2024 Idaho Annual Conservation Report

September 1, 2025

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: Spirit Lake, Idaho

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES AND SUPPLEMENTS

(This page intentionally left blank.)

EXECUTIVE SUMMARY

Wallace, Idaho

EXECUTIVE SUMMARY

For nearly 50 years, Avista's energy-efficiency programs have helped customers in Idaho discover innovative ways to conserve energy, live more comfortably, operate businesses more efficiently, and save money. This 2024 *Annual Conservation Report* (*ACR*) summarizes Avista's efforts to support the energy needs of residential and commercial customers across the service territory.

FIGURE 1 - ELECTRIC AND NATURAL GAS SERVICE AREAS

Energy efficiency continues to be a least-cost resource for the company, and 2024 was a very strong year for conservation, with programs achieving electric savings significantly beyond targets. These achievements built on changes to the portfolio implemented in early 2023 to encourage increased program participation. Avista's Midstream and Small Business Direct-Install Lighting programs continued to lead the portfolio in kWh savings. All programs sustained a focus on affordability and flexibility, with a large emphasis on customer-centered energy solutions.

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

IDAHO ACHIEVEMENTS

TABLE 1 - ENERGY-EFFICIENCY SAVINGS AND COST-EFFECTIVENESS RESULTS

	Savings	Expenditures	Total Resource Cost	Utility Cost Test
Electric				
Electric Actuals (kWh)	30,150,532	$ 17,316,094	0.82	1.41
Percent of Planned Savings/Budget	336%	322%		
Annual Planned Savings/Budget	8,960,566	$ 5,376,930		
Natural Gas				
Natural Gas Actuals (Therms)	220,279	$ 2,282,282	1.24	1.05
Percent of Planned Savings/Budget	56%	84%		
Annual Planned Savings/Budget	392,021	$ 2,725,904		

- *Electric Conservation:* For 2024, savings from NEEA's programs added an additional 6,952 MWh, bringing the overall savings achieved from 30,151 MWh to 37,103 MWh.

TABLE 2 - IDAHO ELECTRIC ACHIEVEMENTS

	Savings Achieved (MWh)
Commercial/Industrial	27,695
Residential	2,391
Low-Income	65
Total Local Program	30,151
NEEA	6,952
Total	37,103

- *Natural Gas Conservation:* After including 285,431 therms from NEEA's programs, the overall savings achieved in 2024 was 505,710 therms.

TABLE 3 - IDAHO NATURAL GAS ACHIEVEMENTS

	Savings Achieved (Therms)
Commercial/Industrial	33,187
Residential	185,712
Low-Income	1,380
Total Local Program	220,279
NEEA	285,431
Total	505,710

Portfolio Trends

Avista achieved significantly higher-than-anticipated electric energy savings in 2024. A key driver was enthusiastic participation in the Small Business Direct-Install Lighting and Midstream programs (particularly Midstream residential measures). Substantial savings were also achieved through the commercial/industrial Site-Specific and Prescriptive Lighting programs.

- The Small Business Direct-Install Lighting Program achieved 50 percent of the kWh savings for the entire electric portfolio in 2024. This program remains extremely popular with customers and trade allies alike, for its simplicity and little to no out-of-pocket costs for customers.
- About 17 percent of portfolio savings came from the Site-Specific Program, perhaps indicating some market recovery in the commercial/industrial segment, particularly for lighting upgrades.

TABLE 4 - ENERGY-EFFICIENCY SAVINGS BY SECTOR - ELECTRIC

	Planned Savings (kWh)	Achieved Savings (kWh)	% of Planned Savings Achieved
Commercial/Industrial	7,215,555	27,694,876	384%
Residential	1,623,462	2,390,778	147%
Low-Income	121,549	64,878	53%
Total	8,960,566	30,150,532	336%

Natural gas programs, on the other hand, achieved less therm savings than anticipated. While residential programs reached about three-quarters of the company's planned savings goal, commercial/industrial programs achieved around one-third.

- The Low-Income natural gas program achieved significantly higher savings than anticipated. The Community Action Partnership (CAP) of Lewiston was better able to address labor shortages in 2024, compared to prior years.
- Residential programs were buoyed by very robust participation in the Midstream Program.
- The company continued to see diminished participation in commercial/industrial natural gas programs, as pressure on capital expenditures remained high and interest rates and inflation contributed to uncertainty.

TABLE 5 - ENERGY-EFFICIENCY SAVINGS BY SECTOR - NATURAL GAS

	Planned Savings (Therms)	Achieved Savings (Therms)	% of Planned Savings Achieved
Commercial/Industrial	101,325	33,187	33%
Residential	290,201	185,712	64%
Low-Income	496	1,380	278%
Total	392,021	220,279	56%

Expenditures

As part of Avista's annual business planning process, the company sets an expectation to pursue all cost-effective measures possible under Tariff Schedules 90 and 190. Because of this mandate, variances may exist between planned and actual spending each year. For 2024, expenditures for the company's conservation programs far exceeded anticipated budgets. On the electric side, actual spending was approximately 3.5 times the planned spend – in line with the achievement of 336 percent of planned savings. On the natural gas side, actual spending closely aligned with planned spending, though savings fell short of projections. Overall, the company saw a reduction in incentive expenditures and higher-than-expected non-incentive costs during this program year. These costs included administrative expenses for the Midstream Program, Home Energy Audit Program, and Regional Market Transformation (which achieved more therms than planned).

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

	2024 Planned Expenses	2024 Actual Expenses
Electric		
Incentives	$ 2,905,424	$ 13,643,398
Non-Incentives and Labor	$ 1,359,845	$ 2,558,375
MT, CPA, EM&V	$ 1,111,661	$ 1,114,321
Total Electric Expenditures	$ 5,376,930	$ 17,316,094
Natural Gas		
Incentives	$ 2,441,310	$ 1,604,312
Non-Incentives and Labor	$ 151,094	$ 381,866
MT, CPA, EM&V	$ 133,500	$ 296,104
Total Natural Gas Expenditures	$ 2,725,904	$ 2,282,282

COST- EFFECTIVENESS

Avista's energy-efficiency portfolio offerings are evaluated throughout implementation, as well as at the conclusion of each program year, to gauge cost-effectiveness. Cost-effectiveness tests are utilized to determine whether a program is beneficial from the company's and customers' perspectives. Avista's cost-effectiveness goal for the electric and natural gas program portfolios is a Utility Cost Test (UCT) above 1.00, indicating that benefits to the utility exceed the costs of implementing the program.

The electric portfolio achieved a UCT ratio of 1.41 in 2024, and the company's natural gas portfolio achieved a UCT ratio of 1.05. Although declining avoided costs drove natural gas incentives downward in 2024, a change in methodology for evaluated savings for residential natural gas furnaces resulted in higher savings per unit than in 2023. During the 2023 program year, Avista began offering its natural gas HVAC rebates through the Midstream Program. With low realization rates for these rebates reported in the *2023 Idaho Electric Impact Evaluation Report*, Avista worked with its third-party evaluator and program implementer throughout 2024 to review savings calculations for understanding and potential alignment in approaches or assumptions. While the impact analysis initially relied on inputs consistent with baselines dictated by the Regional Technical Forum of the Northwest Power and Conservation Council (RTF), evaluators determined that a billing analysis of Midstream furnace measures would be a more accurate methodology for Avista's service territory. From 2020 to 2023, furnaces were evaluated at or above 80 therms per unit each program year. In 2024, furnace savings determined through the billing analysis were 90 therms per unit, compared to values in the RTF that were closer to 30 therms per unit. These significant differences in savings can be attributed to a colder climate in the Avista service territory in Idaho compared with other regions in Southern Idaho and Western Washington, as well as a baseline with a higher proportion of inefficient units.

TABLE 7 - PORTFOLIO COST-EFFECTIVENESS RESULTS - ELECTRIC

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Utility Cost Test (UCT)	$ 23,222,846	$ 16,510,052	1.41
Total Resource Cost (TRC)	$ 23,222,846	$ 28,252,370	0.82
Participant Cost Test (PCT)	$ 37,174,523	$ 25,693,995	1.45
Ratepayer Impact (RIM)	$ 23,222,846	$ 18,633,116	1.25

TABLE 8 - PORTFOLIO COST-EFFECTIVENESS RESULTS - NATURAL GAS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
UCT	$ 2,052,929	$ 1,962,187	1.05
TRC	$ 2,052,929	$ 1,660,247	1.24
PCT	$ 3,633,250	$ 1,020,983	3.56
RIM	$ 2,052,929	$ 2,090,636	0.98

Impact Evaluation

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

- *Electric:* 98 percent realization rate and 30,150,532 kWh in annual verified savings.
- *Natural Gas:* 185 percent realization rate and 220,279 therms in annual gross savings.

TARIFF RIDER BALANCES

At the start of 2024, the Idaho electric and natural gas (aggregate) tariff rider balances were overfunded by roughly $4.4 million. Approximately $8.1 million in tariff rider revenue was collected to fund energy efficiency during the year, while roughly $19.6 million went to operate energy-efficiency programs. While the electric portfolio ended the year with an $8.9 million underfunded balance, the natural gas portfolio remained overfunded by $1.8 million, resulting in an overall underfunded balance of $7 million by the end of 2024. For electric programs, the underfunded balance was driven by much higher-than-anticipated participation in the Small Business Direct-Install Lighting Program. Increased participation drove much higher-than-expected savings, which in turn drove increases in costs. The Midstream Program also saw higher-than-expected participation, which also drove cost increases, although not to the same degree as for the Small Business Direct-Install Lighting Program. For natural gas programs, the overfunded balance was driven primarily by lower-than-expected participation in both commercial and residential programs. Lower-than-expected participation was driven by a number of factors, one of which was a significant drop in avoided costs in 2024. The company responded to these changes by more aggressively managing costs; for example, reducing marketing activities in an effort to preserve cost-effectiveness of the natural gas portfolio.

Concurrent with the filing of this *ACR*, Avista is filing proposed rate adjustments to both its electric and natural gas tariffs to true-up these balances. Table 9 illustrates 2024 tariff rider activity by fuel type.

TABLE 9 - TARIFF RIDER ACTIVITY

	Electric	Natural Gas	Total
Beginning Balance (Underfunded)/Overfunded	**$ 4,363,646**	**$ 52,658**	**$ 4,416,304**
Energy-Efficiency Funding Collected in 2024	$ 4,091,564	$ 4,035,247	$ 8,126,812
Total Funding Available in 2024	$ 8,455,210	$ 4,087,905	$ 12,543,116
Energy-Efficiency Expenditures	$ 17,316,094	$ 2,282,282	$ 19,598,375
Ending Balances (Underfunded)/Overfunded	**$ (8,860,883)**	**$ 1,805,624**	**$ (7,055,259)**

(This page intentionally left blank.)

Schweitzer Mountain Resort, Sandpoint, Idaho

COMMERCIAL/INDUSTRIAL SECTOR

Overview

Commercial/industrial customers are offered multiple pathways for participation in Avista's energy-efficiency programs. The Midstream Program partners with distributors to ensure that the mix of HVAC, hot water, and foodservice equipment available to contractors is energy-efficient, and Prescriptive measures offer a simple approach for lighting, shell, variable frequency drive (VFD), and grocer-related improvements. Any savings measure not offered through the Midstream or Prescriptive pathways is eligible for consideration through the Site-Specific Program path. This path is designed for unique or complex projects that require customer savings calculations and/or technical assistance from Avista's energy engineering team (such as compressed air, process equipment and controls, and comprehensive lighting retrofits). In certain instances, a performance-based approach is used, in which incentives are paid based on the building's performance over a multiyear period.

In 2024, Avista also continued its innovative Direct-Install Lighting Program for small businesses, offering low- to no-cost lighting upgrades for Schedule 11 and Schedule 12 customers. The program remained extremely popular with customers and trade allies alike, accounting for more than half of electric savings in 2024. The Midstream Program accounted for the majority of therm savings in the commercial/industrial natural gas portfolio.

Portfolio Performance

The electric program portfolio achieved nearly four times its 2024 savings goal, with over half of savings coming from the Small Business Direct-Install Lighting Program. Most programs in the portfolio achieved more than one-and-a-half times their savings goal.

The table below shows savings goals assigned to Avista's commercial/industrial electric programs for 2024, as well as reported savings and percentage of goal achieved.

TABLE 10 - COMMERCIAL/INDUSTRIAL VERIFIED VS PLANNED SAVINGS - ELECTRIC

Commercial/Industrial Program	Planned Savings (kWh)	Verified Savings (kWh)	Percentage of Planned Savings
Site-Specific	3,456,295	5,185,350	150%
Prescriptive Lighting	3,312,429	6,888,637	208%
Small Business Direct-Install Lighting	289,101	15,161,166	5,244%
Green Motors Rewind			No 2024 participation
Commercial Grocer	52,091	37,199	71%
Commercial Prescriptive HVAC VFD Retrofit	–	115,111	–
Commercial Shell	15,437	16,263	105%
Midstream	90,202	172,150	191%
Building Operator Certification	–	119,000	–
Commercial/Industrial Total	**7,215,555**	**27,694,876**	**384%**

The natural gas segment of the portfolio achieved 33 percent of the planned savings for 2024. The Site-Specific Program came close to achieving planned savings; the Midstream and Shell programs, by contrast, had lower-than-expected savings.

- The Midstream Program achieved 75 percent of therm savings for the commercial/industrial sector.
- Shell and Site-Specific programs accounted for the remaining 25 percent of commercial/industrial natural gas savings.

The table below shows planned savings assigned to Avista's commercial/industrial natural gas programs for 2024, as well as verified savings and percentage of planned savings achieved.

TABLE 11 - COMMERCIAL/INDUSTRIAL VERIFIED VS PLANNED SAVINGS - NATURAL GAS

Commercial/Industrial Program	Planned Savings (Therms)	Verified Savings (Therms)	Percentage of Planned Savings
Site-Specific	5,116	4,818	94%
Commercial Shell	7,202	3,600	50%
Midstream	89,007	24,769	28%
Commercial/Industrial Total	**101,325**	**33,187**	**33%**

Verified Savings

In 2024, the commercial/industrial electric portfolio reported savings of 28,795 MWh and achieved evaluated savings of 27,695 MWh, resulting in a realization rate of 96.2 percent. The natural gas portfolio reported 35,812 therms and achieved evaluated savings of 33,187 therms, resulting in a 92.7 percent realization rate (see the program-specific summaries later in this section for individual program realization rates). Further discussion of realization rates is included in the impact evaluation reports appended to this report.

Cost-Effectiveness

Tables 12 and 13 show the commercial/industrial sector cost-effectiveness results by fuel type.

TABLE 12 - COMMERCIAL/INDUSTRIAL COST-EFFECTIVENESS RESULTS - ELECTRIC

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 18,758,389	$ 26,148,400	0.72
UCT	$ 18,758,389	$ 15,135,905	1.24
PCT	$ 31,827,752	$ 24,081,858	1.32
RIM	$ 18,758,389	$ 17,086,053	1.10

TABLE 13 - COMMERCIAL/INDUSTRIAL COST-EFFECTIVENESS RESULTS - NATURAL GAS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 238,463	$ 300,269	0.79
UCT	$ 238,463	$ 235,653	1.01
PCT	$ 429,759	$ 236,108	1.82
RIM	$ 238,463	$ 255,005	0.94

Marketing

Avista continued a robust approach to commercial/industrial energy-efficiency marketing in 2024. The company's campaigns shared rebate programs, customer success stories, and ways to save energy. Messages were deployed across multiple channels, including print, digital, search, streaming and broadcast, social media, email, website, newsletters, and more. Additionally, the company's regional account executives continued building program awareness and engagement by managing business customer projects and relationships.

Avista's energy-efficiency rebate program ads were refreshed in 2024, engaging customers with multiple messages. Because this customer segment holds vast potential for energy savings, a new industrial case study and several small-business project highlights were developed to showcase successful experiences. Existing case studies were also leveraged, such as Harvester Restaurant and Luxury Living, during major event sponsorship and broadcast media buys. Short stories were shared frequently across Avista's social media channels, generating interest and engagement in rebate and direct-install programs. The purpose of these efforts was to bring the business audience into the energy-efficiency conversation, helping them see how their peers are benefiting from Avista's programs.

Throughout the year, Avista reached out to business customers directly via email, offering energy-saving advice and program information. For example, an email sent to school districts within Avista's service areas detailed opportunities through the Department of Energy's Renew America's Schools Program and Energy Champions Leading the Advancement of Sustainable Schools. Avista also continued its longstanding e-newsletter, *Energy Solutions*, directing customers to helpful programs at myavista.com.

Avista offered a fall open house focused on energy-efficiency programs, where program managers, energy engineers, and account executives welcomed commercial/industrial trade ally vendors and contractors in an effort to further engage these organizations. Energy-efficiency rebate programs and services were discussed and shared, with the intention that trade allies would advance their participation on behalf of their customers.

Power of Change

Avista took a fresh creative approach to promoting energy efficiency in 2024 with the launch of a campaign called Power of Change. The campaign positions energy efficiency as an approachable way into the broader energy conversation, and messaging includes energy-saving tips and program promotion.

Power of Change is the first large-scale paid social media advertising campaign in Avista's history. The decision to enter the paid social media market was driven by changing customer preferences and demographics. Ads ran on Meta, X, LinkedIn, TikTok, and YouTube, in addition to digital display and streaming, and messaging was included in sponsorship activations for local sporting events. Ads ran in six-week phases, with a total of six business ads per phase.

FIGURE 2 - COMMERCIAL/INDUSTRIAL POWER OF CHANGE ADS

Business Partner Program

The Business Partner Program (BPP) raises awareness of Avista's programs among rural small-business customers in Idaho and Washington, providing information on energy audits, budget billing plans, and energy-efficiency rebates. Due to the program's success, it expanded in fall 2023 to include both rural and urban small-business customers.

Through this program, Avista continues to offer the Trade Ally Bid Program, through which various vendors (e.g., lighting, HVAC, window, and insulation) provide cost estimates to customers for energy-efficiency upgrades. Collaboration with trade ally partners enables Avista to offer energy assessments, walking customers through the incentive process and helping them obtain project bids. The Trade Ally Bid Program has empowered small-business customers who may lack the time, budget, or access to contractors to make improvements toward energy efficiency.

Commercial/Industrial Site-Specific Program

Description

Site-Specific (custom) incentives are available for many energy-efficiency projects that fall outside the parameters of Prescriptive or Midstream programs. These incentives apply to first-year energy savings (not behavioral modifications) and are offered for projects with measure-lives of 10 years or greater based on the simple payback of the individual project.

Avista's account executives help customers identify energy-efficiency and incentive opportunities in Site-Specific projects, including appliances, compressed air, industrial processes, non-prescriptive motors, shell, and lighting, with most projects focusing on shell and lighting.

