas costs:
  - Efficiency measures capture 91% of shared category
  - Codes & Standards capture 9% of shared category

7 Appendix D: Summary of Missing Values

In this section, the Evaluators summarize the elements missing from the tracking data delivered by NEEA to estimate total regional and utility savings for each Idaho Power Electric, Avista Electric, and Avista Gas savings reports.

Table 7-1: Avista Electric Summary of Missing Values

Initiative	2017	2018	2019	2020	2021
Load shape	6 (11%)	23 (12%)	23 (12%)	25 (11%)	101 (100%)
Measure Life	7 (13%)	12 (6%)	0 (0%)	17 (8%)	0 (0%)
kWh/unit energy savings	2 (4%)	56 (30%)	61 (32%)	64 (29%)	43 (43%)
Total Regional Units	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Local Program Units	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
NEEA Baseline	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Retirements	6 (11%)	8 (4%)	13 (7%)	12 (5%)	14 (14%)
Retirements allocated to local programs	3 (5%)	9 (5%)	11 (6%)	10 (5%)	15 (15%)
Retirements allocated to baseline	9 (16%)	17 (9%)	23 (12%)	22 (10%)	29 (29%)
Initiative Start Year	55 (100%)	0 (0%)	0 (0%)	0 (0%)	101 (100%)

Table 7-2: Avista Gas Summary of Missing Values

Initiative	2019	2020	2021
Load shape	N/A	N/A	N/A

Measure Life	24 (100%)	25 (100%)	43 (100%)
Therm/unit energy savings	3 (13%)	0 (0%)	8 (19%)
Total Regional Units	0 (0%)	0 (0%)	0 (0%)
Local Program Units	0 (0%)	0 (0%)	0 (0%)
NEEA Baseline	0 (0%)	0 (0%)	0 (0%)
Retirements	24 (100%)	25 (100%)	43 (100%)
Retirements allocated to local programs	24 (100%)	25 (100%)	43 (100%)
Retirements allocated to baseline	24 (100%)	25 (100%)	43 (100%)
Initiative Start Year	24 (100%)	25 (100%)	43 (100%)

Table 7-3: Idaho Power Electric Summary of Missing Values

Initiative	2017	2018	2019	2020	2021
Load shape	14 (9%)	12 (11%)	23 (12%)	24 (11%)	101 (100%)
Measure Life	7 (4%)	8 (7%)	1 (1%)	17 (8%)	0 (0%)
kWh/unit energy savings	49 (31%)	0 (0%)	61 (32%)	64 (29%)	0 (0%)
Total Regional Units	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Local Program Units	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
NEEA Baseline	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Retirements	11 (7%)	3 (3%)	13 (7%)	12 (5%)	11 (11%)
Retirements allocated to local programs	8 (5%)	5 (5%)	11 (6%)	11 (5%)	3 (3%)
Retirements allocated to baseline	18 (11%)	7 (7%)	23 (12%)	22 (10%)	14 (14%)
Initiative Start Year	0 (0%)	0 (0%)	0 (0%)	0 (0%)	101 (100%)

The Evaluators imputed a likely load shape and appropriate measure life in cases in which the load shape or measure life was not defined by NEEA. For the line items missing kWh/unit or Therm/unit energy savings values, the Evaluators note that the number of units in which savings apply are zero do not affect savings, as the number of units claimed for those examples was zero. Although the total net market units for these measures are zero, and total net market effects are effectively zero, the Evaluators recommend that appropriate kWh/unit and Therm/unit energy savings values are still defined appropriately.

NEEA includes in the tracking data estimates of total retired units in the region. The Evaluators note that in some instances, total regional retirement units are defined in aggregate, whereas in other instances, local program retirement and baseline retirement units are defined. The Evaluators recommend that in any instances where local program, baseline, or total regional retirement units is above 0, that those retirement units are then categorized under the local program or baseline retirement units. This will help with tracking how retirement units are partitioned between each category, for each measure, over time.

EASTSIDE COLLABORATIVE MARKET TRANSFORMATION:

FINDINGS & RECOMMENDATIONS REPORT

September 28, 2023

EXECUTIVE SUMMARY

Established in 2019, the Eastside Collaborative, which includes Avista Corporation (Avista) and Idaho Power Company (IPC), completed its fourth year in 2023. Created to assess the feasibility of localized market transformation opportunities and the market's willingness to partner and invest in regional, smaller-scale efforts, the Eastside Collaborative's activities were extended by a year when the COVID pandemic introduced supply chain delays.

When pandemic disruptions subsided, the Eastside Collaborative moved forward with an initial ductless heat pump (DHP) market transformation pilot to understand the supply chain's willingness to partner and invest prior to the undertaking of a comprehensive market transformation effort. The pilot efforts resulted in direct investments from the market of more than $1.5 million across both utility territories, every dollar of which directly benefited Avista's and IPC's respective customers and local economies.

The pilot efforts demonstrated a market enthusiasm for localized market transformation efforts that establishes an opportunity for Avista and IPC to move forward with comprehensive localized market transformation efforts, either jointly or individually. As such, this report includes recommendations that:

- Highlight a pathway to establishing a localized market transformation model.
- Capture market effects savings through resource acquisition programs.
- Cover DHP technology, specifically.

In addition to detailing key activities, market partner experience, and the findings of a third-party evaluation of the DHP pilot, the following report provides recommendations on how Avista and IPC can continue to diversify their market transformation activities.

With full rationale and analysis provided in the following report, the pilot team's key recommendations are as follows:

- Continue to diversify market transformation investments that prioritize Avista's and IPC's respective territories, customers and local economies.
- Leverage shared commitments and interests across organizations, when applicable and/or desired. There are economies of scale and increased impact opportunities that can be achieved with combined forces, though these efforts do not necessarily require constant collaboration or perfectly parallel paths.
- Continue the partnership with NEEA to leverage regional resources, research, data and tools, while continuing to undertake regional activities.
- Continue deeper DHP-specific engagement to further develop Eastside markets, with a focus on increasing installations in electrically heated homes and maximizing energy-savings opportunities.
- Invest in contracting support to administer localized market transformation efforts.

This Eastside Collaborative's pilot has proven that the market is not only willing to invest in localized market transformation efforts, but also enthusiastic about taking a leadership role in transforming the market in partnership with Avista and IPC. In whatever way Avista and IPC chooses to actualize the pilot's findings, Brio looks forward to supporting the next steps that lead to total market transformation, with a continued focus on providing economic benefit to Avista's and IPC's customers and local economies.

EASTSIDE COLLABORATIVE INTRODUCTION

To support their localized market transformation efforts, Avista contacted Brio for consultation and eventually contracted with Brio to assess the opportunity of deploying localized market transformation efforts that would occur in addition to and beyond the market transformation efforts already taking place in the four-state region.

A few key assumptions informed this work:

- Not all products, practices or services that are well-suited for Avista's and IPC's markets are appropriate for or of interest to the entire Northwest region.
- Avista and IPC have potential interest in market transformation opportunities that the region as a whole may not have interest in pursuing.
- The needs and motivators of customers east of the Cascades differ from those of customers in other areas. For example, the market adoption rate east of the Cascades often develops at a different pace and trajectory than that of the more western states in the four-state region.
- Opportunity exists to achieve optimal results by timing certain market transformation interventions when Avista's and IPC's markets are at peak readiness.

While the team was confident that the principles and tools of market transformation could be right-sized and successfully deployed without a four-state or national effort, they knew it would be critical to test whether local and national market actors would respond to and participate in interventions without the heft of the full four-state region in play.

Therefore, before deploying a full-scale market transformation effort, the Eastside Collaborative decided to run a pilot to determine:

- Whether the market would invest and support localized efforts without the four-state-regional scale.
- How IPC and Avista would experience the opportunity to collaborate.
- Whether we could build a flexible framework that offers levels of customization in the respective territories, including varied approaches to data access and availability.
- The ease and feasibility of:
    - Working with NEEA
    - Evaluation efforts

Given this focus, this pilot scope did not include investing in building 1) a cost-effectiveness approach and associated models, 2) unique market research, or 3) baseline development. By doing so, the pilot team proceeded as careful stewards of ratepayers' funds, avoiding the expenses associated with long-term market transformation portfolio development at a point before the pilot had yet established whether this opportunity warranted longer term investment.