The program also includes a Pay for Performance track, designed to pay Avista's commercial/industrial customers for implementing efficiency measures that are monitored at the meter level. Customers participating in this track implement whole-building energy retrofits and receive a set incentive rate for measurable savings achieved over the course of three years, with incentive payments made at the end of each year.

TABLE 14 - COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM METRICS

Site-Specific Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		18
Overall kWh Savings		5,185,350
Incentive Spend	$	1,162,477
Non-Incentive Utility Costs	$	457,068
Idaho Energy Efficiency Rider Spend	$	1,619,545
Site-Specific Program Summary - Natural Gas		**2024**
Participation, Savings, and Costs		
Conservation Projects		3
Overall Therm Savings		4,818
Incentive Spend	$	18,928
Non-Incentive Utility Costs	$	5,269
Idaho Energy Efficiency Rider Spend	$	24,197

Program Activities

The electric Site-Specific Program showed strong performance in 2024, achieving 150 percent of its kWh savings target of 3,456,295. This upward savings trend was likely influenced by the stabilization of interest rates for program financing, as well as resolutions to supply chain disruptions that impacted the market from 2020-2023.

The natural gas program achieved 94 percent of planned therm savings. In addition to the savings claimed in the table above, there are also five Pay for Performance projects currently contracted, all of which will be completed in future years.

Program Changes

The program's longtime manager retired in 2024, and a new program manager was promoted internally. The Pay for Performance track eliminated the minimum square-footage requirement, boosting participation by businesses with smaller footprints.

Impact Evaluation

Tables 15 and 16 show reported and evaluated electric and natural gas energy savings for Avista's commercial/industrial Site-Specific Program path for the year.

TABLE 15 - COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Site-Specific	5,335,550	5,185,350	97%

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

Program Type	Reported Savings (Therms)	Evaluated Savings (Therms)	Realization Rate
Site-Specific	5,408	4,818	89%

Plans for 2025

Avista plans to continue the Site-Specific Program in Idaho in 2025 and will assess the current measurement and verification process to determine whether improvements are needed. The company will also continue the BPP and the Trade Ally Bid Program therein.

Commercial/Industrial Prescriptive Lighting Program

Description

The Prescriptive Lighting Program prompts commercial/industrial electric customers to increase the energy efficiency of lighting equipment through direct financial incentives. This methodology indirectly supports the infrastructure and inventory necessary to ensure that installation of high-efficiency equipment is a viable option for customers. Program measures include retrofits from fluorescent lamps and fixtures, high-intensity discharge (HID), directional, and incandescent can fixtures to more energy-efficient LED light sources and controls.

TABLE 17 - COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM METRICS

Prescriptive Lighting Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		417
Overall kWh Savings		6,888,637
Incentive Spend	$	2,297,810
Non-Incentive Utility Costs	$	524,393
Idaho Energy Efficiency Rider Spend	$	2,822,203

Program Activities

Business customers and trade allies faced inflation-related obstacles to energy-efficiency projects in 2024, and Avista continued its generous incentive rate structure for this program. Originally implemented in July 2021, these robust offerings help bridge the gap for large customers and trade allies as they navigate rising costs in labor and materials. Since the launch of the Small Business Direct-Install Lighting Program in April 2023, overall project throughput and savings have declined in the Prescriptive Lighting Program, as many customers are now directed to the enhanced program when eligible. However, 2024 remained a busy year for the program, which achieved 208 percent of its 3,312,430 kWh target.

Program Changes

TABLE 18 - COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM CHANGES

Changes to Prescriptive Lighting Program Rebates	2023	2024
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	$ 85	$ 85
90-100W HID Fixture to ≤ 30W LED Fixture or Lamp	$ 120	$ 120
150W HID Fixture to ≤ 50W LED Fixture or Lamp	$ 180	$ 180
175W HID Fixture to ≤ 100W LED Fixture or Lamp	$ 180	$ 180
200W HID Fixture to ≤ 140W LED Fixture or Lamp	Site-Specific	$ 120
250W HID Fixture to ≤ 140W LED Fixture or Lamp	$ 230	$ 230
320W HID Fixture to ≤ 160W LED Fixture or Lamp	$ 280	$ 280
400W HID Fixture to ≤ 175W LED Fixture or Lamp	$ 375	$ 375
575W HID Fixture to ≤ 300W LED Fixture or Lamp	$ 400	$ 400

Changes to Prescriptive Lighting Program Rebates	2023	2024
750W HID Fixture to ≤ 300W LED Fixture or Lamp	$ 750	$ 750
1000W HID Fixture to ≤ 400W LED Fixture or Lamp	$ 930	$ 930
1500W HID Fixture to ≤ 600W LED Fixture or Lamp	$ 1,300	$ 1,300
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	$ 170
250W Code HID Fixture to ≤ 140W LED Fixture	$ 195	$ 225
320W Code HID Fixture to ≤ 160W LED Fixture	$ 220	$ 250
Sign Lighting Retrofit - Requires at Least 4,288 Hours of Use per Year		
T12 to LED Sign Lighting – per Square Foot	$ 13	$ 13
Controls		
Exterior Networked Lighting Controls	$ 85	$ 85
Interior Lighting		
T12 to LED Sign Lighting - per Square Foot Replacement Lamps - Must Be DLC or ENERGY STAR-Rated		
T12/T8 Fluorescent to ≤ 13W T8 Two Foot TLED	$ 9	$ 9
T12/T8 Fluorescent to ≤ 17W T8 Three-Foot TLED	$ 11	$ 11
T12/T8 Fluorescent to ≤ 23W T8 Four-Foot TLED	$ 14	$ 14
T12/T8 Fluorescent to ≤ 45W T8 Eight-Foot TLED	$ 27	$ 27
T12/T8 Fluorescent to ≤ 23W T8 U-Bend TLED	$ 15	$ 15
T5 Fluorescent to ≤ 18W T5 Four-Foot TLED	$ 17	$ 17
T5HO Fluorescent to ≤ 29W T5HO Four-Foot TLED	$ 35	$ 35
T8/T5 TLED to TLED (3-4W reduction)	Site-Specific	$ 3
T8/T5 TLED to TLED (≥ 5W reduction)	$ 5	$ 7
Four-Pin Base CFL to Four-Pin Plug-in LED	$ 18	$ 18
Replacement Fixtures - Must be DLC or ENERGY STAR-Rated		
T12/T8 to ≤ 40W 1x4 LED Fixture	$ 40	$ 40
T12/T8 to ≤ 40W 2x2 LED Fixture	$ 36	$ 40
T12/T8 to ≤ 60W 2X4 LED Fixture	$ 60	$ 75
T12/T8 to ≤ 90W Eight-Foot LED	$ 85	$ 90
4-Lamp T5HO Fluorescent to ≤ 135W LED	$ 100	$ 120
6-Lamp T5HO Fluorescent to ≤ 160W LED	$ 210	$ 210
175W HID to ≤ 75W LED Fixture or Lamp	$ 145	$ 145
250W HID to ≤ 140W LED Fixture or Lamp	$ 265	$ 300
400W HID to ≤ 175W LED Fixture or Lamp	$ 325	$ 325
1000W HID to ≤ 400W LED Fixture or Lamp	$ 560	$ 600
> 42W Incandescent Can to ≤ 20W LED Fixture	$ 20	$ 20
65W Incandescent to ≤ 10W LED Fixture	$ 45	$ 55
75-100W Incandescent Can to ≤ 20W LED Fixture	$ 60	$ 65
≥ 150W Incandescent to ≤ 30W LED Fixture	$ 75	$ 85
Controls		
Wall Switch Occupancy Sensor	$ 17	$ 17
Ceiling or Fixture Mount Occupancy Sensor	$ 75	$ 75
Networked Lighting Controls	$ 150	$ 150

Program Marketing

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

Impact Evaluation

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

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Prescriptive Lighting	6,963,399	6,888,637	99%

Recommendations

Evaluators recommended using HVAC space-configuration information and interactive factors of HVAC effects when calculating Prescriptive Lighting Program savings for interior spaces, as well as incorporating in-service rates specific to lamp type.

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

Plans for 2025

With the more sophisticated measure-level detail in iEnergy, Avista has been able to update lighting measures annually to reflect market conditions, adding new ones that were typically paid for through the Site-Specific Program. Additionally, as a result of fewer small-business customers participating in this program, more refinements could better align offerings with new customer demographics.

Small Business Direct-Install Lighting Program

Description

Small-business customers covered by Rate Schedules 11 and 12 are eligible through the Small Business Direct-Install Lighting Program to receive benefits, including a free facility lighting assessment to identify potential upgrades; installation of low- to no-cost energy-saving measures (lamps, fixtures, and controls); and informational handouts.

TABLE 20 - SMALL BUSINESS DIRECT-INSTALL LIGHTING PROGRAM METRICS

Small Business Direct-Install Lighting Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		618
Overall kWh Savings		15,161,166
Incentive Spend	$	9,497,604
Non-Incentive Utility Costs	$	1,055,980
Idaho Energy Efficiency Rider Spend	$	10,553,584

Program Activities

The program was highly successful and far exceeded planned savings for the year. While much of the participation has come from door-to-door marketing efforts among trade allies, co-branded promotion postcards mailed directly to customers have also proven effective. Customer case studies posted on social media have been valuable in gaining trust and engagement, often leading to word-of-mouth referrals to neighboring businesses. Lastly, the Avista website has driven more customer traffic by highlighting the enhanced incentives and enrollment opportunity.

Program Changes

Beginning in May 2024, as the program saw a significant increase in project throughput, the third-party implementer began site inspections on 5 percent of all projects.

Additionally, with the advancement of building code and lighting standards, along with ENERGY STAR discontinuing the certification of non-recessed downlight products, the program eliminated incentives on screw-base lamps while continuing to cover other ENERGY STAR-listed products.

Impact Evaluation

TABLE 21 - SMALL BUSINESS DIRECT-INSTALL LIGHTING PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Small Business Direct-Install Lighting	16,181,397	15,161,166	94%

Recommendations

Evaluators recommended calculating savings for occupancy sensors using a different algorithm to avoid the slight double counting of savings. Modifications to the calculation and incentive will be made on the first of the new year.

Plans for 2025

The company has taken several steps to re-focus the program on the intended small-business customer segment, including removing municipalities, universities, schools, and hospitals from eligibility. And with numerous changes to the Department of Energy's ENERGY STAR certification guidelines, the program no longer allows for certain non-downlight specialty fixtures. Lastly, because the program team identified the control savings-calculation discrepancy prior to the 2024 impact evaluation report, the changes to the calculation and incentive amount have already been implemented.

Commercial/Industrial Prescriptive Non-Lighting Programs

This group of programs offers simple incentives for a wide variety of non-lighting measures. A description of each offering follows, as does a recap of program activities.

Description/Program Activities

Green Motors Rewind – A program to restore a motor to its original efficiency through repair/rewind; commonly called a "green rewind." The regional Green Motors Practices Group terminated its program in the fall of 2024. Avista opted to bring the program in-house, using the same format to remain consistent for customers. Participating service centers apply a $1-per-horsepower instant discount to the customer invoice, and Avista reimburses that rebate when the appropriate paperwork is submitted. This is a small program with historically low throughput, but it is being highlighted with the Power of Change campaign.

Commercial Grocer Program – A program designed to reduce energy use for customers with commercial refrigeration equipment. National grocery chains submitted rebates for multiple stores (due to the uniformity of refrigeration equipment in national chains, it is easier to retrofit and repair equipment across all stores). This is a small program with low throughput, but it is being highlighted with the Power of Change campaign.

Commercial Prescriptive HVAC VFD Retrofit Program – A program that incentivizes application of a VFD on commercial heating, ventilation, or air conditioning equipment served by Avista. The program pays $200 per horsepower of the motor on which the VFD is installed. Installation verification is required before incentives are paid. This program ended in 2024, and VFDs are now managed through the Site-Specific Program path.

Commercial Shell Program – Avista commercial customers using an Avista primary heat source are eligible for incentives for bringing insulation up to code or better in wall, attic, or roof applications. The program was highlighted in the Power of Change campaign, resulting in increased throughput.

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

Prescriptive Non-Lighting Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		67
Overall kWh Savings		168,573
Incentive Spend	$	26,657
Non-Incentive Utility Costs	$	11,255
Idaho Energy Efficiency Rider Spend	$	37,912
Prescriptive Non-Lighting Program Summary - Natural Gas		**2024**
Participation, Savings, and Costs		
Conservation Projects		7
Overall Therm Savings		3,600
Incentive Spend	$	28,340
Non-Incentive Utility Costs	$	6,155
Idaho Energy Efficiency Rider Spend	$	34,495

Program Marketing

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

Impact Evaluation

- *Electric:* Table 23 shows the reported and evaluated electric energy savings for Avista's commercial/industrial Prescriptive Non-Lighting Program path, as well as the realization rates between the evaluated and reported savings for 2024. Overall the programs achieved a 125 percent realization rate.

TABLE 23 - COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Commercial Grocer	37,199	37,199	100%
Commercial Prescriptive HVAC VFD Retrofit	81,760	115,111	141%
Commercial Shell	16,263	16,263	100%
Commercial/Industrial Total	**135,222**	**168,573**	**125%**

- *Natural Gas:* Natural gas programs achieved a realization rate of 100 percent.

TABLE 24 - COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING PROGRAM IMPACT FINDINGS - NATURAL GAS

Program Type	Reported Savings (Therms)	Evaluated Savings (Therms)	Realization Rate
Commercial Shell	3,600	3,600	100%

Recommendations

Evaluators recommended including facility heating and cooling equipment information within the Shell Program tracking data.

Plans for 2025

Avista will reassess all program measures and incentive levels.

Midstream Program

Description

Avista's Midstream Program incentivizes the purchase of high-efficiency commercial HVAC, water-heating, and foodservice products and helps ensure they are in stock when customers need them. The program works directly with distributors, who influence equipment sales in the region.

TABLE 25 - COMMERCIAL/INDUSTRIAL MIDSTREAM PROGRAM METRICS

Midstream Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		105
Overall kWh Savings		172,150
Incentive Spend	$	84,815
Non-Incentive Utility Costs	$	14,218
Idaho Energy Efficiency Rider Spend	$	99,033
Midstream Program Summary - Natural Gas		**2024**
Participation, Savings, and Costs		
Conservation Projects		130
Overall Therm Savings		24,769
Incentive Spend	$	144,028
Non-Incentive Utility Costs	$	32,933
Idaho Energy Efficiency Rider Spend	$	176,961

Program Activities

Throughout 2024 Avista worked to address the Midstream Program's low realization rates in 2023. In consultation with evaluators, the program implementer reviewed and updated savings assumptions and methodologies across all measures. As a result, realization rates for the commercial program improved across both electric and natural gas measures in 2024.

Program Changes

Beginning in 2024, residential new construction Tier 1 heat pumps were no longer eligible for incentives, and commercial furnaces changed to a per-unit incentive structure. New commercial foodservice measures eligible for discount include:

- Conveyor toasters
- Electric holding bins
- Natural gas and electric cooktops
- Rotisseries
- Soup wells
- Steam tables

Throughout 2024, the program was open to any interested distributor, and a handful of new distributors joined.

Impact Evaluation

TABLE 26 - COMMERCIAL/INDUSTRIAL MIDSTREAM PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings	Evaluated Savings	Realization Rate
Midstream	179,583	172,150	96%

TABLE 27 - COMMERCIAL/INDUSTRIAL MIDSTREAM PROGRAM IMPACT FINDINGS - NATURAL GAS

Program Type	Reported Savings	Evaluated Savings	Realization Rate
Midstream	26,804	24,769	92%

Recommendations

The evaluators found that all measures' claimed savings were calculated based on assumed average equipment sizing, whereas verified savings calculations were carried out using standard engineering algorithms. Although relative magnitudes of savings per project generally aligned with algorithm-based results, the evaluators recommended the program implementers adjust assumed average sizing to better reflect program participants' purchasing behaviors.

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

Plans for 2025

During 2025, Avista will add packaged terminal heat pumps, PEI (Pump Energy Index) pumps, and heat pumps for space-constrained installations like manufactured homes. Quarterly market share reports to distributors will continue as a means of promoting healthy competition within the market.

Building Operator Certification Program

Description

This national training and certification program helps participants develop skills in commercial building operation, with an emphasis on no-cost and low-cost solutions. Competency is demonstrated through project work involving the participants' own buildings and equipment.

TABLE 28 - BUILDING OPERATOR CERTIFICATION PROGRAM METRICS

Building Operator Certification Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		1
Overall kWh Savings		119,000
Incentive Spend	$	–
Non-Incentive Utility Costs	$	3,628
Idaho Energy Efficiency Rider Spend	$	3,628

Program Activities

Avista partnered with Building Potential (formerly the Northwest Energy Efficiency Council or NEEC) to bring a Building Operator Certification (BOC) training course to the Inland Northwest. Avista also offered a discount on the course for customers managing commercial buildings.

Plans for 2025

Avista plans to actively recruit participants for the in-person Level 1 course in Spokane with the assistance of the account executive and community relations teams. Avista will also continue to share information about upcoming virtual and in-person BOC courses with customers. Avista energy efficiency staff plan to regularly attend BOC courses to share energy-efficiency program information with Avista customers who participate in BOC courses.

Coeur d'Alene, Idaho

RESIDENTIAL SECTOR

Overview

Avista offers a wide variety of programs encouraging residential customers to save energy while living more comfortably in their homes. Over $1.5 million in rebates and direct benefits went to Idaho residential customers in 2024, offsetting costs and enabling customers to make desired upgrades. The combined energy savings achieved for all programs within the residential portfolio were 2,390,778 kWh and 185,712 therms.

Portfolio Performance

The electric portfolio's achievement of 117 percent of 2024 planned savings reflects the Midstream Program reaching six-and-a-half times the expected savings, accounting for 79 percent of total savings. The Appliances Program also over-performed at 145 percent of planned savings. 2024 was the first year that the Home Energy Audit Program was evaluated for savings, and while savings were less than expected, the evaluation was informative. The Fuel-Efficiency and Shell programs also had lower-than-expected savings in 2024.

Table 29 shows planned savings assigned to Avista's residential programs for the year, as well as verified savings and the percentage of planned savings achieved.

TABLE 29 - RESIDENTIAL PROGRAMS VERIFIED VS PLANNED SAVINGS - ELECTRIC

Program	Planned Savings (kWh)	Verified Savings (kWh)	Percentage of Planned Savings
Midstream	293,307	1,891,168	645%
Shell	1,032,269	214,110	21%
Home Energy Audit	112,181	9,418	8%
ENERGY STAR/NEEM Manufactured Housing	–	77,951	-
Appliances	65,395	94,924	145%
Fuel-Efficiency	539,240	103,207	19%
Residential Total	**2,042,392**	2,390,778	117%

The natural gas segment of the residential portfolio achieved 64 percent of planned savings for 2024.

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

- The Midstream Program accounted for 78 percent of residential natural gas savings.
- Prescriptive programs accounted for the remaining 32 percent of residential natural gas savings.

Table 30 shows planned savings assigned to Avista's residential natural gas programs for 2024, as well as verified savings and percentage of planned savings achieved.

TABLE 30 - RESIDENTIAL PROGRAMS VERIFIED VS PLANNED SAVINGS - NATURAL GAS

Program	Planned Savings (Therms)	Verified Savings (Therms)	Percentage of Planned Savings
Midstream	180,942	144,315	80%
Prescriptive	109,259	41,397	38%
Residential Total	290,201	185,712	64%

Impact Evaluation

The residential sector saw higher-than-expected realization rates in 2024, due primarily to high realization rates for Midstream and Shell programs for both natural gas and electric measures. Natural gas appliance measures also had higher than expected realization rates (see program-by-program summaries as well as Appendices A and B, Electric and Natural Gas Impact Evaluation Reports).

- *Electric:* Verified savings of 2,390,778 kWh, resulting in a realization rate of 118 percent.
- *Natural Gas:* Verified savings of 185,712 therms, resulting in a realization rate of 226 percent.

Cost-Effectiveness

The tables below show residential sector cost-effectiveness results by fuel type.

TABLE 31 - RESIDENTIAL COST-EFFECTIVENESS RESULTS - ELECTRIC

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
UCT	$ 4,339,129	$ 1,146,640	3.78
TRC	$ 4,339,129	$ 1,855,502	2.34
PCT	$ 5,007,744	$ 1,377,477	3.64
RIM	$ 4,339,129	$ 1,314,988	3.30

TABLE 32 - RESIDENTIAL COST-EFFECTIVENESS RESULTS - NATURAL GAS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
UCT	$ 1,799,871	$ 1,537,790	1.17
TRC	$ 1,799,871	$ 1,151,918	1.56
PCT	$ 3,002,867	$ 579,530	5.18
RIM	$ 1,799,871	$ 1,646,082	1.09

Marketing

Meeting customers where they are, with information that's valuable to them, drives Avista's energy-efficiency marketing strategies to increase awareness and engagement. Both markedly increased in 2024 through exposure on owned channels, including web pages, bill inserts, print and electronic newsletters, email, and social media. Additional audiences were reached through expanded print tactics and digital display and search ads.

Education was a focus throughout the year, with "summer cooling" and "winter bill" campaigns promoting easy energy-saving tips on social media, in Avista's newsletter, in digital and print advertising, and via direct email outreach. Digital ads and website content were translated into Spanish.

Digital and search ad campaigns promoting energy-efficiency rebate programs ran throughout 2024. Ad materials were refreshed and optimized through A/B testing, utilizing new imagery and a clarified call-to-action button.

Energy-efficiency awareness also built through messaging in Avista sponsorship activities. Local sporting event programs included program ads and even energy-saving games for kids. Radio advertisements helped share DIY tips on saving energy.

At Home with Lisa

Many Avista customers live in older, energy-inefficient homes. Between 2020 and late 2024, the company 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. Lisa wrote weekly features sharing her experience with do-it-yourself projects to improve her energy use and comfort. Avista expanded the "At Home with Lisa" series in 2022 to include a digital campaign using static ads and short videos. In the videos, Lisa walks viewers through DIY projects, everything from thermostat control to mail slot fixes, hot water heater wrap to window plastic, door sweeps to insulated drapes. Two final "Lisa" videos were completed in early 2024, focusing on the benefits of the Home Energy Audit Program and how it helped drive her decision to upgrade her windows and doors using Avista's energy-efficiency rebates. The "Lisa" series continues to be shared through Avista's owned channels, website, and messaging through direct mail and social media.

Power of Change

Building on the success of the "At Home with Lisa" series, Avista's Power of Change campaign included messages for residential customers in 2024. Positioning energy efficiency as an entry point to the broader energy conversation, the campaign offers tips on low-cost ways to save energy that are delivered in a light-hearted and humorous tone. When relevant, residential programs are also promoted.

Ads ran on Meta, X, LinkedIn, TikTok, and YouTube, in addition to digital display and streaming, and messaging was included in sponsorship activations for local sporting events. Ads ran in six-week phases, with a total of six ads per phase.

FIGURE 3 - RESIDENTIAL POWER OF CHANGE ADS

Midstream Program

Description

Avista's Midstream Program incentivizes the purchase of high-efficiency residential HVAC and water-heating systems and works to ensure these products are always in stock for customers. The program works directly with distributors, who influence equipment sales in the region.

TABLE 33 - RESIDENTIAL MIDSTREAM PROGRAM METRICS

Midstream Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		897
Overall kWh Savings		1,891,168
Incentive Spend	$	400,000
Non-Incentive Utility Costs	$	297,996
Idaho Energy Efficiency Rider Spend	$	697,996
Midstream Program Summary - Natural Gas		**2024**
Participation, Savings, and Costs		
Conservation Projects		1,640
Overall Therm Savings		144,315
Incentive Spend	$	709,650
Non-Incentive Utility Costs	$	249,126
Idaho Energy Efficiency Rider Spend	$	958,776

Program Activities

The electric program had a very strong year, achieving 645 percent of the kWh savings target of 293,307. The natural gas program achieved 80 percent of planned savings of 180,942 therms.

Program Changes

Beginning in 2024, residential new construction Tier 1 heat pumps were no longer eligible for incentives. Throughout 2024, the program was open to any interested distributor, and a handful of new distributors joined.

Impact Evaluation

TABLE 34 - RESIDENTIAL MIDSTREAM PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Midstream	1,492,479	1,891,167	126.7%

TABLE 35 - RESIDENTIAL MIDSTREAM PROGRAM IMPACT FINDINGS - NATURAL GAS

Program Type	Reported Savings (Therms)	Evaluated Savings (Therms)	Realization Rate
Midstream	51,706.71	144,314.62	279.10%

As mentioned on page 5 of this report, evaluation of residential furnaces in 2024 resulted in significantly higher savings per measure than in 2023. The reported savings in the tables above reflect the lower savings assumption in the 2023 impact evaluation, which, after billing analysis, resulted in a much higher-than-expected realization rate for the program, because furnaces account for the vast majority of savings therein.

Recommendations

Evaluators recommended Avista estimate natural gas savings for furnace measures based on billing analysis results. The natural gas furnace billing analysis yielded annual savings of 90 therms, for a 298% realization rate for the measure. According to the evaluators, "furnace installation by Avista customers in Idaho seems to be associated with substantially higher natural gas savings than reported by the RTF Residential Gas Furnace UES workbook. To maximize the accuracy of reported savings, future ex-ante savings estimates should likely be based on billing analysis results instead of deemed savings."

Evaluators also recommended that the Midstream Program continue incorporating RTF baselines for all non-furnace measures.

Avista acknowledges and agrees with the recommendations and is working with the implementor and evaluators to implement these recommendations.

Plans for 2025

During 2025, Avista will add packaged terminal heat pumps, PEI pumps, and heat pumps for space-constrained installations like manufactured homes. Quarterly market share reports to distributors will continue as a means of promoting healthy competition within the market.

Residential Shell Program

Description

Avista encourages residential customers to improve the building envelope of their homes by adding insulation and storm windows and/or upgrading existing windows and exterior doors. For insulation projects, required contractor documentation includes an invoice and verification of the space's square footage insulated and both pre- and post-installation R-values.

TABLE 36 - RESIDENTIAL SHELL PROGRAM METRICS

Shell Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		933
Overall kWh Savings		214,110
Incentive Spend	$	161,589
Non-Incentive Utility Costs	$	114,518
Idaho Energy Efficiency Rider Spend	$	276,107
Shell Program Summary - Natural Gas		**2024**
Participation, Savings, and Costs		
Conservation Projects		520
Overall Therm Savings		21,430
Incentive Spend	$	430,006
Non-Incentive Utility Costs	$	63,438
Idaho Energy Efficiency Rider Spend	$	493,443

Program Activities

In 2024, insulation contractors employed aggressive marketing and communication tactics to encourage participation in the residential Shell Program. This led some customers to contact Avista with concerns about the quality of work. In response, Avista hired a third-party inspector to conduct random insulation inspections. This quality control project will be completed in 2025.

Impact Evaluation

TABLE 37 - RESIDENTIAL SHELL PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Shell	189,092	214,110	113.23%

TABLE 38 - RESIDENTIAL SHELL PROGRAM IMPACT FINDINGS - NATURAL GAS

Program Type	Reported Savings (Therms)	Evaluated Savings (Therms)	Realization Rate
Shell	18,414	21,420	116.38%

Recommendations

- The evaluators found that verified savings from attic insulation, wall insulation, and window upgrades displayed low realization rates at the project level, primarily due to granular differences between RTF and Avista TRM prescriptive savings values. The RTF differentiates savings by heating type, R-value, and climate zone, while the TRM provides more generalized estimates. With appropriate weighting, such generalized savings estimates can be valid; however, several Shell Program savings values presented in the TRM don't align perfectly with characteristics of the average participating home. The evaluators recommended Avista update the TRM value to reflect a more accurate weighted average.
- The evaluators found some project documentation lacking, pointing to discrepancies in unit quantities, insufficient verification of square footage and R-values, and questionable claims about savings values. They recommended Avista verify that each project meets efficiency requirements through documentation provided in the application and request additional information if needed. The evaluators also recommended Avista conduct measure-level verification to ensure proper fuels are being claimed in the tracking datasets.
- Further, the evaluators recommended Avista assign window-measure savings by window square footage rather than unit quantity, and that expected heating type be incorporated into UES values (estimates of energy savings for a single unit of an installed energy-efficiency measure) to align with RTF projections. Additionally, they recommended that program managers determine if an applicant is an Avista electric and/or natural gas customer before providing an incentive for dual fuel.

The company will consider these recommendations as it plans for the next program year. For insulation measures, the company will take these recommendations into account as it develops and implements a new insulation program.

Plans for 2025

In 2025, Avista plans to replace insulation measures under the current Shell Program with a direct-install model, in which a third party will oversee a closed network of contractors. The program, which is called the Home Insulation Program (HIP) will be available only to electric customers in Idaho.

Residential Home Energy Audit Program

Description

The Home Energy Audit Program offers customers a personalized in-home audit to identify opportunities for energy-efficient upgrades. After the audit, the customer receives a written Home Performance Report detailing the auditors' recommendations, estimated project costs, potential energy savings, directions for installation of some energy-saving measures, and handouts with follow-up information.

TABLE 39 - RESIDENTIAL HOME ENERGY AUDIT PROGRAM METRICS

Home Energy Audit Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		120
Overall kWh Savings		9,418
Incentive Spend	$	–
Non-Incentive Utility Costs	$	120
Idaho Energy Efficiency Rider Spend	$	120
Home Energy Audit Program Summary - Natural Gas		**2024**
Participation, Savings, and Costs		
Conservation Projects		263
Overall Therm Savings		–
Incentive Spend	$	–
Non-Incentive Utility Costs	$	–
Idaho Energy Efficiency Rider Spend	$	–

Program Activities

This program remained extremely popular in 2024, resulting in a lengthy waiting list. The program currently conducts approximately 40 audits per week, roughly 25 percent more than in previous years. Efforts to grow customer awareness and participation included several communication tactics: A new handout was developed for in-person outreach events; a second promotional video was created, highlighting the benefits of the program through the "At Home with Lisa" series; and all residential customers received a bill insert in September, leading up to National Energy Awareness Month.

Program information was also highlighted in Avista's customer newsletters, which accompany paper bills or are sent electronically to those with paperless billing. In addition, three direct emails were sent to households with higher-than-average energy usage.

While savings were identified for homes with electric heat, evaluators found no savings for natural gas-heated homes. However, the program still significantly benefits customers by helping them identify opportunities to pursue efficiency upgrades.

Impact Evaluation

TABLE 40 - RESIDENTIAL HOME ENERGY AUDIT PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Home Energy Audit	N/A	9,418	N/A

Plans for 2025

Avista plans to continue the Home Energy Audit Program in 2025.

Residential ENERGY STAR/NEEM Manufactured Housing Program

Description

Any Idaho residential electric or natural gas customers who purchase a new ENERGY STAR manufactured home (as certified by the Northwest Energy-Efficient Manufactured Housing Program or NEEM) with Avista covering their space and water heating are eligible for the rebate.

TABLE 41 - RESIDENTIAL ENERGY STAR/NEEM MANUFACTURED HOUSING PROGRAM METRICS

ENERGY STAR/NEEM Manufactured Housing Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		26
Overall kWh Savings		77,951
Incentive Spend	$	26,000
Non-Incentive Utility Costs	$	42,628
Idaho Energy Efficiency Rider Spend	$	68,628
ENERGY STAR/NEEM Manufactured Housing Program Summary - Natural Gas		**2024**
Participation, Savings, and Costs		
Conservation Projects		–
Overall Therm Savings		–
Incentive Spend	$	–
Non-Incentive Utility Costs	$	–
Idaho Energy Efficiency Rider Spend	$	–

Program Activities

All homes incentivized through this program in 2024 utilized electric heat, an interesting trend that may be driven by the fact that a large majority of participating homes were in rural areas without access to natural gas infrastructure.

Impact Evaluation

TABLE 42 - RESIDENTIAL ENERGY STAR/NEEM MANUFACTURED HOUSING PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
ENERGY STAR/NEEM Manufactured Housing	85,018	77,951	91.69%

Recommendations

The evaluators found that realization rates differed from 100 percent due to the application of RTF-designated heating and cooling zones (geographic areas within the region defined by their climate characteristics to model energy consumption), which Avista's TRM lacks. They recommended updating the measure savings database to match the primary heating type for dual-fuel households and heating/cooling zones reflected in the RTF workbooks.

Avista will consider this recommendation and may make changes accordingly.

Plans for 2025

Avista plans to continue the ENERGY STAR/NEEM Manufactured Housing Program in 2025.

Residential Appliances Program

Description

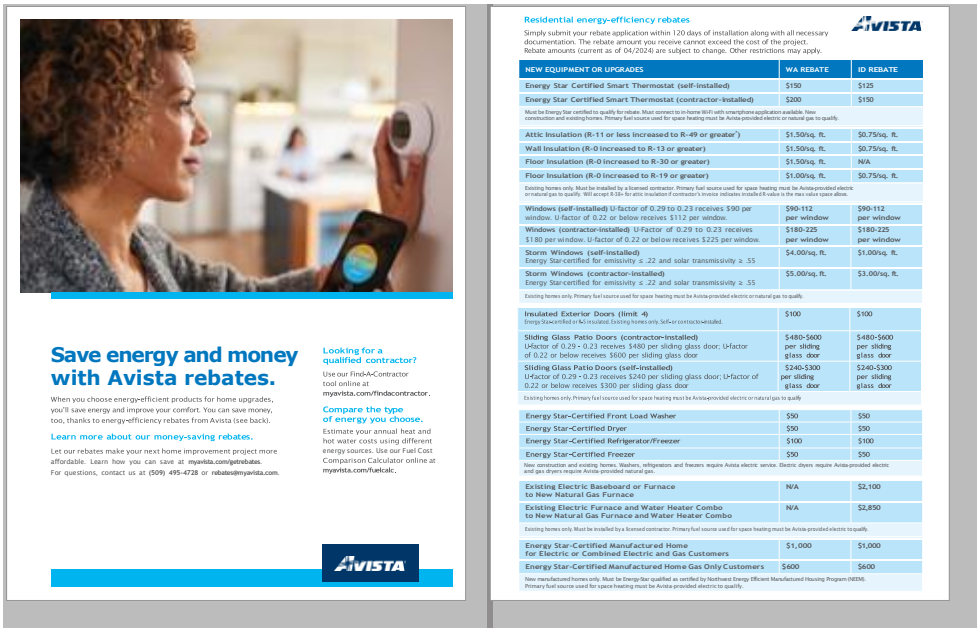
Avista has long offered incentives for high-efficiency appliances such as residential washers, dryers, and refrigerators through point-of-sale programs, Prescriptive paths, and other avenues. Prescriptive offerings include rebates for ENERGY STAR-certified appliances, including:

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

TABLE 43 - RESIDENTIAL APPLIANCES PROGRAM METRICS

Appliances Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		606
Overall kWh Savings		94,924
Incentive Spend	$	50,726
Non-Incentive Utility Costs	$	5,755
Idaho Energy Efficiency Rider Spend	$	56,480
Appliances Program Summary - Natural Gas		**2024**
Participation, Savings, and Costs		
Conservation Projects		509
Overall Therm Savings		19,968
Incentive Spend	$	63,340
Non-Incentive Utility Costs	$	22,231
Idaho Energy Efficiency Rider Spend	$	85,571

FIGURE 4 - RESIDENTIAL APPLIANCES PROGRAM FLYER



Save energy and money with Avista rebates.

When you choose energy-efficient products for home upgrades, you'll save energy and improve your comfort. You can save money, too, thanks to energy-efficiency rebates from Avista (see back).

Learn more about our money-saving rebates.

Let our rebates make your next home improvement project more affordable. Learn how you can save at myavista.com/getrebates. For questions, contact us at (509) 495-4728 or rebates@myavista.com.

Looking for a qualified contractor?

Use our Find-A-Contractor tool online at myavista.com/findacontractor.

Compare the type of energy you choose.

Estimate your annual heat and hot water costs using different energy sources. Use our Fuel Cost Comparison Calculator online at myavista.com/fuelcalc.

AVISTA

Residential energy-efficiency rebates

AVISTA

Simply submit your rebate application within 120 days of installation along with all necessary documentation. The rebate amount you receive cannot exceed the cost of the project. Rebate amounts (current as of 04/2024) are subject to change. Other restrictions may apply.