MARKET TRANSFORMATION FRAMEWORK

The initial objective of the Eastside Collaborative was to identify and select a residential pilot to test the supply chain's willingness to actively participate and invest in smaller, more localized efforts. Simultaneously, the Eastside Collaborative researched and defined a market transformation framework and partnership structure that allowed Avista and IPC to work more closely together, while also remaining flexible and nimble to meet the needs of their individual organizations. Throughout, the team leveraged the established best practices of market transformation to ensure these efforts and their results could be replicated in future localized market transformation efforts.

In addition to testing the potential of localized market transformation efforts, the pilot was also designed to test the ability of these efforts to bring positive beneficial impact to the local economy. At each step, the pilot featured close cross-team collaboration between Avista, IPC and the local region to avoid market confusion while leveraging, sharing and maximizing collective resources. And finally, the pilot was flexibly designed so that each utility could exit pilot activities at any point should the efforts prove ineffective or wasteful of ratepayer funds.

KEY ACTIVITIES

Research and discovery

- Scanned industry for market transformation definitions and models (both existing and potential) for market transformation.
- Reviewed documentation, including potential study, regional studies and plans to uncover product opportunities.
- Interviewed staff to better understand current organizational challenges, motivators, opportunities and staff experience with market transformation programs.

OUTCOMES

- Decided collectively to use the established market transformation definition from ACEEE to remain consistent with other national market transformation efforts.
- Decided collectively to utilize a hybrid market transformation model to maintain alignment across Avista and IPC while continuing to engage the four-state-regional model by funding and participating in NEEA.

KEY ACTIVITIES	OUTCOMES

Framework development
 	
• Built market transformation tools and templates for designing pilots and initiatives using market transformation best practices.
	• Identified the foundational elements necessary for an effective and replicable market transformation initiative:
	  o Selection criteria for pilots and initiatives
	  o Tool to document and align on risks and mitigation strategies
	  o Clearly defined target market
	  o Measurability and progress indicators
	  o Assumed impediments to market transformation
	
	• Developed the foundational strategic and tactical elements necessary for an effective and replicable market transformation initiative:
	  o Theory of market transformation
	  o Logic models
	  o Market progress indicators
	  o Data plans
	  o Market characterization approach
	  o Activities, intervention strategies and leverage points to overcome assumed impediments
	  o Estimated timeline to market transformation
	  o A definition of completeness to indicate that market transformation has occurred

The Eastside Collaborative structure
 	
• Facilitated meetings and developed an Eastside Collaborative communication plan.
• Recommended establishing market transformation training curriculum for utility staff.
• Explored risk and mitigation strategies.
	• Created a high-level Three-Year Activities plan.
	• Created a resource plan that established roles and responsibilities, including:
	  o Arranging a steering committee to make decisions and identify internal utility resources to support efforts.
	  o Designating a Pilot team to support pilot design.
	  o Determining that utilities would deploy marketing and communications internally.

KEY ACTIVITIES	OUTCOMES
Pilot identification and preparation • Developed five pilot concepts using selection criteria for market transformation pilots, with the assumption that RTF savings numbers could be leveraged.	• Collectively selected ductless heat pumps (DHP) as the pilot technology (for selection criteria, see Pilot Planning section below). • Informed pilot efforts by developing market snapshots using culled regional data and other research to understand market trends and resident demographics. • Established a regular meeting cadence and shared pilot decision with NEEA and other identified points of collaboration.

Evaluation and investigation
 	
• Facilitated discussions regarding cost-effectiveness for localized market transformation.
• Created a process for evaluating the Eastside Collaborative's progress.
• Explored for firms to support recommended cost-effectiveness models and evaluate the pilot.
  o Note: Several evaluation firms declined to participate, citing concerns that it would impact current or future contracts with NEEA.
	• Developed interim success metrics, including metrics that measure the expected success of future efforts, including:
	  o Customer and market satisfaction
	  o The comparative measurable impact of money invested in the market in relation to prior efforts
	  o Achievement of energy-savings targets
	  o Measurable economic benefit to the communities
	  o Documented and ongoing process improvement
	  o Demonstrated evidence of local market transformation
	• Selected Cadeo Group as the third-party evaluator of pilot efforts.
	
	Note: Should localized efforts continue, a tailored cost-effectiveness approach will be required. This tailored approach can account for any differences in approach between Avista and IPC, while also finding a middle ground between existing utility and NEEA models.

PILOT OUTCOMES DEMONSTRATE FEASIBILITY OF LOCALIZED MARKET TRANSFORMATION

At the start of the project, the team decided to adopt ACEEE's definition of market transformation to instill an internal consistency of meaning and shared terminological understanding. However, as new organizations have since emerged, each one has infused their own unique approach and definition, creating a bigger pool of experiences to leverage and learn from.

Despite this flux in market definitions, the pilot team believes the outcomes of the Eastside Collaborative's pilot indicate that efforts successfully motivated the supply side to participate and make economic investments in Avista and IPC that directly benefit their respective customers. This progress demonstrates the required foundations of initial market transformation interventions, setting the stage for continued market transformation advancement should the Eastside Collaborative choose to build on these achievements.

The following report details the successes and lessons from the pilot project from an implementation perspective. For a deeper look into the pilot's success from a market and utility perspective, see the attached report from third-party evaluator, Cadeo Group.

> *"The strategic process of intervening in a market to create lasting change in market behavior by removing identified barriers or exploiting opportunities to accelerate the adoption of all cost-effective energy efficiency as a matter of standard practice."*
>
> *— ACEEE's definition of market transformation*

PILOT OUTCOMES	PROGRESS INDICATORS
The supply side made investments in the local market.	• The supply chain invested more than $1.5 million in human and financial capital throughout the pilot's run. • Distributors assigned dedicated staff members to support the pilot. • Distributors and manufacturers recruited and trained installers and dealers. • Manufacturers, distributors and contractors created additional financial offerings to lower product costs for customers. • Manufacturers additionally invested in buying down the interest rates for installers' consumer-financing offers. • Partners at every level of the supply chain invested in local marketing.
Dealers and installers participated in the pilot and trainings.	• 64 dealers/installers participated in the pilot, including installers from areas of the respective utility territories that had not been previously covered. • Distributors provided historical and promotional-period sales data by branch, by model number and by date for participating and non-participating installers.

PILOT OUTCOMES	PROGRESS INDICATORS
Dealers and installers sold more DHP.	• Participating dealers in IPC territory increased sales by 60% from January 2021–April 2023. • Participating dealers in Avista territory increased sales by 48% from January 2022–April 2023.
Dealers/installers and manufacturers demonstrated an increased interest in the technology.	• Increased sales and promotion participation. • Non-participating installers, dealers, distributors and manufacturers contacted the pilot team to get involved.
Contractors targeted electrically heated homes.	• Fifty-four contractors each received 50 postcards and 50 flyers, with 21 contractors also downloading digital marketing tools from the online contractor partner portal.
The pilot successfully increased customer awareness of technology.	• Promotion achieved over 200,000 impressions through utility communications, website and paid advertising activities.

Key lessons and experience from the Eastside Collaborative include:

- While coordination began with in-person meetings, the Eastside Collaborative shifted to virtual meetings as one group, which again shifted to separate virtual meetings for each utility. To ensure that everyone stayed informed throughout these transitions, the pilot team developed a monthly reporting tool to provide on-demand access to pilot activities and up-to-date data.
- The evaluation team didn't interview Brio, the pilot implementor, which would have been a valuable opportunity to provide insight and context for their evaluation efforts.
- The pilot team worked with NEEA to collect annual and aggregate regional sales data from the territory. Though these total sales numbers were valuable, granular data would have provided an even stronger understanding of sales activity in the local market.
- Since launching this effort and undergoing the initial exploration, new models of market transformation have emerged across the country as more states engage in statewide market transformation efforts. Such efforts include those in Minnesota, California and Wisconsin. These emerging market transformation efforts have added complexity to the previously central and consistent definition of market transformation, including ACEEE's definition cited above.