NEW EQUIPMENT OR UPGRADES	WA REBATE	ID REBATE
Energy Star Certified Smart Thermostat (self-installed)	$150	$125
Energy Star Certified Smart Thermostat (contractor-installed)	$200	$150
Must be Energy Star certified to qualify for rebate. Must connect to in-home Wi-Fi with smartphone application available. New construction and existing homes. Primary fuel source used for space heating must be Avista-provided electric or natural gas to qualify.		
Attic Insulation (R-11 or less increased to R-49 or greater*)	$1.50/sq. ft.	$0.75/sq. ft.
Wall Insulation (R-0 increased to R-13 or greater)	$1.50/sq. ft.	$0.75/sq. ft.
Floor Insulation (R-0 increased to R-30 or greater)	$1.50/sq. ft.	N/A
Floor Insulation (R-0 increased to R-19 or greater)	$1.00/sq. ft.	$0.75/sq. ft.
Existing homes only. Must be installed by a licensed contractor. Primary fuel source used for space heating must be Avista-provided electric or natural gas to qualify. Will accept R-38+ for attic insulation if contractor's invoice indicates installed R-value is the max value space allows.		
Windows (self-installed) U-factor of 0.29 to 0.23 receives $90 per window. U-factor of 0.22 or below receives $112 per window.	$90-112 per window	$90-112 per window
Windows (contractor-installed) U-Factor of 0.29 to 0.23 receives $180 per window. U-factor of 0.22 or below receives $225 per window.	$180-225 per window	$180-225 per window
Storm Windows (self-installed) Energy Star-certified for emissivity ≤ .22 and solar transmissivity ≥ .55	$4.00/sq. ft.	$1.00/sq. ft.
Storm Windows (contractor-installed) Energy Star-certified for emissivity ≤ .22 and solar transmissivity ≥ .55	$5.00/sq. ft.	$3.00/sq. ft.
Existing homes only. Primary fuel source used for space heating must be Avista-provided electric or natural gas to qualify.		
Insulated Exterior Doors (limit 4) Energy Star-certified or R-5 insulated. Existing homes only. Self-or contractor-installed.	$100	$100
Sliding Glass Patio Doors (contractor-installed) U-factor of 0.29 - 0.23 receives $480 per sliding glass door; U-factor of 0.22 or below receives $600 per sliding glass door	$480-$600 per sliding glass door	$480-$600 per sliding glass door
Sliding Glass Patio Doors (self-installed) U-factor of 0.29 - 0.23 receives $240 per sliding glass door; U-factor of 0.22 or below receives $300 per sliding glass door	$240-$300 per sliding glass door	$240-$300 per sliding glass door
Existing homes only. Primary fuel source used for space heating must be Avista-provided electric or natural gas to qualify.		
Energy Star-Certified Front Load Washer	$50	$50
Energy Star-Certified Dryer	$50	$50
Energy Star-Certified Refrigerator/Freezer	$100	$100
Energy Star-Certified Freezer	$50	$50
New construction and existing homes. Washers, refrigerators and freezers require Avista electric service. Electric dryers require Avista-provided electric and gas dryers require Avista-provided natural gas.		
Existing Electric Baseboard or Furnace to New Natural Gas Furnace	N/A	$2,100
Existing Electric Furnace and Water Heater Combo to New Natural Gas Furnace and Water Heater Combo	N/A	$2,850
Existing homes only. Must be installed by a licensed contractor. Primary fuel source used for space heating must be Avista-provided electric to qualify.		
Energy Star-Certified Manufactured Home for Electric or Combined Electric and Gas Customers	$1,000	$1,000
Energy Star-Certified Manufactured Home Gas Only Customers	$600	$600
New manufactured homes only. Must be Energy-Star qualified as certified by Northwest Energy Efficient Manufactured Housing Program (NEEM). Primary fuel source used for space heating must be Avista-provided electric to qualify.		

Program Activities

The electric program achieved 145 percent of its savings goal of 65,395 kWh in 2024. The natural gas program performed lower than expected, achieving around 39 percent of the program goal.

Impact Evaluation

TABLE 44 - RESIDENTIAL APPLIANCES PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Appliances	150,143	94,924	63.22%

TABLE 45 - RESIDENTIAL APPLIANCES PROGRAM IMPACT FINDINGS - NATURAL GAS

Program Type	Reported Savings (Therms)	Evaluated Savings (Therms)	Realization Rate
Appliances	11,974	19,968	166.77%

Recommendations

- In the Appliances Program, one sampled smart-thermostat rebate included equipment that did not meet specifications to receive verified savings through the RTF workbooks, from which the Avista TRM savings values are drawn. The evaluators recommended providing a qualified product list for customers to ensure purchased smart thermostats meet program requirements. In addition, the evaluators recommended Avista review program documentation to verify qualifications after rebates are submitted.
- The evaluators recommended Avista update the clothes dryer TRM value to correctly assign 1.60 therm savings for the measure, as reflected in the RTF (currently, the Avista TRM reflects 2.72 therms/unit). Additionally, the evaluators recommended Avista update the front-load clothes washer TRM value to correctly convert 119.99 kWh/unit to 2.40 therms/unit (currently, the Avista TRM reflects 6.03 therms/unit).
- The evaluators note that the RTF defines an annual savings of 11.7 therms for all natural gas smart-thermostat measure specifications defined in the Connected Thermostats RTF workbook. Although this finding did not impact the realization rate of the program in 2024 (due to statistically significant savings identified for smart thermostats through the billing analysis method), the evaluators recommended Avista update the assumed claimed savings values in the TRM to avoid discrepancies in future smart-thermostat savings calculations.
- The evaluators also found one sampled smart-thermostat model that did not meet the minimum RTF qualifications for savings, although Avista had assigned the maximum savings value to that project. The evaluators recommended Avista verify each smart-thermostat model meets the RTF requirements for regional savings compared to the market practice baseline, or provide a list of qualified products for customers to select from when participating in this program.

Plans for 2025

Thermostat measures will be discontinued in 2025. The company will consider updating the TRM for clothes dryers, as described in the evaluator's recommendations.

Residential Fuel-Efficiency Program

Description

Avista's residential rebate program provides a variety of options to assist customers with multiple energy-efficiency improvements for the home, including 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 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 (Air-Conditioning, Heating, and Refrigeration Institute) 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.

TABLE 46 - RESIDENTIAL FUEL-EFFICIENCY PROGRAM METRICS

Fuel-Efficiency Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		15
Overall kWh Savings		103,207
Incentive Spend	$	30,300
Non-Incentive Utility Costs	$	17,008
Idaho Energy Efficiency Rider Spend	$	47,308

Program Activities

The electric program produced saving of 103,207 kWh in 2024, which is 4 percent of the overall residential impact.

Impact Evaluation

TABLE 47 - RESIDENTIAL FUEL-EFFICIENCY PROGRAM IMPACT FINDINGS - ELECTRIC

Program Type	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Fuel-Efficiency	105,612	103,207	97.72%

Recommendations

The evaluators recommended updating the Avista tracking database to capture previous heating types for conversion measures and requiring the rebate application to include the home's type, previous heating type, and existing cooling type. Furthermore, Avista should review the AHRI annual fuel utilization efficiency (AFUE) reported values to make sure the equipment qualifies for savings, and enforce required document submission for all rebates (such as the AHRI certification or full model number).

Plans for 2025

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

Kootenai River, Bonners Ferry, Idaho

LOW-INCOME SECTOR

Program-by-Program Summaries

Low-Income Program

Description

Avista partners with a CAP agency to deliver energy-efficiency programs to low-income residents in 10 counties within the company's Idaho service territory. The CAP agency has the infrastructure in place to income-qualify customers, as well as provide them access to a variety of funding sources for efficiency improvements in 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 and outreach efforts.

The CAP agency has discretion in spending contracted program dollars on either electric or natural gas efficiency measures, depending on individual customer need. The home must demonstrate a minimum level of annual energy use of 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 use of 4,000 kWh is required. Customers with natural gas as their main heating source must demonstrate a baseline usage of at least 340 therms. The annual funding allocation includes a 15 percent reimbursement for both administrative and program support costs. The agency may also choose to allocate up to 15 percent of its funding for home repairs as well as other health and safety improvements.

TABLE 48 - LOW-INCOME PROGRAM METRICS

Low-Income Program Summary - Electric		2024
Participation, Savings, and Costs		
Conservation Projects		64
Overall kWh Savings		64,878
Incentive Spend	$	213,700
Non-Incentive Utility Costs	$	13,807
Idaho Energy Efficiency Rider Spend	$	227,507
Low-Income Program Summary - Natural Gas		**2024**
Participation, Savings, and Costs		
Conservation Projects		39
Overall Therm Savings		1,380
Incentive Spend	$	186,030
Non-Incentive Utility Costs	$	2,715
Idaho Energy Efficiency Rider Spend	$	188,744

In 2024 the Low-Income Program served 20 electric and 19 natural gas customers. Program participation is quantified in the number of installed units or square feet of installed insulation or windows.

Program Activities

TABLE 49 - LOW-INCOME PROGRAM REPORTED SAVINGS

Program	Planned Savings	Verified Savings	Percentage of Planned Savings
Electric (kWh)	121,549	64,878	53%
Natural Gas (Therm)	496	1,380	278%

Avista continued to reimburse CAP agencies for 100 percent of the cost of installing most energy-efficiency measures defined on the approved measure list (see Table 50). The program achieved very high natural gas savings in 2024, especially when compared to other natural gas programs. The factors contributing to the natural gas program's success are unclear, because benefits are provided on a first-come, first-served basis, and heating fuel type is not a factor in prioritizing weatherization services. Achievements across the electric and natural gas sectors can therefore vary.

TABLE 50 - 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 gallons .65 EF Water heater (tankless) .82 EF Windows – ENERGY STAR-rated, U-factor .30 or less

The CAP agency may receive partial reimbursement for 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 with the greatest cost-effectiveness from the utility's perspective. To allow for additional flexibility, the agency may use dollars allocated for health and safety to fully fund the cost of these measures.

TABLE 51 - 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 Electric to natural gas space and 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/sq ft Duct insulation: $.096/sq ft Duct sealing: $157.82 Floor insulation: $.97/sq ft Smart thermostat: $75 Storm windows: $1/sq ft Wall insulation: $.75/sq ft

Program Changes

A new program manager was hired in November 2024.

Customer Outreach

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 come from Avista's outreach events. The community and economic vitality department collaborates with energy-efficiency efforts to educate and support low-income customers, seniors, veterans, and individuals with disabilities. The outreach team engages these populations through workshops, community events, and mobile outreach, distributing materials focused on low- and no-cost efficiency and conservation. Key outreach strategies include:

- *Workshops:* Hands-on coaching on energy conservation for senior and low-income customers.
- *Mobile outreach:* Avista energy resource vans provide tips on managing energy use, bill payment options, and community resources.
- *General outreach:* 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.

In Q4 2024, Avista's outreach efforts in Idaho – led by a CAP agency in Lewiston – continued to grow in both reach and impact. The agency's conservation education specialist dedicated approximately 280 hours to engaging with Avista customers through a combination of phone calls, emails, flyers, and in-person conversations at the CAP office.

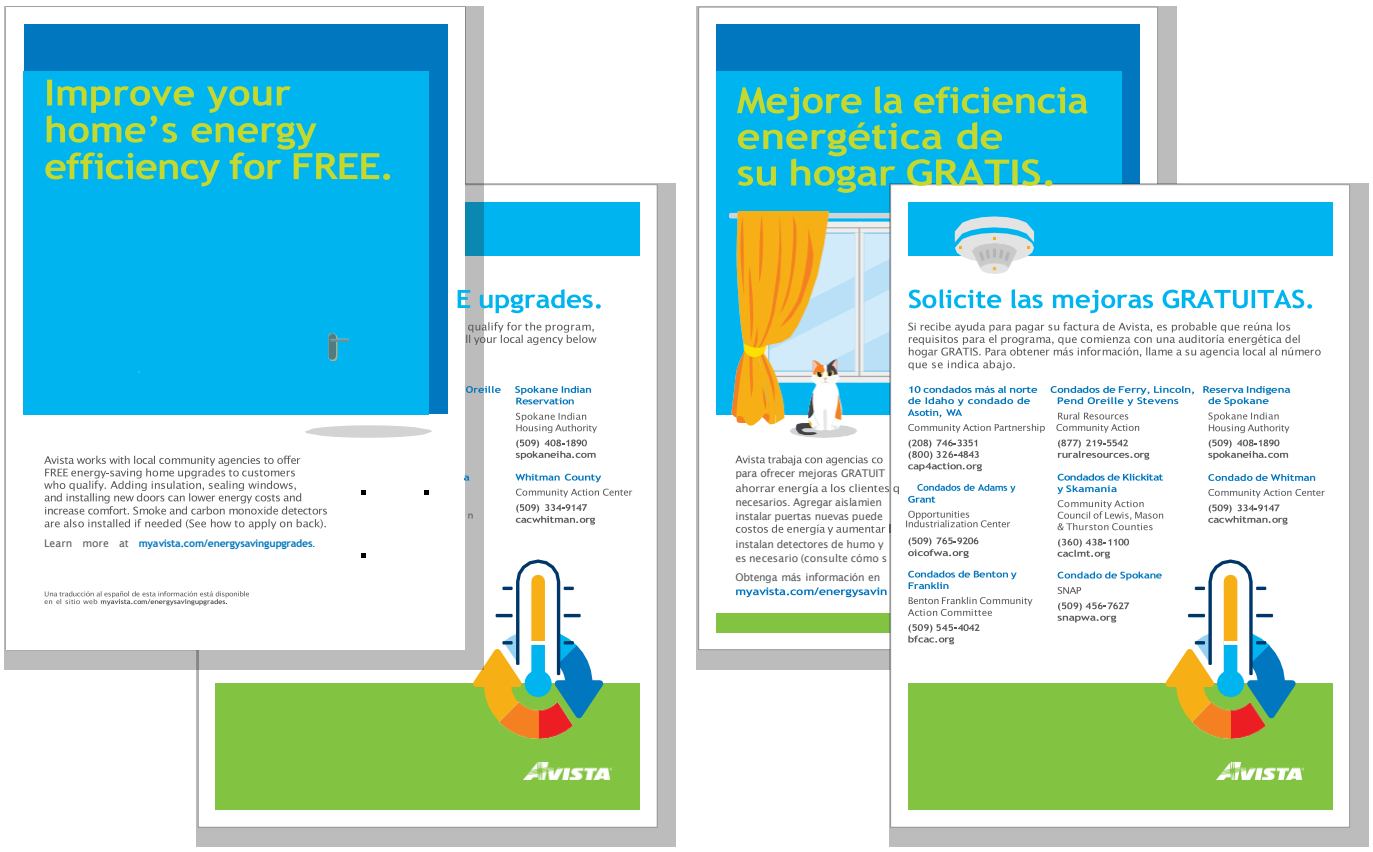
Despite winter weather challenges, outreach efforts remained strong:

- 1,224 community members were reached through printed and digital materials, including flyers, brochures, and informational videos focused on low-cost weatherization tips and energy-saving behaviors.
- The CAP agency participated in a presentation at Lewis-Clark Early Childhood Development in Lewiston, engaging with approximately 60 attendees – primarily Head Start parents – on topics such as window films, door strips, and other energy-saving services.
- One-on-one education was provided to 23 individuals, offering personalized conservation advice and distributing Conservation Education (ConEd) kits.

To improve efficiency and customer experience, the CAP agency pre-assembled ConEd kits that included an instruction sheet and estimated savings for each item. This change allowed more time for meaningful conversations and ensured that even when staff were unavailable, customers still received valuable education.

Through this experience, the agency observed that weatherization items like window films and door strips were more impactful for community members than water-saving tools. Moving forward, weatherization kits will be prioritized for in-person events, while water-saving items will be distributed at mobile pantries where educational interaction is limited.

FIGURE 5 - LOW-INCOME PROGRAM WEATHERIZATION FLYER



Cost-Effectiveness

Tables 52 and 53 show the low-income sector cost-effectiveness results by fuel type.

TABLE 52 - LOW-INCOME PROGRAM COST-EFFECTIVENESS RESULTS - ELECTRIC

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 125,328	$ 248,467	0.50
UCT	$ 125,328	$ 227,507	0.55
PCT	$ 339,028	$ 234,660	1.44
RIM	$ 125,328	$ 232,075	0.54

* PCT is not appropriate to apply to Low-Income benefits and costs. These totals include Low-Income totals aggregated with residential and commercial totals.

TABLE 53 - LOW-INCOME PROGRAM COST-EFFECTIVENESS RESULTS - NATURAL GAS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 14,594	$ 208,059	0.07
UCT	$ 14,594	$ 188,744	0.08
PCT	$ 200,624	$ 205,345	0.98
RIM	$ 14,594	$ 189,549	0.08

* PCT 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

Low-Income programs were not evaluated in 2024, in keeping with the EM&V plan for program years 2024 and 2025.

Plans for 2025

Avista will continue to implement weatherization measures in Idaho through its partnership with the Lewiston CAP agency – the sole Community Action Agency operating in Avista's service territory. As part of the eligibility review process, the agency will identify customers with high energy burdens, and Avista will support this effort by providing relevant data and coordinating outreach activities.

Coeur d'Alene, Idaho

PILOT PROGRAMS

Program-by-Program Summaries

Building Energy IQ Pilot Program

Description

Formerly known as the Active Energy Management pilot, the Building Energy IQ (BEIQ) pilot program fully launched in 2022 for a three-year term, with 2024 as the last full year. The BEIQ pilot is a strategic energy-management program that focuses on the commercial sector in both Idaho and Washington. The final study report is planned for Q2 2025.

Program Activities

With 2024 being the last full year of the pilot, no new customers were added. Pilot participants included 11 customers having 16 buildings total, seven of which are in Idaho. Teams from Avista and pilot partner Edo identified potential energy-conservation measures within these buildings and engaged building operators to implement them. This unfolded through regular monthly meetings, individualized project discussions, and annual performance reports, along with access to an online tool that customers and the pilot team used to track activities and performance.

Program Changes

Pilot energy savings are being analyzed by Avista's third-party EM&V contractor. After the final evaluation, Avista will determine if a full program offering is cost-effective and can be delivered more broadly. In the meantime, closeout activities for pilot participants were completed in Q1 2025.

Plans for 2025

The pilot will be evaluated in mid-2025 to determine whether a program should be offered.

Compressed Air Leak Detection Pilot Program

Description

A program to detect leaks in commercial compressed air systems, while offering incentives to repair leaks.

Program Activities

In April 2024 Avista terminated the prior program due to low participation, beginning a pilot mid-year to spark enrollment and determine how to provide for leak detection and repair while offering a more positive customer experience. Through a partner vendor, customers were provided with acoustic imaging scans and offered repairs to fix detected leaks. Once leaks were repaired, a second scan was performed to verify the repair and savings. The pilot data will be analyzed to inform design of a future program.

Research and Development

Inland Northwest Center for Energy and Decarbonization

In 2024, 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 2024, the center was awarded $996,490 through Avista's partner, Urbanova, to further develop a vision to accelerate innovation and sustained economic growth by building on the region's existing energy sector.

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 (11 in Idaho). Its overarching goals are 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, nonprofits 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 exploring R&D prospects that include 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.

Spokane River at Centennial Trail Bridge, Post Falls, 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. This occurs 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 NEEA to address opportunities beyond the ability or reach of individual utilities. Avista has been participating in and funding NEEA since it was founded in 1997.

Table 54 shows 2024 NEEA savings and the associated costs for Idaho, which exclude internal administrative costs related to participation in 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 54 - NEEA ENERGY SAVINGS AND PARTICIPATION COSTS

Fuel Type	2024 NEEA Energy Savings	2024 NEEA Participation Costs	Avista 2020-2024 Funding Share
Electric	6,952 MWh (0.79 aMW)	$ 679,292	1.69%
Natural Gas	285,431 Therms	$ 188,004	3.55%

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

Electric Energy Savings Share

Values provided in NEEA's 2024 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

100 percent of the 285,431 therms acquired through NEEA natural gas savings in Idaho in 2024 were attributed to changes to the residential code.

GLOSSARY OF TERMS

Moscow, 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 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 1 pound of water 1 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 programs (CAP): 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 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 15 cooling degree days. If the next day has a mean temperature of 83°F, it has 18 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 set period, with an allowed profit margin, divided by a forecasted amount of unit sales over the same period. If the actual sales turn out 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 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 mean 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 that advises investor-owned utilities on the development of integrated resource plans and conservation programs.

Equity Advisory Group (EAG): A group that consults on various company endeavors to ensure that all customers are benefiting from the transition to clean energy through the equitable distribution of energy/non-energy benefits and reduced energy burdens to vulnerable populations and highly 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 performance, cost-effectiveness, levels of demand or energy savings, related markets and market operations, and program-induced changes in those markets. 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, standards, and naturally occurring adoption, with 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 20 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 directly or indirectly induced program-specific 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 commission 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 (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 1 pound of water 1 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 leveling 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 or modification of equipment – whether a single piece, subsystem, or system – or operation at an end-use energy consumer facility for the purpose of reducing energy use and/or demand (and associated 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 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 modeling. M&V approaches are defined in the International Performance Measurement and Verification Protocol (available at evo-world.org).

megawatt (MW): The electrical unit of power that equals 1 million watts or 1,000 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 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 (a) ex ante gross reported savings to ex-post gross evaluated savings, or (b) 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: residential, commercial (e.g., retail stores, office, and institutional buildings), industrial, and agriculture (e.g., dairy farms, irrigation).

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 electric 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 1 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 electromechanical 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 its 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 associated with verification. Verification may include one-time or multiple activities over the estimated life of the measures and review of commissioning or retro-commissioning documentation. It 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.

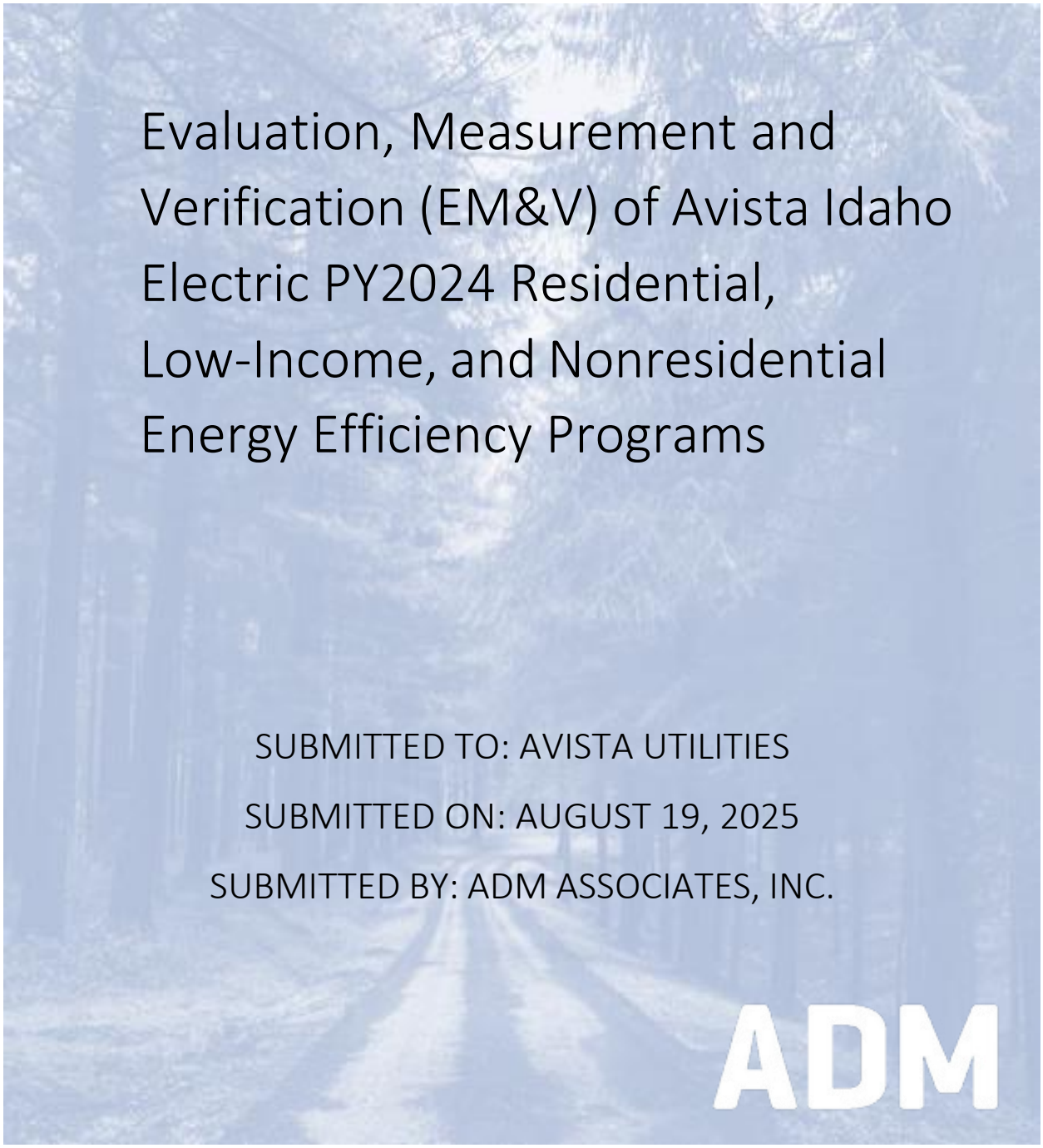
weather normalized: This is an adjustment that is made to actual energy usage, stream-flows, etc., which would have happened if "normal" weather conditions would have taken place.

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.

8,760: Total number of hours in a year.

APPENDICES AND SUPPLEMENTS

City Park, Rathdrum, Idaho



ADM Associates, Inc
3239 Ramos Circle
Sacramento, CA 95827

Avista Utilities
1411 E. Mission Ave.
Spokane, WA 99252

Table of Contents

List of Tables

1. Executive Summary

This report is a summary of the Residential, Low-Income, and Nonresidential Electric Evaluation, Measurement, and Verification (EM&V) effort of the 2024 program year (PY2024) portfolio of programs for Avista Corporation (Avista) in the Idaho service territory. The evaluation was administered by ADM Associates, Inc. (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 PY2024. The Residential portfolio savings amounted to 2,390,777 kWh with a 118.22% realization rate. The Low-Income portfolio savings amounted to 68,878 kWh; however, this portfolio was not evaluated in PY2024 and therefore does not have a realization rate associated with the portfolio. The Nonresidential savings amounted to 27,694,878 with a 96.2% 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
Shell	189,092	214,110	113.23%
Fuel Efficiency	105,612	103,207	97.72%
ENERGY STAR Homes	85,018	77,951	91.69%
Appliances	150,143	94,924	63.22%
Midstream	1,492,479	1,891,167	126.71%
On Bill Repayment	NA	NA	NA
Home Energy Audit	NA	9,418	NA
Total	**2,022,344**	**2,390,777**	**118.22%**

Table 1-2: Low-Income Expected Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Low-Income	64,878	NA	NA
Total	**64,878**	NA	NA

Table 1-3: Nonresidential Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Prescriptive Lighting	6,963,399	6,888,639	98.93%
Small Business Lighting	16,181,397	15,161,166	93.70%
HVAC	81,760	115,111	140.79%
Grocer	37,199	37,199	100.00%
Shell	16,263	16,263	100.0%
Green Motors	No PY2024 participation		
Midstream	179,583	172,150	95.86%
Site-Specific	5,335,550	5,185,350	97.18%
Building Operator Certification	N/A	119,000	N/A
Total	**28,795,151**	**27,694,878**	**96.18%**

Table 1-4 summarizes the electric programs offered to Residential, Low-income, and Nonresidential

customers in the Idaho Avista service territory in PY2024 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	Shell	✓		RTF UES
Residential	Fuel Efficiency	✓	✓	RTF UES
Residential	ENERGY STAR® Homes	✓		RTF UES
Residential	Appliances	✓	✓	RTF UES, Billing Analysis
Residential	Midstream	✓		Engineering Algorithm with RTF Baseline Assumptions
Residential	On Bill Repayment	✓		Not Evaluated in 2024
Residential	Home Energy Audit	✓		Billing Analysis
Low-Income	Low-Income	✓		Not Evaluated in 2024
Nonresidential	Lighting	✓	✓	Prescriptive Engineering Algorithms
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	Midstream	✓		RTF UES, Avista TRM
Nonresidential	Site-Specific	✓		IPMVP

*No verification surveys were completed in PY2024. The Evaluators reference verification survey results from PY2023.

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 2,390,777.39 kWh with a realization rate of 118.22%.
- The Residential Portfolio impact evaluation resulted in a realization rate of 118.22% due to verified savings of 126.71% in the Midstream Program. 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. In some cases, the implementer applied more efficient than necessary

baselines for projects completed in PY2024. This led to an upward adjustment for a portion of the Midstream measures.

- The Evaluators conducted verification surveys for a random sample of customers who had participated in the residential prescriptive rebates programs in PY2023. Since there was not a process evaluation completed in PY2024 due to a change in evaluation cadence, the Evaluators applied the in-service rates determined from the PY2023 survey efforts to the PY2024 projects. The Evaluators calculated in-service rates for measures in which in-service rates are not typically 100% (clothes washers and dryers, smart thermostats, etc.). The Evaluators found that all surveyed measures responses indicated in-service rates of between 90 to 100%. These values were applied to impact analysis results to estimate verified savings through the programs.
- The **Midstream Program**, which comprises 73% of the overall expected residential electric savings, had a realization rate of 126.71% whereas all of the other residential programs combined yielded a 93% realization rate. The higher-than-expected savings in the Midstream Program is the main reason we see a residential program-wide realization rate of 118.22%.
- The **Shell Program** displayed a realization rate of 113.23% with verified savings of 214,110 kWh. Differences in the granularity of the Avista TRM and the RTF workbook calculations are the primary cause of this non-100% realization rate.
    - A lack of granularity in the Avista TRM data led to substantial deviation from 100% realization rates for attic insulation and window measures. More specifically, the RTF unit energy savings (UES) measure workbook assigns savings values by climate zone and heating type, while the Avista TRM applies a single savings value for all customers. The expected savings calculations also appeared to use a value of 1.86 kWh per square foot for attic savings calculations while the RTF UES aligns closer with the value of 0.6 kWh per square footage based on home characteristics. Similarly, there were differences in RTF values and the Avista TRM value for window replacement savings. For single-family single-pane window replacement customers this difference yielded a realization rate of 64.09%. 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, and U-value savings into Avista's TRM.
    - In addition to the discrepancy in applied unit energy savings values, the Evaluators identified many discrepancies in the documentation provided in terms of square footage and unit quantity verification which caused savings to deviate from 100%. In particular, ex-ante single-pane multifamily window savings calculations seemed to be based on window quantity as opposed to total window square footage (as is the case in the RTF UES workbook). This difference in calculation structure yielded a realization rate of 339.6% for the multifamily window replacement from single pane measure. Ultimately, these differences in Avista TRM vs. RTF assumptions led to an overall realization rate of 113.23% for the Shell Program.

- The **ENERGY STAR Homes Program** had a realization rate of 91.69% with verified savings of 77,951 kWh. The Evaluators found that realization rates differed from 100% due to the fact that the RTF differentiates savings by heating zone and cooling zone, while the Avista TRM does not. In addition, the Evaluators found that realization rates differed from 100% due to limited customer application form information. Program application forms frequently lacked information about home primary and secondary space and water heating type as well as heating and cooling zones. The Evaluators recommend updating the Avista measure savings database to match the primary heating type for dual fuel households as well as heating and cooling zones reflected in the RTF workbooks. In addition, the Evaluators recommend updating document data aggregation to ensure consistency between the tracking database and the provided rebate forms.
- The **Fuel Efficiency Program** was had a realization rate of 97.72% with verified savings of 103,207 kWh. The Evaluators found that the realization rate deviated from 100% due to two projects in which the 80% AHRI AFUE values did not meet the minimum criteria to qualify for calculated savings. The applied Avista TRM prescriptive savings values and the verified savings aligned in the tracking data, however, the exclusion of savings from these two projects caused the program's realization rate to drop down to 97.72%. 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. In addition, the Evaluators would recommend requiring home previous heating type, existing cooling type, and home type as inputs on the rebate application forms. Lastly, the Evaluators would suggest Avista enforce required document submission for all rebates, such as the AHRI documentation and/or full model number in order to verify measure efficiency.
- The **Appliances Program** displayed a 63.22% realization rate with verified savings of 94,924 kWh. 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 63.22% realization rate due to a variety of reasons. The Evaluators found that although most refrigerator/freezer models met ENERGY STAR requirements, the expected savings values applied to each refrigerator/freezer was the ESME-rated UES defined by the RTF, which is significantly higher than ENERGY STAR-qualified products. This led to a low realization rate for these measure categories. Additionally, the Avista TRM currently assigns smart thermostats rebated through the program the highest available option defined by the RTF workbook. However, this efficiency option does not align with project-level documents. The Evaluators also found that eight smart thermostat projects did not qualify based on RTF UES requirements due to lack of occupancy sensors. The Evaluators recommend Avista update the smart thermostat and refrigerator/freezer expected savings to align with observed efficiency products rebated through the program rather than the highest efficiency option or highest savings value option defined by the RTF.

- The **Midstream Program** displayed a 126.71% realization rate in PY2024 with 1,891,167 kWh in verified savings. This is a large improvement compared to the PY2023 impact evaluation result for this program. The Evaluators reviewed the 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 Evaluators concluded that the implementers correctly estimated expected savings values for a portion of the projects, and incorrectly defined above market practice efficiency baseline for a portion of projects, leading to a realization rate larger than 100%. The Evaluators recommend incorporating appropriate baselines for each project, reflecting the RTF market practice baseline present in the year in which the project was installed.
- The **Home Energy Audit Program** displayed verified savings of 9,418 kWh. In PY2024, the Evaluators successfully identified Home Energy Audit Program participant impacts through a billing analysis. The billing analysis incorporated the census of participants in Washington and Idaho. The Evaluators then extrapolated household-level savings to the weighted number of full-year participants in PY2024, after removing double counted savings from other Avista program participation. These impacts summarize the educational and behavioral impacts offered through the program audits and expert contractor communications. The Evaluators estimated a total of 165 kWh impacts for each home that received a home energy audit through the 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 Program displayed an expected savings value of 64,877.67 kWh. The Evaluators do not define a realization rate for this portfolio, as the Low-Income Program was not evaluated in PY2024.
- The Evaluators did not complete an impact evaluation for the **Low-Income Program**. Instead, impact evaluation is planned for the PY2025 evaluation cycle.

1.2.1.3 Nonresidential Programs

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

- The verified savings for the Non-Residential portfolio are 27,694,878 kWh with a realization rate of 96.2%.
- The verified savings for the **Prescriptive Lighting Program** are 6,888,639 kWh with a realization rate of 98.9%. The Evaluators used the RTF Midstream Lighting workbooks and assigned ISRs according to the rates shown above in Table 5-10, resulting in slightly lower verified savings than expected.
- The verified savings for the **Small Business Lighting Program** are 15,161,166 kWh with a realization rate of 93.70%. For measures without occupancy sensors, realization is ±1% of expectations, with any differences likely due to rounding. For measures with occupancy sensors, the Evaluators found that expected savings were calculated by applying the occupancy

sensor reduction factor to 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.

- The verified savings for the **Prescriptive HVAC Program** are 115,111 kWh with a realization rate of 140.8%. Appropriate RTF UES were assigned to each measure based on horsepower controlled and type of HVAC equipment.
- The verified savings for the **Grocer Program** are 37,199 kWh with a realization rate of 100.00%.
- The verified savings for the **Shell Program** are 16,263 kWh with a realization rate of 100.0%.
- The **Green Motors Rewind Program** had no PY2024 participation.
- The **Midstream Program** verified savings are 172,150 kWh with a realization rate of 95.9%.
    - **Fryers:** The source of expected savings is unclear. Verified savings were sourced from the RTF and reflect electric savings for a 'standard vat-sized fryer.
    - **Mini/Multi Splits:** The Evaluators were unable to fully recreate expected savings, though for 45 new construction projects, a 7.1 was used as a baseline HSPF. While 7.1 is a weighted average representing existing heating equipment types (ER and gas) for retrofit projects where the true baseline is unknown. For new construction projects, the baseline is the current building/energy code, 7.5. This alone does not fully describe all the differences between expected and verified savings but is a systematic contributor to the deviation.
    - **Split and Packaged Heat Pumps:** The Evaluators were unable to determine how expected savings were calculated. Using identical methodology to program planning materials, the Evaluators calculated 'expected' savings which would yield near 100% realization rates, but claimed savings estimates did not correspond with any known method for determining savings. Simply put, claimed savings were roughly half the results of using other methods.
- The **Site-Specific Program** in total displays a realization rate of 97.2% with 5,185,350 kWh verified electric energy savings in the Idaho service territory.
    - **SSOP_140807 –** Verified savings were measured with a whole-facility billing analysis. Measured savings were lower than ex-ante savings. Discrepancies in savings could not be traced because the implementer did not provide the calculations used to develop initial savings estimates. Low RRs suggest either that occupant behavior has changed since project implementation or that the initial analysis did not adequately capture the relationship (or lack thereof) between energy usage and exterior temperature.
    - **SSOP_140225 –** A whole-facility billing analysis was completed and produced statistically significant savings, however the estimates greatly exceeded expectations (693.9% of expectations), or indeed what can reasonably be expected in savings from

the refrigeration measures installed. This indicates the significant other changes, such as additional equipment or changes in occupancy took place conflating results. The evaluators examined projects documents and calculated prescriptive savings estimates based on available data. While documentation did not provide the level of detail to fully replicate expected savings, verification estimates were similar to and corroborated claimed savings, thus the results of this project are considered to be 100% realization.