PILOT PLANNING

Pilot Design

Avista and Idaho Power each assigned pilot teams to support Brio. Once the steering committee selected DHP as the pilot technology, Brio took the next step of aligning the group on overall pilot design by orienting the pilot teams on the rationale for DHP as the selected pathway to test the market's willingness to invest and bring value to the Eastside markets. Further, we highlighted the collaborative partnership between Avista and IPC, including the primary drivers that led their respective leadership teams to determine that DHP technology was prime for a new approach:

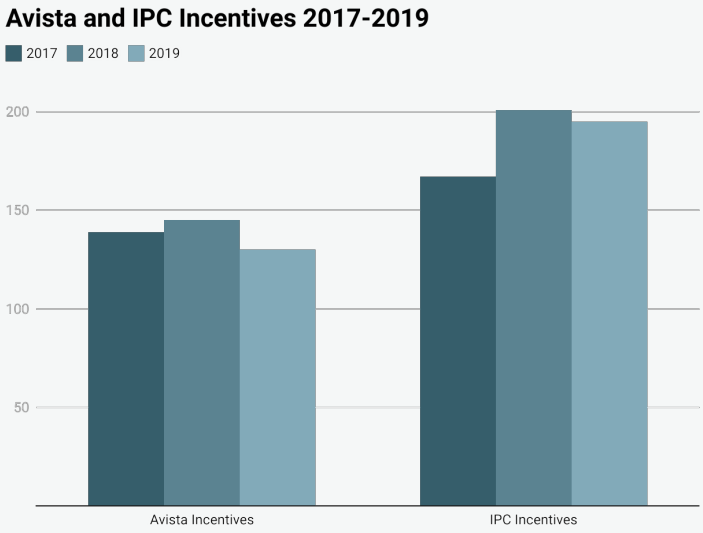
- Potential studies showcased substantial savings opportunities existed for DHP in both Avista and IPC territories, priming the path for a collaborative approach.
- NEEA was transitioning their DHP initiative from market development to long-term monitoring and tracking in 2020, which reduced concerns and risks of the pilot overlapping with those market efforts.
- Incentives claimed in both utility territories have ebbed and flowed without significant gains as regional efforts continued, as indicated in the chart to the right.

While the pilot was focused on determining whether the market had interest and would participate, as opposed to focusing on market transformation theory or energy savings, the team nevertheless primed these efforts for future replicability by designing a pilot logic model including Eastside barriers, interventions, assumed outcomes and measurement approach, and then used all the framework elements to cultivate market transformation experience and test the strategic foundation.

Pilot Objectives

Use market transformation principles to drive local economic impacts and residential customer uptake of DHP technology.

- Collaborate with DHP manufacturers, distributors and contractors to increase installations and remove market barriers, including specific goals of 600 installations and market investment in the local communities.
- Establish a motivated and enthusiastic installer network to support the pilot.
- Support the execution of a transparent measurement and verification process to capture potential program impacts.



Target Audiences

Based on market potential and ideal product applications, the following audiences were identified as optimal targets. Note that marketing for the pilot focused specifically on the primary audience.

Primary	• Existing single-family homes with permanently installed electric heat • Duplexes, triplexes or fourplexes with permanently installed electric heat
Secondary	• New construction, site-built • Multifamily homes • Manufactured homes

Two-Phased Approach

The team designed a two-phased pilot approach to allow the team to acquire hands-on local experience to help identify gaps and gain new insights to potentially inform modifications to our intervention strategies and tactics. Further, these efforts would help the pilot gather important on-the-ground intelligence, including finding out if opportunities existed, if the efforts were successful, if the pilot should scale up or down, or if the pilot was producing uptake at a size that budgets would not support.

PILOT IMPLEMENTATION: PHASE I

Phase I: Manufacturer and Distributor Engagement

RFP Process

To solicit innovative ideas, we released an RFP to distributors, manufacturers and manufacturer representatives. We chose this approach to understand if the market would show up and also how they would show up if and when they did. In addition to sharing our own targets, we asked respondents to define what they could achieve, how they would achieve it, and what resources and efforts they would require from the pilot to drive results and support the growth of the DHP market.

The RFP process generated local and national attention, including from four distributors and the country's top three manufacturers. While we didn't select every partner that responded to the RFP, their combined proposals showcased that all respondents were willing to train and onboard contractors and invest in marketing and discounts on products (ranging from single-unit to multi-head systems) of more than $1 million—a significant influx of funds that would directly benefit Avista and IPC customers.

Partner Selection and Planning

Brio received multiple proposals and conducted interviews alongside members of IPC and Avista staff.

After reviewing proposals and interviewing respondents, Brio ranked proposals based upon the following categories:

- Innovative approach
- Experience in market
- Overall value (i.e., estimated investment in local economy, committed resources and reach of funding)
- Grasp of submission requirements

Below are the partners the pilot team selected along with a few key pieces of their offerings that were particularly attractive to the team. Originally, the pilot team planned to only select one partner; however, the team decided to expand the partner pool because Thermal Supply did not request additional incentives.

Thermal Supply and Daikin in both Avista and IPC territory

Offering highlights:

- Product discounts
- $10,000 marketing campaign investment
- Provided sales data during the RFP process
- Came with substantial experience delivering programs in the field

Note: Daikin acquired Thermal Supply during the first phase of the pilot.

Russel Sigler, Carrier and Bryant in IPC territory
AIREFCO POWERED BY FERGUSON ("Airefco"), Carrier and Bryant in Avista territory

Offering highlights:

- Substantial product rebates
- Wells Fargo financing and interest-rate buy down to provide contractors with a powerful tool to reduce upfront costs for customers.

Note: Airefco was formerly represented by FE Partners at the time of their proposal submission. They are now owned by Ferguson.

Once partners were identified, Brio negotiated agreements and developed Pilot Project Plans with each of them. Throughout the planning process, Brio worked to leverage each partner's understanding of their business and desired approach, allowing the partners to lead as much of the process as possible, as opposed to telling them what to do in a limiting and prescriptive manner. This approach resulted in distributors and manufacturers showcasing their commitment to the pilot with active and enthusiastic participation throughout the planning process. Inspired to take a leading role in the pilot, the partners agreed to manage the dealer/installer recruitment process in partnership with their manufacturers, with a shared strategy to focus on the most skilled dealers with capacity to support the pilot. Partners further agreed to utilize their internal resources to manage and distribute leads to participating installers, based on the location of the lead.

Additional committed partner participation included:

- Russel Sigler, AIREFCO POWERED BY FERGUSON ("Airefco"), Carrier and Bryant conducted recruitment and training webinars, in partnership with Brio, and held one-on-one meetings with contractors.
- Thermal Supply and Daikin managers conducted one-on-one meetings to recruit and train installers. They also distributed pilot overview flyers at each meeting.

Phase I: Customer Support

To ensure that customers received a clear call to action when Avista and IPC began marketing efforts, the pilot shared costs with the market to customize individual partner websites and provide individual phone numbers though Ruby Receptionist, a virtual receptionist service provider. The websites and Ruby Receptionist touchpoints were optimized to capture customer contact information. Distributors facilitated this customer information by 1) delivering the leads to dealers/installers, and 2) following up with installers/dealers to ensure they supported customers by scheduling quotes.

To ensure positive customer experiences, Brio worked with utilities to develop call scripts, ensure customer engagement protocols were followed, and support phone inquiries to distributors and utilities, as needed.

In addition, phone scripts and FAQs were provided to the utilities' call-center staffs to equip them with promotional information so they could respond confidently to ad hoc inquiries.

CUSTOMER SUPPORT HIGHLIGHTS

$5,200	Distributors investment (equaling 42% of total cost of service)
950	Calls fielded (461 Avista / 489 IPC)
855	Leads yielded from customer calls (411 Avista / 444 IPC)

Phase I: Marketing

Brio developed a marketing strategy that largely leveraged utility marketing channels due to their low cost and high effectiveness, as based on past campaigns and program successes. These channels were augmented with plug-and-play digital tools that contractors could use to drive leads directly.

The team started by developing messaging options for testing, as based on perceived drivers and barriers unique to the Avista and IPC markets, including messages that focused on energy savings, comfort, reduced waste and zonal control. Each utility selected a different message to customize the campaign for their own territory, which allowed the pilot to compare and contrast messaging efficacy as the pilot unfolded.

Custom Lead-Generation Websites

To make customer participation easy, the team developed, designed and launched unique, single-page websites for both Carrier and Daikin wherein customers could enter their contact information to be assigned a contractor and receive a free estimate. Leads were evenly distributed to participating contractors by their distributor. The websites in Phase I were manufacturer-branded, with "in partnership" messaging for each respective utility.