- **SSLP_128331 –** An error in project record keeping assigned savings attributable only to lighting HVAC savings (as a result of the reduced load on the HVAC system). These misplaced savings artificially inflated savings expectations. While no other corrections or changes were made, this lowered the verified savings to 59.7%.
- **SSLP_111655 –** Expected savings for seven interior lighting line items could not be exactly recreated, ranging between 98.5% and 104.4% of savings expectations. Using verified input data, the Evaluators calculated savings to be 102.6% of expectations.
- **SSOP_107281 –** The discrepancy in savings are likely a result of minor differences in billing analysis specification (the Evaluators used linear regression, Implementer used alternative method), and/or inputs: Historical weather data source (ADM used NOAA, Implementer used alternative source), and normalization (ADM normalized usage to TMYx data, Implementer did not perform any usage normalization). Verified savings are 108.9% of expectations.
- **SSOP_82450 –** The discrepancy in motor replacement savings is likely due to the inclusion of low-RPM data points from the raw SCADA data in the binning process. The discrepancy in cooling blower savings is likely due to rounding. Combined, these produce 96.8% of expected savings.

1.2.2 Recommendations

The following section details the Evaluator's recommendations resulting from the program evaluations of 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 found a handful of instances in which the rebated equipment did not meet the program minimum requirements for efficiency or did not meet the measure specifications defined by the RTF to achieve expected savings claimed by Avista. The Evaluators recommend Avista check the source AHRI documentation and product level documentation to verify efficiency prior to incentivizing installation of the measure and assigning expected savings.
- In the **Shell Program**, the Evaluators recommend Avista assign window savings by square foot of window rather than quantity of windows. Additionally, the Evaluators recommend Avista incorporates expected heating type for window UES values in order to align with RTF projected UES 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, and U-value savings into Avista's TRM. In addition, the Evaluators identified many discrepancies in the documentation provided in terms of square footage and unit quantity verification which caused savings to deviate from 100%. The Evaluators recommend updating the document data aggregation to ensure consistent values between the tracking database and the provided rebate forms (primary heating type, heating and cooling zones).

- In the **Fuel Efficiency Program**, the Evaluators recommend updating the Avista tracking database to capture previous heating types for conversion measures and requiring home previous heating type, existing cooling type, and home type as inputs on the rebate application forms. Furthermore, Avista should review the AHRI AFUE reported values to make sure the equipment qualifies for savings, and lastly enforce required document submission for all rebates, such as the AHRI documentation or full model number are reported for all measures.
- In the **ENERGY STAR Homes Program**, the Evaluators found that realization rates differed from 100% due to the application of heating zone and cooling zone via the RTF, which the Avista TRM lacks. The Evaluators recommend updating the Avista TRM to match the primary heating type for dual fuel households and heating/cooling zones reflected in the RTF workbooks.
- In the **Appliances Program**, one sampled smart thermostat rebate included equipment that did not meet RTF measure specifications to receive verified savings through the RTF workbooks, which the Avista TRM savings values are drawn from. The Evaluators recommend providing a qualified product list for customers to ensure purchased smart thermostats meet program requirements. In addition, the Evaluators recommend Avista review program documentation to verify qualifications after rebates are submitted.
- For the **Midstream Program**, the Evaluators concluded that the implementers correctly estimated expected savings values for a portion of the projects and incorrectly defined above market practice efficiency baseline for a portion of projects, leading to a realization rate larger than 100%. The Evaluators recommend incorporating appropriate baselines for each project, reflecting the RTF market practice baseline present in the project installation year.

1.2.2.2 Low-Income Programs

The Evaluators do not offer any recommendations for Avista's PY2024 Low-Income electric program.

1.2.2.3 Nonresidential Programs

The Evaluators offer the following recommendations for 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, as well as incorporating in-service rates specific to lamp type.
- For the **Small Business Lighting Program**, expected savings for occupancy sensors should be calculated using a different algorithm to avoid the slight double counting of savings.
- Within the **Shell Program**, both facility heating and cooling equipment information should be included in tracking data. Instances of gas-heated buildings with electric AC should be noted.

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]:

- 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:

- **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

[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.

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. This section is organized by general task due to the methodological overlap across programs.

The Evaluators outline the approach to verifying, measuring, and reporting the portfolio impacts 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 was conducted during this impact evaluation for site-specific projects.

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 2024 and 2025 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.

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 measures with sufficient PY2024 participation data to identify savings effects. 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). The following subsection outlines the specific regression equations used as a part of these billing analyses.

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-checked 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. 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.

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.

- Shell Program (res)
- Fuel Efficiency Program
- ENERGY STAR® Homes Program
- Appliances Program
- Midstream Program (res)

[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

- Prescriptive Lighting Program
- Small Business Lighting Program
- HVAC Program (non-res)
- Grocer
- Shell Program (non-res)
- Midstream Program (non-res)
- Site-Specific

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, Section 4.1, and Section 5.3.

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	Shell	199	51	90% ± 9.96%
Residential	Fuel Efficiency	15	14	90% ± 5.88%
Residential	ENERGY STAR® Homes	26	20	90% ± 9.01%
Residential	Appliances	606	77	90% ± 8.76%
Residential	Midstream	402	402	90% ± 0.00%
Low-Income	Low-Income	8	NA	NA
Nonresidential	Prescriptive Lighting	417	324	90% ± 9.94%
Nonresidential	Small Business Lighting	618	410	90% ± 10.85%
Nonresidential	HVAC	2	2	90% ± 0.00%
Nonresidential	Grocer	15	15	90% ± 0.00%
Nonresidential	Shell	7	7	90% ± 0.00%
Nonresidential	Midstream	86	86	90% ± 0.00%
Nonresidential	Site-Specific	18	11	90% ± 8.14%

*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 in PY2023. Due to change in process evaluation cadence, the Evaluators utilized the response results from PY2023 in the PY2024 impact evaluation efforts. A process evaluation, including surveys, will be completed in PY2025 for all 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.

for the Residential Fuel Efficiency, Residential Appliance, and Nonresidential Lighting Programs for the Idaho Electric Avista projects. The Evaluators developed a sampling plan that achieved a sampling precision of ±6.81% at 90% statistical confidence for residential ISRs estimates at the measure-level during web-based survey verification. The Evaluators developed a sampling plan that achieved a sampling precision of ±36.59% at 90% statistical confidence for non-residential 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	Fuel Efficiency*	28	5	90% ± 33.95%
Residential	Appliances	556	112	90% ± 6.95%
Non-Residential	Prescriptive Lighting	379	5	90% ± 36.59%
Total		**1,299**	**176**	**90% ±6.96 %**

*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 characteristics and collected any data needed to conduct savings calculations. In Idaho, a total of four 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 recommended 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 applied 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 2024 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

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

4. National Oceanic and Atmospheric Administration (NOAA) weather data between January 1, 2023 and December 31, 2024)
5. Typical Meteorological Year (TMY3) data

Billing and weather data were obtained for program year 2024 and for one year prior to measure install dates (2023).

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 02/19/2024 start date, overlapping bill 2 had a 02/25/2024 start date, and the previous bill had a 02/19/2024 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, 2024 through June 30, 2024) 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 (normally <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, if sufficient non-participant data is not available to develop a valid control group, gross savings can also be calculated via a treatment-only regression. 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. If billing data for statistically comparable control customers (i.e., non-participant Avista customers with comparable usage to treatment customers) is not available, such gross savings analyses can provide reliable savings estimates. While treatment-only models may not separate out the effects of national or regional events like a pandemic or recession, they still provide meaningful estimates of changes in energy usage associated with measure installation. Given that the COVID-19 pandemic is unlikely to dramatically affect customer energy usage as of PY2024, treatment-only models can provide valid estimates of the savings associated with many energy efficiency measures.

2.2.3.3 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).

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 PY2024. 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
Shell	189,0092.17	214,109.62	113.23%
Fuel Efficiency	105,612.00	103,207.00	97.72%
ENERGY STAR Homes	85,018.00	77,951.08	91.69%
Appliances	150,143.00	94,924.43	63.22%
Midstream	1,492,479.09	1,891,167.23	126.71%
Home Energy Audit	NA	9,418.03	NA
Total Res	**2,022,344.26**	**2,390,777.39**	**118.22%**

In PY2024, Avista completed and provided incentives for residential electric measures in Idaho and reported total electric energy savings of 2,022,344.26 kWh. All programs met savings goals based on reported savings, leading to an overall achievement of 2,390,777.39 kWh leading to a realization rate of 118.22% for the residential programs. Excluding the Home Energy Audit program, which did not have an expected savings estimate, Avista's Idaho PY2024 residential electric measures yielded savings of 2,381,359.36 for a 117.75% realization rate. 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. The Evaluators did not complete surveying efforts in the PY2024 evaluation and therefore referenced simple verification responses from the PY2023 impact evaluation.

Customers with a valid email were sent the survey via an email invitation. The Evaluators surveyed customers that received rebates for Water Heat, HVAC, Small Home & MF Weatherization, Appliance, and Midstream Programs in PY2023. For the purposes of this report, the results for the Fuel Efficiency and Appliance Programs are summarized.

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 Fuel Efficiency 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 ±6.81% 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	Fuel Efficiency*	28	5	90% ± 33.95%
Residential	Appliances	556	112	90% ± 6.95%
Total		**920**	**171**	**90% ±6.81%**

*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	Fuel Efficiency	28	5	90% ± 33.95%
Residential	Appliances	1,688	298	90% ± 4.32%
Total		**2,767**	**446**	90% ± **4.29%**

*These programs did not achieve 90/10 precision. However, responses indicated 100% ISRs

As previously stated, the Evaluators contacted all customers in the Fuel Efficiency Program, and Appliances 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 the tables below.

Table 3-5: 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 3-6: 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: 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 Shell Program

The Shell Program provides incentives to customers for improving the integrity of their home envelope with upgrades to insulation, windows, and doors. Participating homes must have electric or natural gas heating and itemized invoices including measure details such as insulation U-factors, window U-values, or 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 3-7 summarizes the measures offered under this program.

Table 3-7: Shell Program Measures

Measure	Description	Impact Analysis Methodology
E Attic Insulation With Electric Heat	Attic insulation for homes heated with electricity	RTF UES
E Energy Star Certified Insulated Door	Replace door with ENERGY STAR rated door in homes heated with electricity	RTF UES
E Floor Insulation With Electric Heat	Floor insulation for homes heated with electricity	RTF UES
E Sliding Glass Doors with Electric Heat	High efficiency sliding glass door replacement for 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 double pane window replacement for homes heated with electricity installed by home owner	RTF UES
E Window Replc from Single Pane W Electric Heat	High-efficiency double pane window replacement for homes heated with electricity installed by contractor	RTF UES
E Multifamily Attic Insulation With Electric Heat	Attic insulation for homes heated with electricity	RTF UES
E Multifamily Energy Star Certified Insulated Door	Replace door with ENERGY STAR rated door in homes heated with electricity	RTF UES
E Multifamily Floor Insulation With Electric Heat	Floor insulation for homes heated with electricity	RTF UES
E Multifamily Sliding Glass Doors with Electric Heat	High efficiency sliding glass door replacement for homes heated with electricity	RTF UES
E Multifamily Wall Insulation With Electric Heat	Wall insulation for homes heated with electricity	RTF UES
E Multifamily Window DIY Replc With Electric Heating	High-efficiency double pane window replacement for homes heated with electricity installed by home owner	RTF UES
E Multifamily Window Replc from Single Pane W Electric Heat	High-efficiency double pane window replacement for homes heated with electricity installed by contractor	RTF UES

The following table summarizes the adjusted and verified electric energy savings for the Shell Program impact evaluation.

Table 3-8: Shell Program Verified Electric Savings

Measure	PY2024 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
E Attic Insulation With Electric Heat	16	27,955.80	27,955.80	15,084.71	53.96%
E Energy Star Certified Insulated Door	15	1,387.62	1,387.62	1,387.62	100.00%
E Floor Insulation With Electric Heat	6	3,543.15	3,543.15	3,744.67	105.69%
E Sliding Glass Doors with Electric Heat	26	10,009.90	12,512.38	7,307.27	73.00%
E Wall Insulation With Electric Heat	8	13,822.88	14,708.05	15,490.63	112.07%
E Window DIY Replc With Electric Heating	5	3,390.80	3,390.80	3,396.58	100.17%
E Window Replc from Single Pane W Electric Heat	94	95,740.50	80,310.83	61,357.77	64.09%
E Multifamily Attic Insulation With Electric Heat	1	1,836.00	3,348.00	2,194.78	119.54%
E Multifamily Energy Star Certified Insulated Door	0	0.00	0.00	0.00	0.00%
E Multifamily Floor Insulation With Electric Heat	0	0.00	0.00	0.00	0.00%
E Multifamily Sliding Glass Doors with Electric Heat	3	968.70	1,937.40	786.39	81.18%
E Multifamily Wall Insulation With Electric Heat	0	0.00	0.00	0.00	0.00%
E Multifamily Window DIY Replc With Electric Heating	0	0.00	0.00	0.00	0.00%
E Multifamily Window Replc from Single Pane W Electric Heat	25	30,436.82	28,357.44	103,359.20	339.59%
Total	**199**	**189,092.17**	**177,451.47**	**214,109.62**	**113.23%**

The Shell Program displayed verified savings of 214,109.62 kWh with a realization rate of 113.23% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-9: Shell Program Incentive Costs by Measure

Measure	Incentive Costs
E Attic Insulation With Electric Heat	$11,272.50
E Energy Star Certified Insulated Door	$1,800.00
E Floor Insulation With Electric Heat	$3,851.25
E Sliding Glass Doors with Electric Heat	$14,640.00
E Wall Insulation With Electric Heat	$7,300.82
E Window DIY Replc With Electric Heating	$2,520.00
E Window Replc from Single Pane W Electric Heat	$96,094.20
E Multifamily Attic Insulation With Electric Heat	$1,350.00
E Multifamily Energy Star Certified Insulated Door	$0.00
E Multifamily Floor Insulation With Electric Heat	$0.00
E Multifamily Sliding Glass Doors with Electric Heat	$1,440.00
E Multifamily Wall Insulation With Electric Heat	$0.00
E Multifamily Window DIY Replc With Electric Heating	$0.00
E Multifamily Window Replc from Single Pane W Electric Heat	$21,319.84
Total	**$161,588.61**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Shell Program in the section below.

3.2.1.1 Database Review & Verification

This section describes the Evaluator's database review and document verification findings for the Shell Program.

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 one instance of the window replacement measures in which window quantity in the rebate application did not align with the values presented in the tracking data. The Evaluators also had insufficient documentation to verify seven window replacement square footage values. This contributed to deviations from a 100% realization rate.

The Evaluators found no duplicate rebates in the project data and therefore did not remove any rebates from verified savings.

3.2.1.2 Verification Surveys

The Evaluators did not conduct verification survey activities as of PY2024 but per biennium planning should conduct survey efforts for the Shell program in PY2025.

3.2.1.3 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.

3.2.1.4 Verified Savings

The Shell Program in total displays a realization rate of 113.23% with 214,109.62 kWh verified electric energy savings in the Idaho service territory, as displayed in Table 3-8.

The realization rate for the electric savings in the Shell Program deviates from 100% due primarily 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. The RTF differentiates envelope measure savings based on household heating/cooling zone and heating type. In contrast, the Avista TRM applies a single savings value for all customers based on an assumed distribution of customer household characteristics. This assumed distribution seemed to inflate the electric savings associated with some measures in PY2024, such as E Sliding Glass Doors with Electric Heat (73.00% RR) and E Window Replc from Single Pane W Electric Heat (64.09% RR). Introducing more granular measure categories into the Avista TRM that match those in the RTF UES workbook may help improve realization rates in the future.

The Attic Insulation measure realization rate for single-family dwellings deviated from 100% because the RTF assigns unit savings determined by heating zone and heating type. The RTF verified savings result in per unit square footage kWh impacts between 0.52 and 2.16, while the Avista TRM assigns a value of 1.86 kWh per square foot, regardless of heating type. The realization rate deviates further 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 0.6 than 1.86. The Evaluators recommend Avista update the Avista TRM savings values to vary based on key household characteristics like heating zone and heating type.

Lastly, the Evaluators found that the Avista TRM seems to calculate window savings based on the quantity of windows installed as opposed to the square footage of windows. If assumptions regarding the average square footage of installed windows are accurate this can be a valid methodology, but per-quantity calculations (as opposed to per-square foot) seemed to underestimate multifamily window savings, as evidenced by the 339.6% realization rate for the E Multifamily Window Replc from Single Pane W Electric Heat measure. The Evaluators recommend that Avista consider calculating window savings based on installed square footage and encourage customers to include that value in rebate forms to simplify future savings calculations. Calculating window savings based on a per-square foot value would also help the Avista TRM align more closely with the RTF single family weatherization UES workbook.[8]

[8] https://rtf.nwcouncil.org/measure/single-family/

3.2.2 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 3-10: 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 following table summarizes the verified electric energy savings for the Fuel Efficiency Program impact evaluation.

Table 3-11: Fuel Efficiency Program Verified Electric Savings

Measure	PY2024 Participation	Expected Savings	Adjusted Savings	Verified Savings	Verified Realization Rate
E Electric To Natural Gas Furnace	11	66,456.00	81,224.00	73,840.00	111.11%
E Electric To Natural Gas Furnace & Water Heat	4	39,156.00	39,156.00	29,367.00	75.00%
Total	**15**	**105,612.00**	**120,380.00**	**103,207.00**	**97.72%**

The Fuel Efficiency Program displayed verified savings of 103,207.00 kWh with a realization rate of 97.72% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-12: Fuel Efficiency Program Incentive Costs by Measure

Measure	Incentive Costs
E Electric To Natural Gas Furnace	$18,900.00
E Electric To Natural Gas Furnace & Water Heat	$11,400.00
Total	**$30,300.00**

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.

3.2.2.1 Database Review & Verification

This section describes the Evaluator's database review and document verification findings for the Fuel Efficiency Program.

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 the project files contained associated AHRI certifications for the installed equipment.

Two of the AHRI AFUE values reported did not meet the criteria to qualify for calculated savings. Therefore, savings were removed for these projects and led to a reduction in savings for the overall measures. The individual measures and program overall displayed 97.72% realization rate.

3.2.2.2 Verification Surveys

In PY2023, 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 in 2023 were used to calculate ISRs for the measures offered in the Appliances Program in 2023 and were subsequently used to quantify ISRs in 2024. 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 the Idaho electric territory alone, completed in PY2023. The ISRs resulted in 33.95% precision at the 90% confidence interval for the program.

Table 3-13: 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.

3.2.2.3 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.

3.2.2.4 Billing Analysis

The Evaluators did not conduct a billing analysis for the measures in the Fuel Efficiency Program, as there were insufficient participants.

3.2.2.5 Verified Savings

The Fuel Efficiency Program in total displays a realization rate of 97.72% with 103,207.00 kWh verified electric energy savings in the Idaho service territory, as displayed in Table 3-11. The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net program adjusted savings for measures. 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 two of the AHRI AFUE values reported not meeting 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 two projects caused the realization rate to drop from 100% down to 97.72%.

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, performing a review of the AHRI AFUE reported values to make sure the equipment qualifies for savings, and lastly to enforce required documents for all rebates, such as the AHRI documentation and/or full model number to verify measure efficiency.

3.2.3 ENERGY STAR® Homes Program

The ENERGY STAR® Homes Program provides rebates for manufactured homes within Avista's service territory that attain an ENERGY STAR® certification. This program incentivizes ENERGY STAR® Eco-rated homes. Table 3-14 summarizes the measures offered under this program.

Table 3-14: 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 3-15: ENERGY STAR® Homes Program Verified Electric Savings

Measure	PY2024 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
E Energy Star Home - Manufactured, Electric Only	22	72,930.00	72,930.00	77,853.75	106.75%
E Energy Star Home - Manufactured, Gas & Electric	4	12,088.00	12,088.00	97.33	0.81%
Total	**26**	**85,018.00**	**85,018.00**	**77,951.08**	**91.69%**

The ENERGY STAR® Homes Program displayed verified savings of 77,951.08 kWh with a realization rate of 91.69% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-16: ENERGY STAR® Homes Program Incentive Costs by Measure

Measure	Incentive Costs
E Energy Star Home - Manufactured, Electric Only	$22,000.00
E Energy Star Home - Manufactured, Gas & Electric	$4,000.00
Total	**$26,000.00**

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.

3.2.3.1 Database Review & Verification

This section describes the Evaluator's database review and document verification findings for the ENERGY STAR® Homes Program.

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 duplicate rebates in the project data and therefore did not remove any rebates from verified savings. The Evaluators found all Energy Star Home Program rebates to have project documentation with the associated NEEM Certification.

The Evaluators found all three "Gas & Electric" manufactured homes have gas space and water heating. While the homes certainly seem to have electric components (e.g., an ES qualified dishwasher), gas is the primary fuel suggesting "Gas Only" might be the more appropriate assignment.

3.2.3.2 Verification Surveys

The Evaluators did not conduct verification surveys for the ENERGY STAR® Homes Program.

3.2.3.3 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.

3.2.3.4 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 91.69% with 77,951.08 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 ENERGY STAR® Homes Program deviate from 100% due to the categorical differences between the applied Avista TRM prescriptive savings value and the more detailed RTF UES categories.

The realization for the E ENERGY STAR® Home – Manufactured, Electric Only measure is lower than 100% because the expected savings that were claimed do not take heating zones and cooling zones into account; the RTF measure-level savings take weather zones into account. The Evaluators assigned electric savings from the RTF associated with the appropriate heating and cooling zones rather than defaulting to an average value across both zones. The Evaluators recommend updating Avista measure savings to reflect heating zone-specific RTF measure savings rather than averaging savings from heating zones together.

The realization for the E ENERGY STAR® Home – Manufactured, Gas & Electric measure is low because the expected savings employed an additive methodology between a gas-heated home and an electric-heated home for the electric savings. However, the Evaluators reviewed the RTF and determined manufactured home electric savings for a fully natural gas heated home would be closer to the savings for a gas heated home with electricity. The Evaluators verified that all dual fuel homes were heated primarily with natural gas. Therefore, the Evaluators assigned electric savings from the RTF associated with a fully natural gas-heated home using the appropriate heating zone, which yielded a 1% electric realization rate for this measure (and a 158% realization rate for gas savings).

3.2.4 Appliances Program

The Appliances Program is a residential prescriptive program that offers incentives for customers to upgrade their existing clothes washers and dryers to ENERGY STAR-rated clothes dryers and washers. In addition, customers can receive a rebate for purchasing efficient refrigerators, freezers, and smart thermostats. These measures can either be installed in single-family residences or in multifamily homes, a distinction which is highlighted below in Table 3-18.

This section summarizes the impact results of the evaluation results for the Appliances Program. Table 3-17 summarizes the measures offered under this program.

Table 3-17: 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
E Smart Thermostat DIY with Electric Heat	ENERGY STAR-certified Smart Thermostat with DIY install for residential homes	RTF UES
E Smart Thermostat Paid Install with Electric Heat	ENERGY STAR-certified Smart Thermostat with Paid Install for residential homes	RTF UES
E Line Voltage Smart Thermostat Electric Baseboard	Connected thermostat for multifamily homes with electric heat and Electric Baseboard	RTF UES

The following table summarizes the verified electric energy savings for the Appliances Program impact evaluation.

Table 3-18: Appliances Program Verified Electric Savings

Measure	PY2024 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Energy Star Certified Refrigerator and Refrigerator-Freeze	239	29,512.00	29,512.00	2,759.99	9.35%
E Energy Star Certified Upright Freezer	23	1,206.00	1,206.00	613.79	50.89%
E Energy Star Rated Clothes Dryer	134	38,383.00	38,383.00	38,339.01	99.89%
E Energy Star Rated Front Load Washer	86	9,840.00	9,840.00	9,839.09	99.99%
E Energy Star Rated Top Load Washer	16	416.00	0.00	0.00	0.00%
E Smart Thermostat DIY with Electric Heat	24	19,474.00	13,910.00	10,244.33	52.61%
E Smart Thermostat Paid Install with Electric Heat	53	41,944.00	41,944.00	30,557.50	72.85%
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	13	1,612.00	1,612.00	91.75	5.69%
E Multifamily Energy Star Certified Upright Freezer	0	0.00	0.00	0.00	NA
E Multifamily Energy Star Rated Clothes Dryer	2	580.00	580.00	561.20	96.76%
E Multifamily Energy Star Rated Front Load Washer	5	600.00	600.00	599.94	99.99%
E Multifamily Energy Star Rated Top Load Washer	0	0.00	0.00	0.00	NA
E Multifamily Smart Thermostat DIY with Electric Heat	3	1,950.00	1,950.00	1,246.53	63.92%
E Multifamily Smart Thermostat Paid Install with Electric Heat	7	4,550.00	0.00	0.00	0%
E Multifamily Line Voltage Thermostat Electric Baseboard	1	76.00	76.00	71.30	93.82%
Total	**606**	**150,143.00**	**139,613.00**	**94,924.43**	**63.22%**

The Appliances Program displayed verified savings of 94,924.44 kWh with a realization rate of 63.22% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-19: Appliances Program Incentive Costs by Measure

Measure	Incentive Costs
E Energy Star Certified Refrigerator and Refrigerator-Freeze	$23,800.00
E Energy Star Certified Upright Freezer	$900.00
E Energy Star Rated Clothes Dryer	$6,550.00
E Energy Star Rated Front Load Washer	$4,100.00
E Energy Star Rated Top Load Washer	$800.00
E Smart Thermostat DIY with Electric Heat	$3,137.94
E Smart Thermostat Paid Install with Electric Heat	$8,356.68
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	$1,300.00
E Multifamily Energy Star Certified Upright Freezer	$0.00
E Multifamily Energy Star Rated Clothes Dryer	$100.00
E Multifamily Energy Star Rated Front Load Washer	$250.00
E Multifamily Energy Star Rated Top Load Washer	$0.00
E Multifamily Smart Thermostat DIY with Electric Heat	$361.03
E Multifamily Smart Thermostat Paid Install with Electric Heat	$1,050.00
E Multifamily Line Voltage Thermostat Electric Baseboard	$20.00
Total	$50,725.65

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for Appliances Program in the section below.

3.2.4.1 Database Review & Verification

This section describes the Evaluator's database review and document verification findings for the Appliances Program.

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 Section 2.2.2.3.

The rebate application form sufficiently collects all required RTF measure specification details. 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 found that only three of the sampled refrigerator/freezer measures were ESME-rated. Although most models met ENERGY STAR Requirements, the expected savings values applied to each refrigerator/freezer was the ESME-rated UES defined by the RTF, which is significantly higher than ENERGY STAR-qualified products. This led to a low realization rate for these measure categories.

The Evaluators verified each model specification with values provided by ENERGY STAR qualified product lists. The Evaluators found that two smart thermostat measures did not qualify based on Energy Star requirements.

The Evaluators found no duplicate rebates in the project data and therefore did not remove any rebates from verified savings.

3.2.4.2 Verification Surveys

In PY2023, 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 in 2023 were used to calculate ISRs for the measures offered in the Appliances Program in 2023 and were subsequently used to quantify ISRs in 2024. The responses to these additional questions can be found in Appendix B.

Table 3-20 displays the ISRs for each of the Appliances Program measures for Idaho electric territory alone, completed in PY2023. The ISRs resulted in ±6.95% precision at the 90% confidence interval for the program.

Table 3-20: 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%

The Evaluators applied the ISRs listed in Table 3-20 to each rebate to quantify verified savings for each measure.

3.2.4.3 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.

3.2.4.4 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 63.22% realization with 94,924.43 kWh saved, as displayed in Table 3-18.

The program verified savings resulted in a realization rate of less than 100% largely due to low savings attributed to E Energy Star Certified Refrigerator and Refrigerator-Freeze and E Energy Star Certified Upright Freezer projects. All fridge-freezer projects were verified to be ENERGY STAR-qualified, but not ENERGY STAR Most Efficient (ESME). The low realization rate for the fridge-freezer measure is due to the difference in RTF savings value between ENERGY STAR fridge-freezers (about 45kWh/year) and ESME fridge-freezers (about 124 kWh). Avista TRM references the Standard Size Refrigerator and Refrigerator-

Freezer - Side-mounted Freezer - ESME at 124 kWh/year savings, but the Evaluators found that no rebated fridges met this requirement, and therefore lower RTF savings were applied.

Similarly, for the upright freezer measure, all projects were verified to be ENERGY STAR-qualified, but not ESME-qualified. The low realization rate is due to the difference in Avista TRM and RTF savings values. The RTF assigns ENERGY STAR freezers 18 kWh/unit, while ESME freezers are assigned 67 kWh/unit. The Avista TRM references the Standard Size Freezer - Upright – ESME savings at 67 kWh/year savings. However, because the Evaluators found that no freezers met the ESME qualifications, the lower ENERGY STAR savings values were applied to each project.

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 are negative and therefore there are no proven RTF savings for this measure.

Lastly, one sampled thermostat model was found to not qualify based on RTF Connected Thermostat minimum requirements. The Evaluators assigned 0 kWh savings for this project, therefore providing a downward adjustment on verified savings. The expected savings for a Smart Thermostat measure was defined as 749 kWh in the Avista TRM, which is in line with the RTF savings for a Smart Thermostat using an electric Air Source Heat Pump with direct install and resistance optimization in heating zone 2; however, the expected savings were also applied to projects verified to have electric forced-air furnace, which the RTF UES assigns lower savings (195.36 kWh per Smart Thermostat). Therefore, a portion of the smart thermostat verified savings were lower than the expected savings claimed for the measure.

3.2.5 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 (retrofit & new construction)
- Residential split unitary equipment (retrofit & new construction)
- Residential mini split systems (retrofit & new construction)

The nonresidential midstream measures and impact evaluation results are presented in Section 5.3.7. 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 PY2024. Table 3-21 summarizes the measures offered under this program.

Table 3-21: Midstream Program Measures

Measure	Description	Impact Analysis Methodology
E Heat Pump Water Heater (New Construction)	High efficiency heat pump water heater installation (new construction)	Engineering Algorithm with RTF Current Practice Baseline Adjustments
E Heat Pump Water Heater (Retrofit)	High efficiency heat pump water heater installation (retrofit)	
E Mini Split (New Construction)	Conversion to Mini Split system installation (new construction)	
E Mini Split (Retrofit)	Conversion to Mini Split system installation (retrofit)	
E Split Unitary Equipment (New Construction)	Conversion to Air Source Heat Pump installation (new construction)	
E Split Unitary Equipment (Retrofit)	Conversion to Air Source Heat Pump installation (retrofit)	

The following table summarizes the estimated electric energy savings for the Midstream Program impact evaluation.

Table 3-22: Midstream Program Verified Electric Savings

Measure	PY2024 Units	Expected Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Heat Pump Water Heater (New Construction)	2	3,151	3,151	100.00%
E Heat Pump Water Heater (Retrofit)	2	3,212	3,212	100.00%
E Mini Split (New Construction)	198	169,405	299,589	176.85%
E Mini Split (Retrofit)	273	578,130	698,453	120.81%
E Split Unitary (New Construction)	20	36,499	36,600	100.28%
E Split Unitary (Retrofit)	402	702,083	850,163	121.09%
Total	**897**	**1,492,479**	**1,891,167**	**126.71%**

The Midstream Program displayed estimated savings of 1,891,167 kWh with a realization rate of 126.71%. The following table summarizes the incentive costs associated with the program.

Table 3-23: Midstream Program Costs by Measure

Measure	Incentive Costs
E Heat Pump Water Heater (New Construction)	$400.00
E Heat Pump Water Heater (Retrofit)	$1,300.00
E Mini Split (New Construction)	$65,850.00
E Mini Split (Retrofit)	$158,250.00
E Split Unitary (New Construction)	$10,100.00
E Split Unitary (Retrofit)	$164,100.00
Total	$400,000.00

The Evaluators describe the impact evaluation tasks completed for this program in the subsections below.

3.2.5.1 Database Review & Verification

This section describes the Evaluator's database review and document verification findings for the Midstream Program.

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 documents contained 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.

3.2.5.2 Verification Surveys

The Evaluators did not conduct verification surveys for the Midstream Program in PY2024 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.

3.2.5.3 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 note that the expected savings workbook values from the implementer vary slightly from 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.

3.2.5.4 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.

3.2.5.5 Verified Savings

The Evaluators reviewed the 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 126.71% realization with 1,891,167 kWh saved, as displayed in Table 3-22.

The Evaluators concluded that the implementers correctly estimated expected savings values for a portion of the projects and incorrectly defined above market practice efficiency baseline for a portion of projects. The Evaluators recommend incorporating appropriate baselines for each project, reflecting the RTF market practice baseline present in the year in which the project was installed.

3.2.6 On Bill Repayment Program

The On-Bill Repayment/Financing Program provides on-bill repayment/financing programs for residential and small business customers. Avista's on-bill repayment (OBR)/financing program returned as an offering after a half decade hiatus. In 2023 Avista started offering customers access to OBR through its partner the Puget Sound Cooperative Credit Union (PSCCU). OBR, through PSCCU, offers lower rate loans for energy-efficient projects to homeowners and business owners 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 that can therefore be served directly through the partnering community action agencies.

Avista does not claim energy savings for OBR, as the savings associated with any measure installed using OBR financial support is claimed through the relevant and native Avista program. However, Avista intends to claim additional educational and behavioral impacts through the OBR Program.

During the PY2024 impact evaluation, the Evaluators did not conduct an impact evaluation for the On Bill Repayment Program. The Evaluators intend to conduct an impact evaluation of this program in PY2025, as it is a "low risk" program. However, the Evaluators summarize the estimated electric energy savings and costs through the program in the tables below. There were no OBR participants in the Idaho Electric service territory in PY2024.

Table 3-24: On Bill Repayment Program Claimed Electric Savings

Measure	PY2024 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
On Bill Repayment	0	NA	NA	NA	NA
Total	**0**	**NA**	**NA**	**NA**	**NA**

Avista does not quantify expected savings for the OBR Program. The following table summarizes the incentive costs associated with the program.

Table 3-25: On Bill Repayment Program Claimed Costs by Measure

Measure	Incentive Costs
On Bill Repayment	$0.00
Total	**$0.00**

3.2.7 Home Energy Audit Program

The Residential Home Energy Audit Program is designed to educate and generate interest in efficiency in general and, more specifically, in Avista's portfolio of residential energy efficiency and renewable-energy programs. The Evaluators completed a billing analysis of the census of participants to identify the educational impact of the program on customers' energy usage behaviors while removing savings claimed and verified from other program participation. The following table summarizes the verified electric energy savings for the Home Energy Audit Program impact evaluation.

Table 3-26: Home Energy Audit Program Verified Electric Savings

Measure	PY2024 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Home Energy Audit	120	NA	NA	9,418.03	NA
Total	**120**	**NA**	**NA**	**9,418.03**	**NA**

The Home Energy Audit Program displayed verified savings of 9,418.03 kWh. Avista did not estimate claimed savings for this program, and therefore the realization rate is not applicable to the program. The following table summarizes the incentive costs associated with the program.

Table 3-27: Home Energy Audit Program Costs by Measure

Measure	Incentive Costs
Home Energy Audit	$0.00
Total	**$0.00**

The Evaluators summarize the program-specific impact analysis activities, results, conclusions, and recommendations for the Home Energy Audit Program in the section below.

3.2.7.1 Database Review & Verification

This section describes the Evaluator's database review and document verification findings for the Home Energy Audit Program.

Before conducting the billing analysis, the Evaluators conducted a database review for the Home Energy Audit Program. The Evaluators reviewed the list of participants of the Home Energy Audit Program in PY2024. The Evaluators identified participating customers with electric service in the Idaho service territory. The Evaluators found no duplicate participants in the project data and found that program data appropriately reflected customer rate information.

3.2.7.2 Verification Surveys

The Evaluators did not conduct verification surveys for the Home Energy Audit Program in PY2024.

3.2.7.3 Impact Analysis

This section summarizes the verified savings results for the Home Energy Audit Program. ADM conducted the following impact evaluation methodologies to estimate verified net energy savings in the Residential Home Energy Audit Program:

- Billing Analysis with counterfactual group (IPMVP Option C)

This program provides direct install measures to customers. The Avista auditor may provide recommendations for improvements that may be rebated through Avista's programs. In addition, the Avista auditor may also provide recommendations for home improvements that Avista does not currently incent for. Therefore, in order to capture this combination of effects, ADM conducted a billing analysis with a counterfactual group selected via propensity score matching. The methodology used to select the quasi-experimental counterfactual group and the methodology for linear regression billing analysis are summarized in further detail in Section 2.2.3.2: Billing Analysis.

The measures rebated by the customer through other Avista channels were removed from the average household billing analysis results, in order to remove double counted effects.

Due to the participation rate, the Evaluators included Washington Electric, Washington Gas, Idaho Electric, and Idaho gas participants in the census billing analysis, which reflect statistically significant electric impacts for the program. The Evaluators then removed double counted savings by removing verified downstream rebate impacts from the billing analysis regression results. These resulting energy savings values per household were applied to the census of participants, weighted to reflect the number of customers with full year program participation.

3.2.7.4 Verified Savings

The Evaluators conducted a census billing analysis to estimate the impacts of the education efforts of the Home Energy Audit Program. The table below provides annual savings per customer for the Home Energy Audit Program after removing double counted savings from other downstream programs. Total double counted program savings were estimated to be 1,200.73 kWh, or approximately 11% of observed savings through billing analysis. After removing double counted savings from program impacts reflected in the regression model, the total program savings were verified to be 9,418.03 kWh, or 165.23 kWh per customer per year, or 1.6% of annual electric household consumption.