Utility Communications Channels

To make promotional efforts easier for utility staff, the team:

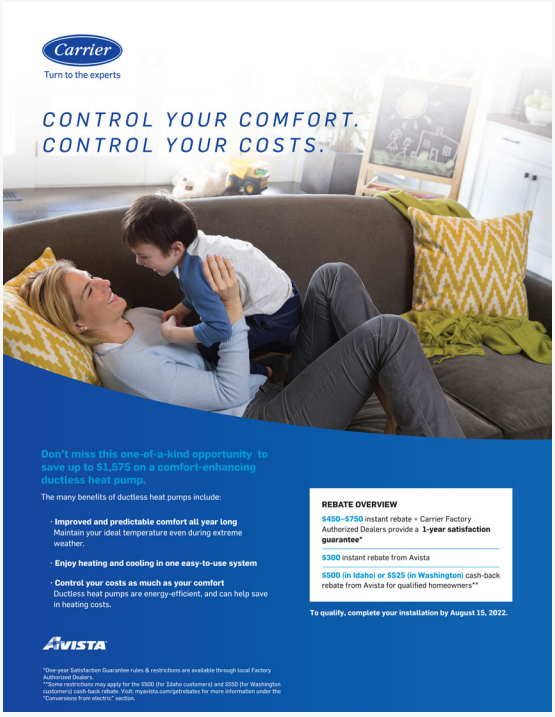
- Coordinated with Avista and Idaho Power on their promotions through each utilities' marketing channels.
- Created content to inform each utility's creation of branded direct-mail letters, emails and social media posts.

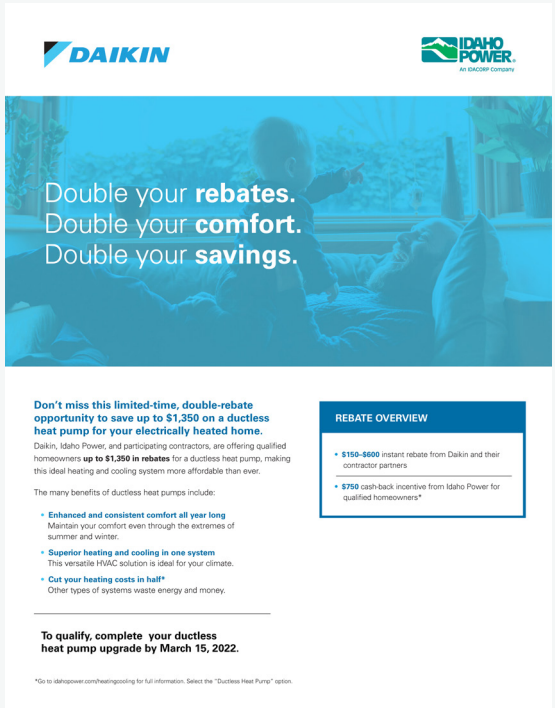
Contractor and Distributor Marketing Materials

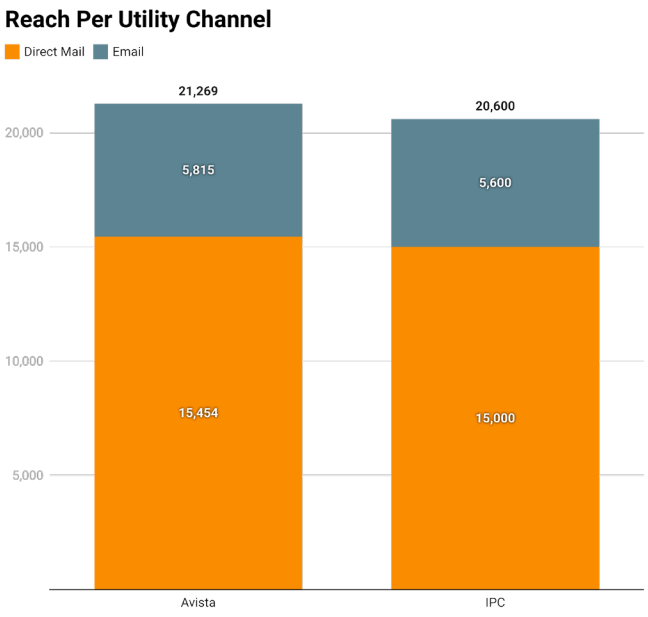
The team created a digitally distributed contractor marketing toolkit that included a campaign overview flyer, customer-facing promotional flyer, postcard, and email and social copy. All materials were designed for easy co-branding to reduce the burden on contractors, many of whom have limited in-house marketing resources.

Paid Advertising *(IPC only)*

To extend campaign reach in IPC territory and drive qualified leads, the team followed a suggestion from Thermal Supply and Daikin to launch a Google Search Ads campaign targeting IPC customers (Avista declined the suggestion, opting instead to focus solely on direct customer outreach). In addition to capturing customers already searching for related products and services, Google Search Ads provided the pilot an opportunity to A/B test messaging to see which messages received the most traction. (See Phase I Pilot Paid Ad report for full details).







Phase I: Installation and Incentive Results

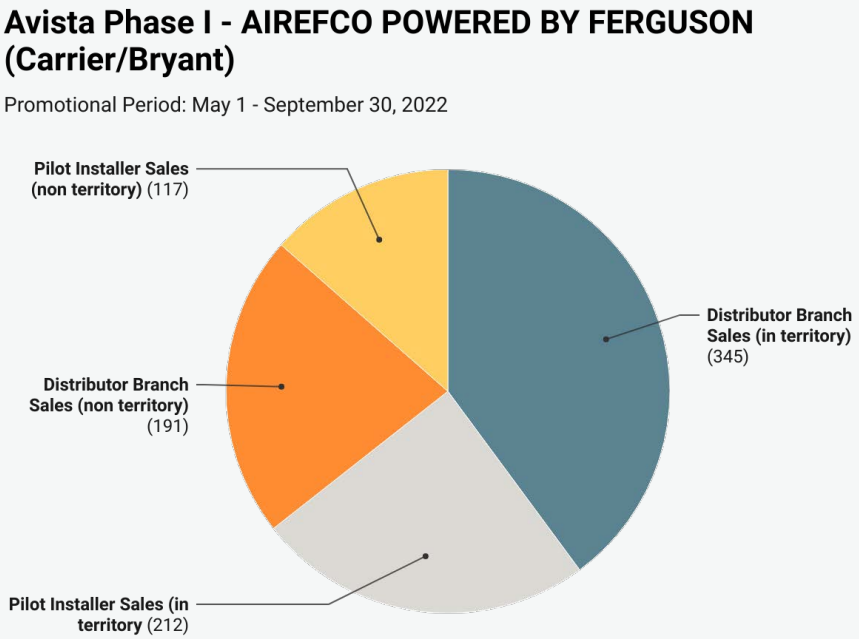
PILOT INSTALLATION HIGHLIGHTS

422	DHP pilot installations (210 IPC and 212 Avista)

Avista

The team again used the DSAT-distributor sales allocation tool (a modeling tool developed by the Bonneville Power Administration) to guide the number of sales allocated to Avista based on estimated installers served by each branch, and the customers those installers reach.

The Airefco, Carrier and Bryant promotion ran May 2022–September 2022. During this timeframe, Carrier Factory Authorized dealers moved 329 units, with 212 allocated to Avista. Airefco's total branch and pilot installer sales are shown below.



IPC

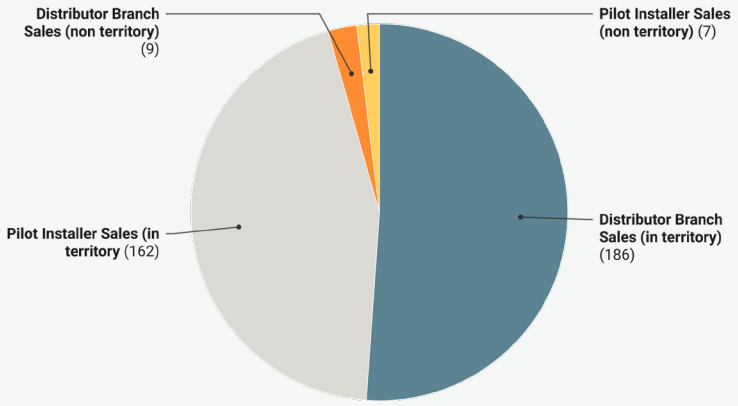
In Phase I, the team used the DSAT-distributor sales allocation tool (a modeling tool developed by the Bonneville Power Administration) to guide the number of sales allocated to IPC based on estimated installers served by each branch, and the customers those installers reach.

The Russel Sigler, Carrier and Bryant promotion ran April 2022–August 2022. During this timeframe, Carrier Factory Authorized dealers moved 167 units in IPC territory that received pilot incentives. Russell Sigler's total branch and pilot installer sales are shown to the right.

The Thermal Supply and Daikin promotion ran October 2021–April 2022. During this timeframe, Daikin Comfort Specialists reported moving 48 units in total; as this total was derived by matching leads generated to IPC incentives received and Daiken warranty data, we suspect the total may be overstated. Following the promotion, we learned that Thermal Supply experienced inventory shortages on eligible equipment, leading dealers and installers to purchase units from other distributors to support customer demand. To reconcile the installation data, Thermal Supply reached out to contractors to collect data on units sold from non-Thermal branches and collected limited Daikin warranty data. The pilot team compared that data against customers that entered their contact information via the pilot website or virtual receptionist, and IPC further cross-checked this information against their completed mail-in incentives. Additionally, Thermal Supply did not provide pilot sales outside of IPC territory; therefore, it is reflected as zero in the chart to the right, which otherwise shows Thermal Supply's total branch and pilot installer sales.

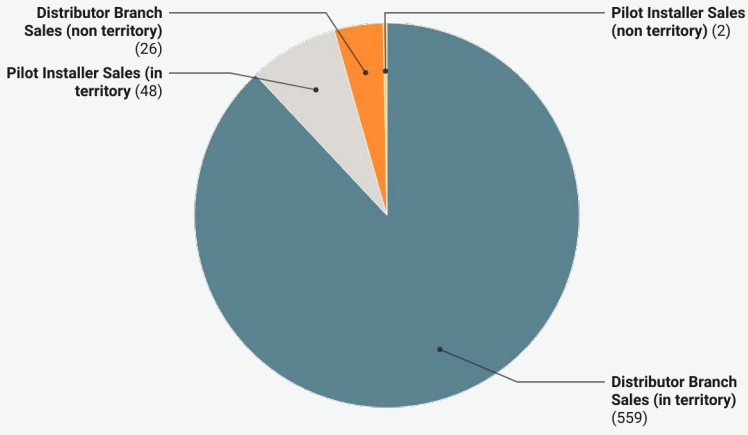
Idaho Power Phase I - Russel Sigler (Carrier/Bryant)

Promotional Period: April 1 - August 31, 2022



Idaho Power Phase I - Thermal (Daikin)

Promotional Period: October 1, 2021 - April 15, 2022



Phase I: What We Learned

In addition to the installation results of the promotion, the following insights, as collected during regular meetings and face-to-face engagements with market partners, were used to inform and revise the design of the promotion's Phase II.

Manufacturers and distributors	• The supply chain is willing to partner and make financial and human investments in the local economy. • Distributors are willing to share category total sales data, both historically and for the promotional period, with small-scale programs. • Distributors are willing to set up systems to track activities for localized promotions. • There are some identified supply-chain inventory and stocking issues. While the market reported ample inventory to support the product, supply-chain issues caused a lack of product that resulted in delayed launches (Carrier) and installers retrieving products from other distributors (IPC/Thermal). • The market is unfamiliar with RFP responses. Many potential partners lacked the time and resources required to respond and were unsure how to create a winning proposal. o *Because of this, the RFP process did not result in creative responses and the response was less than expected.* • Access to the utilities' marketing channels was perceived as the most valuable support to market partners. • Distributors need more direct guidance in their support of installers, including training installers on the pilot, setting installer expectations and ensuring installers meet those expectations. • Industry consolidation is on the rise, as two of the three partners had merged during Phase I. This impacted partner workloads and may have shifted their focus and availability.
Dealers and installers	• Customer leads from utility outreach efforts frequently came with detailed questions about the product and promotion. The contractor's phone staff would benefit from more upfront training on how to handle these calls. • Several dealers/installers reported that many of the leads they received during the promotion were not quality. • Some installers were slower to follow up with customers than would be preferable. • Some dealers/installers were either slow to submit or did not submit installer information to distributors. • While financing was available and access fees were reduced, contractors did not leverage it. • Contractor consolidation is also on the rise. At the end of Phase I, one of the contractors was purchased by a national organization and had plans to move purchasing to another distributor.

Customer support	• More than we expected, customers used their phones to contact the promotion. • Dramatic spikes of customer activity followed utility marketing activity. • Though response time by installers can lag, customers were eager and expected a response within hours. • The pilot saw infrequent customer calls directly to utilities. • Supporting Ruby Receptionist required extensive time and resources from the pilot team.
Marketing	• Direct mail generated more leads than social media and IPC's Google Search Ads. • A/B testing from paid search campaigns revealed that "Comfort" and "Savings" messages outperformed those emphasizing "Waste" and "Control". • Participants reported that the digital marketing templates were useful, but few if any contractors took the next step of printing materials. This feedback indicated that providing already-printed materials would increase the likelihood of them being used. • With a large portion of customers visiting the websites from a mobile device, the sites were fully optimized for mobile use in Phase II. • Additional customer education on the promotional websites could motivate customers to progress from the consideration phase to requesting a free contractor estimate. This would also aid perceptions of overall site legitimacy and credibility—especially when requesting customers to enter personal data. • Contractors found tremendous value in utilities promoting through their communications channels and lending their brand—and thereby stamp of approval and legitimacy—to the campaign's website and promotional materials.
Eastside Collaborative partnership	• As internal timing didn't align for the utilities to launch promotions at the same time, the ability and willingness to be flexible was welcomed by both utility teams. • Regarding meetings and activities, it was helpful to have ongoing alignment on when Avista and IPC should join forces and when to be independent. • Avista and IPC staff were successful in partnering with the market and promoting specific partner brands. • Both the steering committee and the pilot teams were responsive, providing prompt direction and support, as needed. • Avista and IPC were initially deeply engaged. Overtime, they provided Brio with more autonomy and reduced the ongoing meeting schedules for Avista and IPC staff. • The group successfully navigated a variety of staffing changes and shifts.

PHASE II PILOT IMPLEMENTATION

Building on everything we learned during Phase I of the pilot, the pilot team tweaked Phase II design at every stage to continue optimizing our approach to motivating the supply chain to enthusiastically engage and take ownership of the promotion.

Phase II: Partner Engagement

Instead of releasing an RFP in Phase II, the team announced that the pilot would instead conduct direct outreach to perspective partners. We informed prospective partners that the pilot would provide a standard set of guidelines for participation but would remain open to innovative ideas. After inviting them to contact the pilot team, we contacted potential partners to explore interest. Through this process, we ultimately selected the same partners as during Phase I. The team made this decision because the manufacturers were:

- Willing to share access to the utility marketing channel with other brands being marketed alongside them.
- Open to having all participating installers listed on the same installer finder.
- Excited to build on our shared commitment and lessons learned from Phase I.

Additional Phase II changes to manufacturer and distributor engagement included:

- The pilot required installation ZIP-code data for pilot incentives, instead of using the regional DSAT.
- Alongside distributors, the team offered co-created and co-delivered promotional launch webinars to recruit and train installers.
    - The team further supported distributors in educating dealer/installer organizations on the importance of educating phone staff on the nature of utility leads.
- Pilot distributor partnerships were expanded to allow alternate distributors to meet customer demand in the event of supply-chain delays.
- The pilot developed one customer instant rebate to be offered by all pilot partners.

Once partners were identified, they were once again extremely active in the planning process, including by:

- Leading the dealer/installer recruitment process in partnership with their manufacturers.
- Partnering with the pilot team to deliver webinars that extended the invitation to not only sales staff, but to phone and marketing staff as well.

Phase II: Customer Support

While again maintaining a phone number in each territory, the pilot switched call center providers to Specialty Answering Service (SAS), which improved upon the Phase I service by offering:

- The ability to listen in on calls for better insight and real-time feedback.
- Better reporting.

The pilot team further refined phone scripts and FAQs, which were again provided to equip utilities' call-center staffs with detailed information on the promotion and product.

CUSTOMER SUPPORT HIGHLIGHTS

$3,000	Distributors investment (equaling 100% of total cost of service)
387	Calls fielded (268 Avista / 119 IPC)
658	Leads yielded from customer calls (404 Avista / 254 IPC)

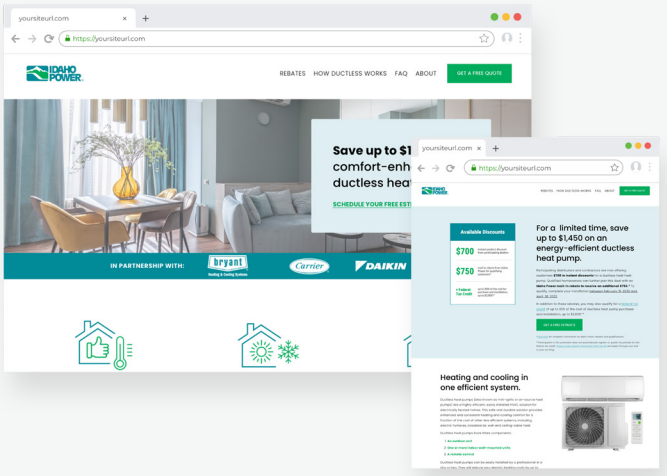
Phase II: Marketing

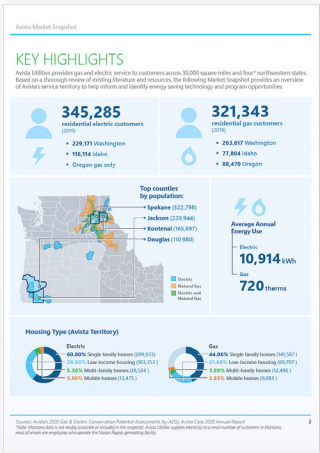
In Phase II, marketing focused on streamlining the customer and contractor experience by hosting a single website and contractor finder, per utility. All materials and messages were refined based on Phase I findings, and new tactics were deployed to further engage contractors with outreach and marketing.

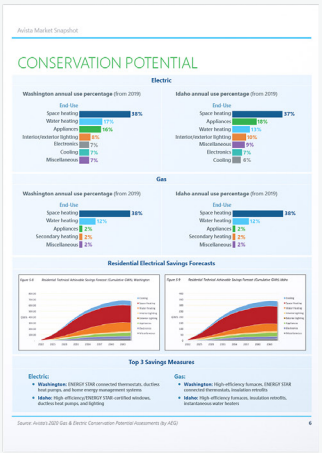
Custom Lead-Generation Websites

Phase II website changes included:

- Shifting to one website per utility that featured utility branding to increase familiarity and credibility with customers.
- Revising the contractor finder tool to allow customers to search by ZIP code instead of requiring them to enter their personal information. This allowed the pilot to continue capturing basic customer information for data analysis purposes, but without requiring any personal contact information to access the finder. This provided more options and control for the customer and generated healthy competition among contractors to inspire speedier response times.
- Providing more robust educational content and value proposition messaging to help guide and ready customers to move from consideration to a purchase decision.







Utility Communications Channels
Based on the success of utility communications channels in Phase I, we refined our messaging based on Phase I findings and repurposed the same channels for Phase II.

Contractor and Distributor Marketing Materials
The team once again created contractor marketing materials, including a campaign overview flyer, customer-facing promotional flyer, postcard, and email and social copy. For Phase II, these materials were all available via custom online partner portals where contractors could download what they needed and/or request free printed and shipped materials through the portal.

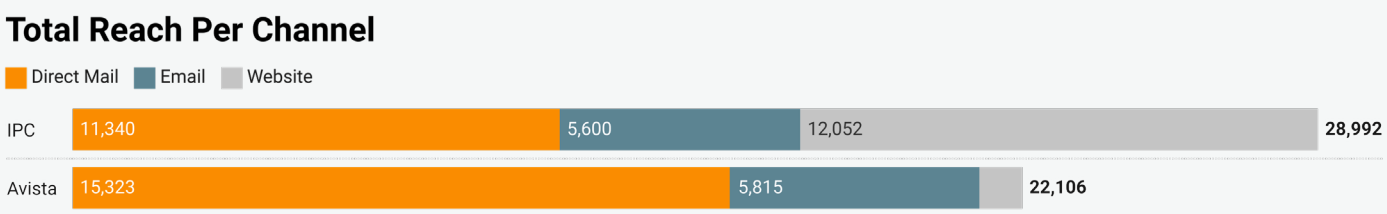
And, to increase the likelihood of contractors printing and using materials, we negotiated for distributors to co-fund the co-branding, printing and distribution of 50 postcards and 50 flyers to each of their participating contractors.

Paid advertising *(IPC only)*
Building on the findings from top-performing ad messages and keywords from Phase I, we launched digital search ads and introduced display ads during the last month of the Phase II promotion. In addition to the digital ads, we tested a series of three 1/3-page print ads in The Idaho Statesman in March and early April 2023.

The increase in web traffic resulting from paid media is reflected in the website traffic results in the chart below.

CONTRACTOR MARKETING HIGHLIGHTS

$4,500	Distributors investment covering 50% of the total cost of printing and shipping
$1,000	Distributor co-op funding for contractor promotion
5,400	Co-branded direct mail postcards and flyers distributed across 54 contractors
154	Visits to online partner marketing portal (45 Avista and 109 Idaho Power)



Phase II: Installation and Incentives Results

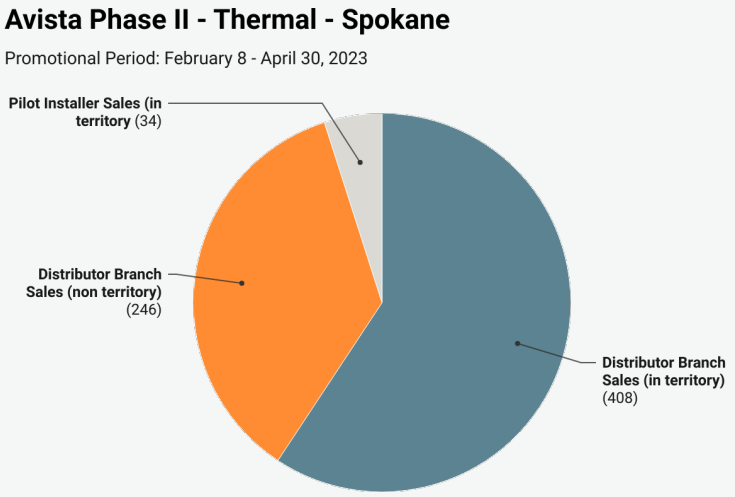
PILOT INSTALLATION HIGHLIGHTS

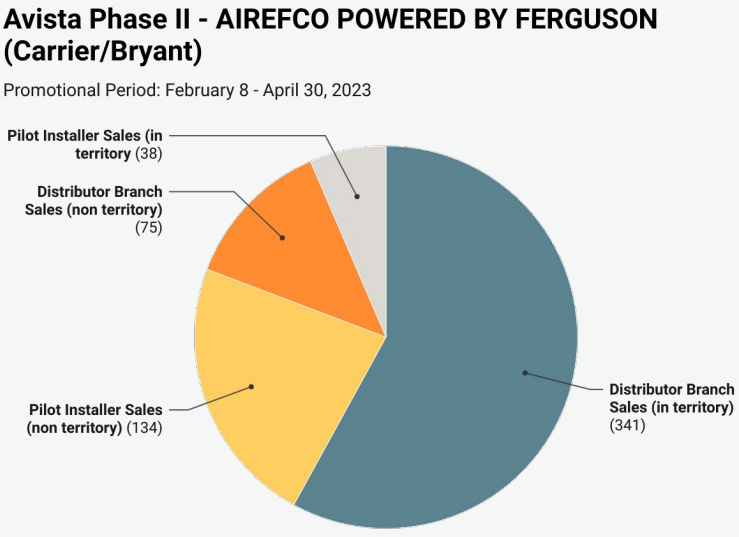
222	DHP pilot installations (150 IPC and 72 Avista)

Avista

The Airefco, Carrier and Bryant promotion installers sold 38 DHPs in the Avista ZIP codes that received pilot incentives.

In Phase II, the Thermal Supply and Daikin promotion generated 34 DHP sales in the Avista ZIP codes that received pilot incentives. As Thermal Supply did not provide pilot installers with sales outside of Avista territory, it is reflected as zero sales in the chart below.

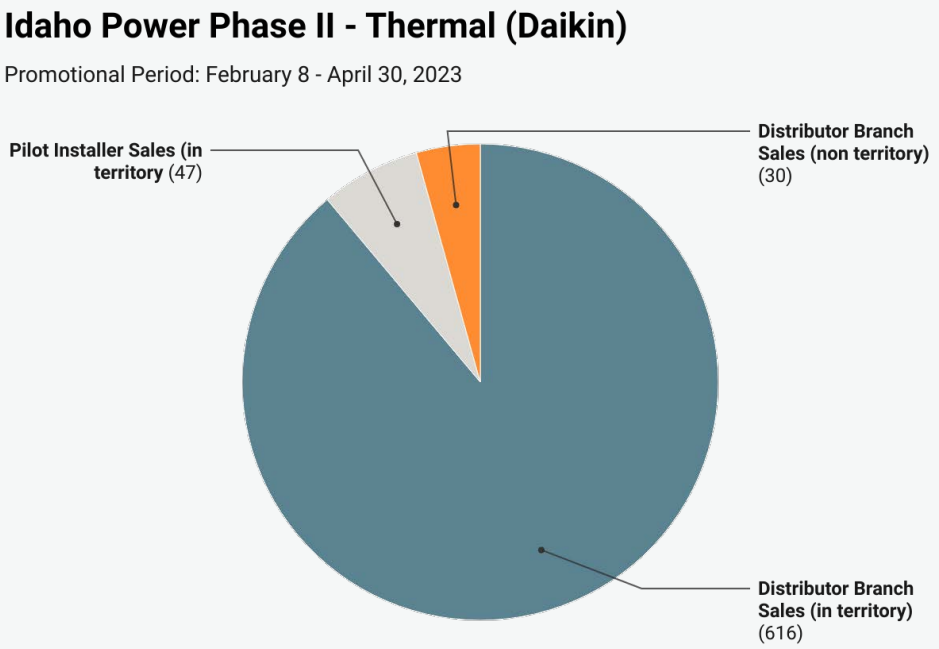


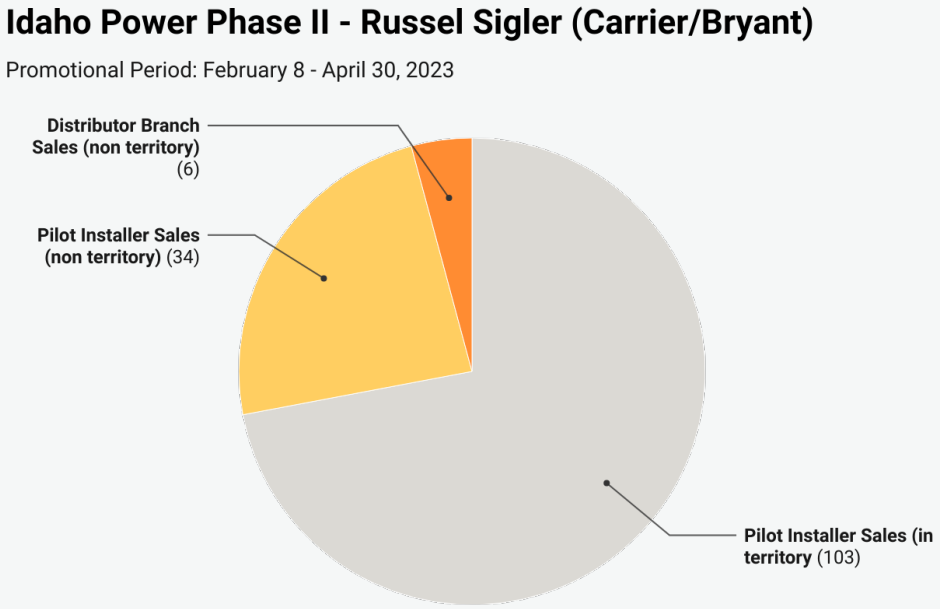


IPC

In Phase II, the Thermal Supply and Daikin promotion generated 47 DHP sales in the IPC ZIP codes that received pilot incentives. As Thermal Supply did not provide pilot installers with sales outside of IPC territory, it is reflected as zero sales in the chart below.

The Phase II Russel Sigler, Carrier and Bryant promotion resulted in 103 sales in the IPC ZIP codes that received pilot incentives, as shown in the chart below.





Phase II: What We Learned

Manufacturers and distributors	• Interest and willingness to participate was generated across the market. • While distributors initially advocated heavily to manage customer leads instead of promoting their brand alongside competitors, once the pilot shifted, they expressed satisfaction when customers had direct access to contractor information. • The sales in both Avista and IPC territories have grown substantially since 2020 and it doesn't appear that the utility incentive programs are growing at the same pace.
Dealers and installers	• Additional non-participating dealers/installers expressed interest in participating. • Even when contractors offered the discount, they occasionally did not submit required ZIP-code data to receive manufacturer, distributor and utility discounts and incentives. This indicates the potential that pilot-generated sales numbers are under-represented.
Customer support	• As with Phase I, Phase II customers continue to use the phone frequently to contact the pilot—more so in Avista's territory than in IPC's. • The SAS operating service required less engagement time from the pilot team than the previous service, and their systems were easier to navigate.
Marketing	• It would be beneficial to include more lead time to create and deliver contractor co-branded marketing materials to increase the likelihood of timely use. • Paid advertising resulted in a big boost in website traffic, but not as many visitors converted to leads, relative to other outreach channels. It would be beneficial to begin paid advertising at the start of campaign launch, so our audience has time to consider and act within the campaign timeframe. This is especially true for print advertising, which can take several impressions before motivating results. • Utility marketing channels continue to be the most effective in driving site traffic that translates to sales leads.
Collaborative partnership	• Phase II pilot delivery efforts were streamlined, requiring less internal navigation and fewer approvals.
Data collection	• Partners continued to share data. • NEEA was agreeable to sharing the regional data collection tool. Our assessment is that their numbers are generally conservative, but as the market has catapulted in the last two years, there is a potential they are underestimating sales. • Avista and IPC DHP incentive programs continue to remain relatively consistent, with slight elevations during some periods, while total distributor sales are increasing.

MARKET TRANSFORMATION OPTIONS AND RECOMMENDATIONS

Avista and IPC have several options from which to choose as pathways to actualize the delivery of market transformation locally. The below recommendations (including market transformation portfolio models, metrics, and approaches to evaluation, cost-effectiveness and budgeting) represent potential, flexible and customizable steps forward that provide Avista and IPC the opportunity to choose their next moves toward market transformation, should the utilities choose to individually or collectively work to build on the positive developments and findings of the Eastside Collaborative's work to date.

POTENTIAL STEPS FORWARD

Regardless of the pilot outcomes, Avista and IPC have always had three post-pilot options from which to choose to continue their market transformation efforts:

Option 1
Continue adopting a hybrid approach to market transformation that combines localized market transformation efforts with continued participation with NEEA.

Option 2
Establish localized market transformation efforts without participating in NEEA.

Option 3
Maintain the status quo by continuing to partner with NEEA without undertaking localized market transformation efforts.

RECOMMENDED STEPS FORWARD

The Eastside Collaborative made the early decision to deploy a hybrid approach to market transformation, exploring activities at a local level that were tailored to IPC's and Avista's territories, while continuing involvement and participation with NEEA. The pilot findings and experiences have confirmed the efficacy of this approach and have illuminated a flexible path forward for Avista and IPC to continue to build on this work, individually or together.

By continuing forward with this hybrid approach, both Avista and IPC have the ability to join forces when advantageous while maintaining their respective ability to undertake solo activities when appropriate. Similarly, we believe that this approach would also prove effective should either utility decide to continue the work on a purely individual basis.

POTENTIAL PORTFOLIO FOCUSES

Throughout the country, many organizations undergoing market transformation activities have established boundary conditions to help them identify when a product or practice is at the prime state of maturity for market transformation efforts. The following examples demonstrate such conditions instituted by various organizations:

Option 1
Focus the portfolio(s) on commercialized technologies.

Option 2
Focus the portfolio(s) on commercialized and non-commercialized technologies.

Option 3
Focus the portfolios on commercialized and non-commercialized technologies and the advancement of codes and standards.

RECOMMENDED PORTFOLIO FOCUS

We recommend a continued portfolio focus on commercialized technology improvements, as pre-commercialized technologies often require years of research and development investment across multiple funding sources. If Avista and IPC continue funding NEEA efforts, we recommend leveraging NEEA to scan for and test emergent energy-efficient technology and driving codes and standards development through national emerging technology groups.

POTENTIAL PORTFOLIO METRICS

Establishing the following metrics would help identify, track and weigh new or existing opportunities:

- Energy savings
- Direct benefit to all customers
- Local economic investment
- Timeline to transformation
- Positive customer experience
- Workforce development
- Hard-to-reach customer opportunities

In addition to any or all of the metrics above, each individual initiatives should also establish unique, measurable market progress indicators to track market momentum and progress to goal.

RECOMMENDED PORTFOLIO METRICS

At a minimum, we recommend that each utility track energy savings and local economic investment to ensure that efforts benefit the local economy and workforce in addition to delivering energy savings.

RECOMMENDED EVALUATION APPROACH

Regardless of specific evaluation approach decisions, the evaluation process should begin by establishing clear goals and market progress indicators for each program or initiative. Together or separately, the utilities should leverage theory-based evaluation principles to measure progress and market impact. An established evaluation firm that regularly evaluates market transformation activities should be leveraged to ensure established best practices are followed.

We recommend utilizing established market transformation evaluation principles, as followed by NEEA, the Midwest region, and the California Market Transformation Administration. With Brio serving in a consulting role, California is in the midst of establishing a statewide approach to evaluation, measurement and verification of market transformation efforts. This group is further exploring cost-effectiveness and benefit calculations, which we see as an opportunity to potentially complement NEEA's established method.

POTENTIAL APPROACHES TO COST-EFFECTIVENESS

Option 1
Create an alternative cost-effectiveness modeling approach for localized market transformation that acknowledges and supports the investment needed (e.g., research, expanded marketing, training, market actor engagement and data analysis) to create mature markets that support energy-efficient technology.

Option 2
Leverage existing cost-effectiveness models and provide market transformation programs or initiatives with a grace period before requiring them to meet those targets. This approach mirrors Minnesota CEE's new approach to market transformation.

Option 3
Hire an outside firm to evaluate existing models and provide recommendations on appropriate approach.

RECOMMENDED APPROACHES TO COST-EFFECTIVENESS

We recommend exploring Option 2, which would allow the use of similar tools and inputs to those being used by existing acquisition programs. This approach acknowledges the longer runway required to develop markets while also limiting the need for staff resources that would otherwise be required to update multiple models.

RECOMMENDED PORTFOLIO BUDGETING CYCLE

We recommend the initial establishment of three-year budgets to support localized market transformation efforts. This timeframe will provide the opportunity for program identification and design, and to gain some market traction. Additionally, it provides Avista and IPC with easy off-ramps, should efforts not proceed as expected, or should greater opportunity emerge at the regional level. This flexibility ensures that the needs of Avista's and IPC's customers will always be met, regardless of changing circumstances.

POTENTIAL APPROACHES TO PORTFOLIO ADMINISTRATION

In addition to directing and supervising consultants, a portfolio administrator will help Avista and IPC define how to plan, design, develop, implement and optimize the market transformation portfolios and individual initiatives as defined in the recommended activities chart below. IPC and Avista, whether together or individually, have two general options in their selection of a portfolio administrator:

Option 1
Internally resource market transformation portfolio administration on two-year budget cycles and procure and manage consultants, as needed.

Option 2
Externally resource market transformation portfolio administration with an internal resource overseeing the administrator.

RECOMMENDED PORTFOLIO ADMINISTRATION

We recommend Option 2, as this approach will provide Avista and IPC with the flexibility to engage internal resources only when necessary, while providing plenty of opportunity to pull back or exit activities, as needed. Hiring an experienced, locally knowledgeable external portfolio consultant such as Brio will provide streamlined activity startup, alignment between the needs of customers and the market, and a strategic approach to 1) creating positive customer experiences, and 2) driving market funds to the direct benefit of Avista's and IPC's customers and local economies. By hiring an external portfolio administrator, Avista and IPC can maintain control of all decisions and activities without straining internal staff resources.

RECOMMENDED THREE-YEAR MARKET TRANSFORMATION ACTIVITIES

To support the continued development of an Eastside model for market transformation, the following activities and outcomes are recommended over the next three years. These activities and their specific sequence have been designed to enhance their repeatability across diverse programs.

PHASE	2024	2025	2026	OUTCOMES
Identify and assess possible market transformation concepts.	• Design and deploy DHP Eastside Collaborative program or initiative. • Refine initiative selection criteria (developed by Eastside Collaborative) for the selection and prioritization of localized market transformation initiative ideas. *o For example, refined criteria may exclude any idea for which cost is the only barrier to entry.*	Assess results and overall progress, continuing DHP efforts, if positive.	Assess and engage industry and market for ideas (potentially by issuing a Request for Ideas) to seek innovative concepts that are ready for market transformation programs.	• Prioritized opportunities based on budgetary and organizational focus areas and goals, with particular emphasis on: *o Initiatives well-suited to the Eastside Collaborative.* *o Initiatives well-suited to the respective individual needs of Avista and IPC.* • Avista and IPC select programs to progress into initial program design. • A bi-annual report detailing emerging opportunities for market transformation.
Program development	• Conduct market research and literature review to support program design. • Engage market actors with selected ideas to gain market insights, socialize efforts and inform design. • Capture and identify relevant market data.		Identify new entrants to portfolio and begin development activities.	• Market transformation strategies developed: *o Product definition* *o Target market* *o Theory of market transformation* *o Logic models* *o Market progress indicators* *o Points of leverage* *o Data and savings estimates* *o Evaluation, risk and mitigation approach* *o Transition strategy to adapt into a resource acquisition program and transition ownership to the market* • Market research reports and literature reviews. • Established market transformation framework for prioritized programs.

PHASE	2024	2025	2026	OUTCOMES
Program implementation		• Develop annual program goals and metrics. • Define specific activities, success metrics and reporting approach. • Deploy intervention strategies and tactics, with specific approaches tailored to general program activities, including: *o Supply-chain engagement and support* *o Product and installation support* *o Marketing* *o Data collection, analysis and reporting*		• Monthly initiative reports • Bi-annual initiative score cards • Market progress evaluation reports assessing program logic and market progress, and quantification of adoption trends • Unique deliverables per program
Evaluation and analysis	• Finalize cost-effectiveness approach. • Assess baselines for each selected program or initiative. • Explore how to leverage existing Avista and IPC evaluation teams and contractors to support market transformation evaluation activities. • Explore for regional data sets and baseline approaches to support Eastside efforts.	Continue exploring for regional data sets and baseline approaches to support Eastside efforts.	Launch evaluation efforts for any active programs or initiatives.	• An evaluation plan for each initiative to support program development, including: *o Baseline and forecasts* *o Cost-effectiveness model and net-market-effects calculator* • Provide data to NEEA for any program that overlaps with NEEA activities, allowing NEEA to analyze the data and avoid duplicative tracking.
NEEA Coordination	• Request research and baseline development, where applicable, so that these activities are only paid for once by Avista and IPC. • Explore and monitor NEEA research activities for oversampling or inclusion of additional research questions to support Eastside efforts.	• Continue exploring and monitoring NEEA research activities for oversampling or inclusion of additional research questions to support Eastside efforts. • Continue coordinating on any emerging technology projects and special funding opportunities.		• Avista and IPC budgets are maximized and leveraged across four-state-regional and local investments to maximize services offered by NEEA to support local efforts, ensuring that Avista and IPC don't pay twice for the same effort. • Data sharing agreements are negotiated and executed to share market data, as needed. • Avista and IPC report market transformation sales and savings to avoid duplicative tracking.

ADDITIONAL RECOMMENDATIONS

CAPTURING MARKET EFFECTS

If either Avista or IPC chooses not to invest in market transformation, we recommend considering the capturing of market-effects savings through resource acquisition programs that focus on short-term energy savings while continuing to design and implement programs that drive longer-term market changes. This approach is currently being undertaken by a number of utilities and implementers, including Brio on behalf of Ameren Illinois, and Cadmus Group on behalf of Focus on Energy.

DHP RECOMMENDATIONS

The Eastside Collaborative pilot has proven that untapped opportunity exists in the local region. The market demonstrated eager interest in the technology and the pilot data shows that sales have increased dramatically over the past three years. To build on this momentum, we recommend:

- Developing a multi-year DHP strategy that includes:
    - *o Continuing market engagement and support.*
    - *o Partnering with manufacturers to develop and support a training program aimed at increasing installations in electrically heated homes.*
    - *o Working with market partners and community organizations to support DHP installations in residences of hard-to-reach customers.*
    - *o Additional promotional opportunities.*
    - *o Exploring research opportunities, including research to help understand where DHPs are being installed and why utility incentives in both Avista and IPC territories are not increasing exponentially.*
- Continuing to request NEEA's DHP data with an aim to acquire more granular data.

Centennial Trail Bridge at the border of Post Falls, Idaho