Table 3-28: Double Counted Savings Removed, Home Energy Audit Program

Treatment Customers	Weighted Treatment Customers	Annual Savings per Customer, Regression Estimate (kWh)	Program Impacts Regression Model (kWh)	Program Double Counted Savings (kWh)	Program Verified Savings (kWh)
120	57	165.23	10,618.77	1,200.73	9,418.03

The Evaluators provide additional detail of the billing analysis completed for this program in Appendix A.

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 Low-Income Program was not evaluated in PY2024, but will be in PY2025. For the purposes of this report, the expected savings claimed by Avista are summarized in this section.

Table 4-1: Low-Income Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Low-Income	64,877.67	NA	NA
Total Low-Income	**64,877.67**	**NA**	**NA**

In PY2024, Avista completed and provided incentives for low-income electric measures in Idaho and achieved total electric energy savings of 64,877.67 kWh.

4.1 Program-Level Impact Evaluation Results

The Evaluators summarize the program-specific ex-ante expected savings as well as incentive costs in the following section.

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
E Air Infiltration	Avista TRM
E Air Source Heat Pump	
E Attic Insulation With Electric Heat	
E Conversion to Air Source Heat Pump	
E Conversion to Ductless Heat Pump	
E Deferred Maintenance Pilot	
E Door Sweep	
E Duct Insulation	
E Duct Sealing	
E Energy Star Certified Refrigerator and Refrigerator-Freeze	
E Exterior Doors	
E Floor Insulation With Electric Heat	
E Health Safety and Repair	
E Lighting	
E Window Replc from Single Pane W Electric Heat	

In PY2024, the Evaluators did not conduct an impact evaluation of the Low-Income Program, as it is considered "low risk". An impact evaluation for this program is planned for PY2025. However, the Evaluators summarize the estimated electric energy savings and costs through the program in the tables below.

Table 4-3: Low-Income Program Verified Electric Savings

Measure	PY2024 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Air Infiltration	10	6,310.00	NA	NA	NA
E Attic Insulation With Electric Heat	3	2,526.24	NA	NA	NA
E Conversion to Air Source Heat Pump	7	41,057.31	NA	NA	NA
E Conversion to Ductless Heat Pump	1	3,016.23	NA	NA	NA
E Duct Insulation	2	536.00	NA	NA	NA
E Duct Sealing	1	709.93	NA	NA	NA
E Energy Star Certified Refrigerator and Refrigerator-Freeze	1	39.00	NA	NA	NA
E Exterior Doors	7	1,619.40	NA	NA	NA
E Floor Insulation With Electric Heat	3	3,547.44	NA	NA	NA
E Health Safety and Repair	11	0.00	NA	NA	NA
E Lighting	10	62.00	NA	NA	NA
E Window Replc from Single Pane W Electric Heat	8	5,454.12	NA	NA	NA
Total	**64**	**64,877.67**	NA	NA	NA

The Low-Income Program displayed estimated savings of 64,878 kWh. 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	$20,369.25
E Attic Insulation With Electric Heat	$7,174.10
E Conversion to Air Source Heat Pump	$102,197.49
E Conversion to Ductless Heat Pump	$8,593.26
E Duct Insulation	$937.38
E Duct Sealing	$264.50
E Energy Star Certified Refrigerator and Refrigerator-Freeze	$1,999.85
E Exterior Doors	$9,726.89
E Floor Insulation With Electric Heat	$7,143.97
E Health Safety and Repair	$23,002.59
E Lighting	$279.75
E Window Replc from Single Pane W Electric Heat	$32,010.95
Total	**$213,699.98**

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 PY2024. 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)	Verified Savings (kWh)	Verified Realization Rate
Prescriptive Lighting	6,963,399	6,888,639	98.9%
Small Business Lighting	16,181,397	15,161,166	93.7%
HVAC	81,760	115,111	140.8%
Grocer	37,199	37,199	100.0%
Shell	16,263	16,263	100.0%
Green Motors	No 2024 Participation		
Midstream	179,583	172,150	95.9%
Site-Specific	5,335,550	5,185,351	97.2%
Building Operator Certification	N/A	119,000	N/A
Total	**28,795,151**	**27,694,878**	**96.2%**

In PY2024, Avista completed and provided incentives for non-residential electric measures in Idaho and achieved total electric energy savings of 27,694,878 kWh, leading to an overall achievement of 96.2% of the expected savings for the non-residential programs.

5.1 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
- Grocer Program
- Shell Program
- Midstream Program
- Site-Specific 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	417	324	90% ± 9.94%
Small Business Lighting	618	410	90% ± 10.85%
HVAC	2	2	90% ± 0.00%
Grocer	15	15	90% ± 0.00%
Shell	6	6	90% ± 0.00%
Midstream	86	86	90% ± 0.00%
Site-Specific	18	11	90% ± 8.14%

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 during PY2023. 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 Idaho 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 four 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	18	4	±8.14%[9]

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.

[9] 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

The Prescriptive Lighting 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 PY2024, the Prescriptive Lighting Program accounted for the second largest share of non-residential expected savings, or roughly 24.2% 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 results by measure including verified savings and realization rates are summarized in Table 5-6.

Table 5-6: Interior Prescriptive Lighting Program Verified Electric Savings

Measure	PY2024 Participation (Measures)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
>= 150W Incandescent to <= 30W LED Fixture	55	21,336	21,336	21,336	100.0%
>= 42W CFL to <= 20W LED Fixture	167	18,963	18,963	18,963	100.0%
1000 watt HID Fixture to 400 watt or less LED Fixture	87	299,901	299,901	299,901	100.0%
175-watt HID Fixture to 75-watt or less LED Fixture	20	25,480	25,480	25,480	100.0%
2, 3, 4-Lamp T12/T8 Fixture to LED Qualified 2x4 Fixture	1,724	419,576	419,576	419,576	100.0%
20-50 watt MR16 to MR16 LED 2-9 watt	72	6,270	5,643	5,643	90.0%
250-watt HID Fixture to 140-watt or less LED Fixture	73	60,336	60,336	60,336	100.0%
2-Lamp T12/T8 Fixture to LED Qualified 1x4 Fixture	165	31,593	31,593	31,593	100.0%
2-Lamp T12/T8 Fixture to LED Qualified 2x2 Fixture	1,191	130,997	130,997	130,997	100.0%
400 watt HID Fixture to 175 watt or less LED Fixture	392	455,377	455,377	455,377	100.0%
65W Incandescent to <= 10 watt LED Fixture	23	3,521	3,521	3,521	100.0%
75-100 watt Incandescent Can to less than 20 watt LED Fixture Retrofit	565	97,246	97,246	97,246	100.0%
Ceiling or Fixture Occupancy sensor with built-in relays	221	29,446	29,446	29,446	100.0%
DLC Qualified LLLC Fixture	3,563	209,034	209,033	209,033	100.0%
Four Pin Base CFL to 17 watt or less Plug in LED	2,177	149,166	134,250	134,250	90.0%
T12/T8 (2') Lamp to 1-Lamp less than 13 watt T8 TLED	318	8,724	8,576	8,576	98.3%
T12/T8 (3') Lamp to 1-Lamp less than 17 watt T8 TLED	17	789	775	775	98.3%
T12/T8 (4') Lamp to 1-Lamp less than 23 watt T8 TLED	35,471	1,987,949	1,954,154	1,954,154	98.3%
T12/T8 8' Fixture to 90 watt or less 8' LED fixture	515	129,654	127,450	127,450	98.3%
T12/T8 Eight-Foot to LED	1,009	107,165	105,343	105,343	98.3%
T12/T8 U-Bend to less than 23 watt T8 LED	62	3,796	3,732	3,732	98.3%
T5 Lamp to 1-Lamp less than 18 watt T5 TLED	218	13,857	13,857	13,857	100.0%
T5HO (4') 4-Lamp to 135 watt of less LED Fixture	37	12,513	12,300	12,300	98.3%

T5HO (4') 6-Lamp to 165 watt of less LED Fixture	293	123,575	121,474	121,474	98.3%
T5HO Lamp to 1-Lamp less than 29 watt T5HO TLED	5,736	868,735	853,966	853,966	98.3%
TLED (4') Lamp to TLED (4') Lamp with 5 watt or more reduction	7,675	239,460	235,389	235,389	98.3%
Wall Switch Occupancy Sensor	65	6,970	6,970	6,970	100.0%
1000 watt HID Fixture to 400 watt or less LED Fixture or Retrofit (Ext)	41	132,997	132,997	132,997	100.0%
150 watt HID Fixture to 50 watt or less LED Fixture or Retrofit (Ext)	61	40,262	40,262	40,262	100.0%
1500 watt HID Fixture to 600 watt or less LED Fixture or Retrofit (Ext)	49	240,491	240,491	240,491	100.0%
175 watt HID Fixture to 100 watt or less LED Fixture or Retrofit (Ext)	219	150,333	150,333	150,333	100.0%
200 watt HID Fixture to 140 watt or less LED Fixture or Retrofit (Ext)	2	1,030	1,030	1,030	100.0%
250 watt HID Fixture to 140 watt or less LED Fixture or Retrofit (Ext)	143	142,384	142,384	142,384	100.0%
320 and 400 watt HID Fixture to 160 or less watt LED Fixture (Ext, NC)	72	66,262	66,262	66,262	100.0%
400 watt HID Fixture to 175 watt or less LED Fixture or Retrofit (Ext)	268	365,088	365,088	365,088	100.0%
70-89 watt HID Fixture to 25 watt or less LED Fixture or Retrofit (Ext)	68	22,173	22,173	22,173	100.0%
750 watt HID Fixture to 300 watt or less LED Fixture or Retrofit (Ext)	1	3,564	3,564	3,564	100.0%
90-100 watt HID Fixture to 30 watt or less LED Fixture or Retrofit (Ext)	127	57,208	57,208	57,208	100.0%
DLC Qualified LLLC Exterior Fixture	47	14,004	14,004	14,004	100.0%
Sign Lighting	5,771	266,172	266,157	266,157	100.0%
Total	**68,780**	**6,963,399**	**6,888,639**	**6,888,639**	**98.9%**

The following table summarizes the incentive costs associated with the program.

Table 5-7: Prescriptive Lighting Program Incentives

Measure	Measure Count	Total Electric Incentives
>= 150W Incandescent to <= 30W LED Fixture	55	$4,675
>= 42W CFL to <= 20W LED Fixture	167	$3,340
1000 watt HID Fixture to 400 watt or less LED Fixture	87	$51,786
175-watt HID Fixture to 75-watt or less LED Fixture	20	$3,000
2, 3, 4-Lamp T12/T8 Fixture to LED Qualified 2x4 Fixture	1,724	$129,300
20-50 watt MR16 to MR16 LED 2-9 watt	72	$585
250-watt HID Fixture to 140-watt or less LED Fixture	73	$19,960
2-Lamp T12/T8 Fixture to LED Qualified 1x4 Fixture	165	$6,600
2-Lamp T12/T8 Fixture to LED Qualified 2x2 Fixture	1,191	$47,562
400 watt HID Fixture to 175 watt or less LED Fixture	392	$125,542
65W Incandescent to <= 10 watt LED Fixture	23	$1,265
75-100 watt Incandescent Can to less than 20 watt LED Fixture Retrofit	565	$33,530
Ceiling or Fixture Occupancy sensor with built-in relays	221	$16,575

Measure	Measure Count	Total Electric Incentives
DLC Qualified LLLC Fixture	3,563	$533,608
Four Pin Base CFL to 17 watt or less Plug in LED	2,177	$38,862
T12/T8 (2') Lamp to 1-Lamp less than 13 watt T8 TLED	318	$2,862
T12/T8 (3') Lamp to 1-Lamp less than 17 watt T8 TLED	17	$187
T12/T8 (4') Lamp to 1-Lamp less than 23 watt T8 TLED	35,471	$489,544
T12/T8 8' Fixture to 90 watt or less 8' LED fixture	515	$46,340
T12/T8 Eight-Foot to LED	1,009	$27,131
T12/T8 U-Bend to less than 23 watt T8 LED	62	$930
T5 Lamp to 1-Lamp less than 18 watt T5 TLED	218	$3,659
T5HO (4') 4-Lamp to 135 watt of less LED Fixture	37	$4,440
T5HO (4') 6-Lamp to 165 watt of less LED Fixture	293	$61,530
T5HO Lamp to 1-Lamp less than 29 watt T5HO TLED	5,736	$198,819
TLED (4') Lamp to TLED (4') Lamp with 5 watt or more reduction	7,675	$53,725
Wall Switch Occupancy Sensor	65	$1,105
1000 watt HID Fixture to 400 watt or less LED Fixture or Retrofit (Ext)	41	$35,209
150 watt HID Fixture to 50 watt or less LED Fixture or Retrofit (Ext)	61	$10,980
1500 watt HID Fixture to 600 watt or less LED Fixture or Retrofit (Ext)	49	$63,200
175 watt HID Fixture to 100 watt or less LED Fixture or Retrofit (Ext)	219	$38,616
200 watt HID Fixture to 140 watt or less LED Fixture or Retrofit (Ext)	2	$240
250 watt HID Fixture to 140 watt or less LED Fixture or Retrofit (Ext)	143	$30,298
320 and 400 watt HID Fixture to 160 or less watt LED Fixture (Ext, NC)	72	$18,000
400 watt HID Fixture to 175 watt or less LED Fixture or Retrofit (Ext)	268	$96,601
70-89 watt HID Fixture to 25 watt or less LED Fixture or Retrofit (Ext)	68	$5,570
750 watt HID Fixture to 300 watt or less LED Fixture or Retrofit (Ext)	1	$80
90-100 watt HID Fixture to 30 watt or less LED Fixture or Retrofit (Ext)	127	$13,748
DLC Qualified LLLC Exterior Fixture	47	$3,995
Sign Lighting	5,771	$74,811
Total	**68,780**	**$2,297,808**

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. Data points checked between project applications and program tracking 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
417	324	±9.94%

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

Three line items had baseline and efficient wattages reversed. No other corrections were made.

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 6,888,639 kWh with a realization rate of 98.9%, as displayed in Table 5-6. Two factors affected the overall realization rate: 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 on 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 PY2024, the Small Business Lighting Program accounted for the largest share of non-residential expected savings, or roughly 56.2% 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	PY2024 Participation (Measures)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
LED Fixture - replacing CFL Screw-in/Pin-based, 8W - 40W	15	18,468	18,456	18,456	99.9%
LED Fixture - replacing FLT12, 400W - 1000W	127	356,096	357,240	357,240	100.3%
LED Fixture - replacing FLT12, 400W - 1000W with OCC	249	1,740,530	1,527,699	1,527,699	87.8%
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W	23	138,158	139,963	139,963	101.3%
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W with OCC	57	860,249	689,509	689,509	80.2%
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W	143	473,477	476,924	476,924	100.7%
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	289	1,954,802	1,712,676	1,712,676	87.6%
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W	88	352,956	352,956	352,956	100.0%
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W with OCC	10	37,438	29,676	29,676	79.3%
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W	280	960,429	960,431	960,431	100.0%
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W with OCC	94	144,275	112,976	112,976	78.3%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W	24	26,553	26,553	26,553	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	177	529,523	529,531	529,531	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W with OCC	3	4,221	3,474	3,474	82.3%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	91	517,361	517,369	517,369	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W with OCC	14	207,850	159,318	159,318	76.7%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	41	952,379	957,214	957,214	100.5%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	4	83,763	65,827	65,827	78.6%
LED Fixture - replacing T12: 2ft - 8ft, 34W - 80W	46	183,744	183,744	183,744	100.0%

Measure	PY2024 Participation (Measures)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
LED Fixture - replacing T12: 2ft - 8ft, 34W - 80W with OCC	84	532,326	403,277	403,277	75.8%
LED Replacement Lamp - replacing CFL Screw-in/Pin-based, 8W - 40W	4	9,842	9,842	9,842	100.0%
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W	81	411,626	411,635	411,635	100.0%
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W with OCC	17	76,532	77,448	77,448	101.2%
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W	13	65,654	65,654	65,654	100.0%
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W with OCC	1	5,669	7,997	7,997	141.1%
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W	154	1,161,423	1,161,458	1,161,458	100.0%
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	11	51,499	51,132	51,132	99.3%
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 150-1500W	7	47,981	47,981	47,981	100.0%
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W	265	1,733,325	1,733,341	1,733,341	100.0%
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W with OCC	14	58,824	55,521	55,521	94.4%
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, < 100W	2	1,752	1,752	1,752	100.0%
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	7	36,608	36,608	36,608	100.0%
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	2	15,089	15,089	15,089	100.0%
LED Retrofit Kit - replacing CFL, 8W - 40W	2	375	375	375	100.0%
LED Retrofit Kit - replacing FLT12, 400W - 1000W	17	118,316	118,318	118,318	100.0%
LED Retrofit Kit - replacing FLT12, 400W - 1000W with OCC	45	329,394	286,984	286,984	87.1%
LED Retrofit Kit - replacing FLT12: 2ft to 8ft, 34W - 80W	4	78,745	78,745	78,745	100.0%
LED Retrofit Kit - replacing FLT12: 2ft to 8ft, 34W - 80W with OCC	6	113,711	86,145	86,145	75.8%
LED Retrofit Kit - replacing FLT5: 2ft to 8ft, 14W - 54W	1	403	403	403	100.0%
LED Retrofit Kit - replacing FLT5: 2ft to 8ft, 14W - 54W with OCC	9	208,666	161,584	161,584	77.4%
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W	35	263,128	269,447	269,447	102.4%

Measure	PY2024 Participation (Measures)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	62	625,342	569,031	569,031	91.0%
LED Retrofit Kit - replacing Halogen/Incandescent lamp, 20-150W	42	147,495	147,495	147,495	100.0%
LED Retrofit Kit – replacing Halogen/Incandescent lamp, 20-150W	73	496,724	496,748	496,748	100.0%
LED Retrofit Kit - replacing Halogen/Incandescent lamp, 20-150W with OCC	1	3,101	2,349	2,349	75.8%
LED Retrofit Kit – replacing Halogen/Incandescent lamp, 20-150W with OCC	2	9,703	7,398	7,398	76.2%
LED Retrofit Kit - replacing Metal Halide/High Pressure Sodium lamp, < 100W	3	14,188	14,188	14,188	100.0%
LED Retrofit Kit - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	8	21,685	21,685	21,685	100.0%
Total	**2,747**	**16,181,397**	**15,161,166**	**15,161,166**	**93.7%**

The following table summarizes the incentive costs associated with the program.

Table 5-13: Small Business Lighting Program Costs by Measure

Measure	Measure Count (Savings Units)	Total Electric Incentives
LED Fixture - replacing CFL Screw-in/Pin-based, 8W - 40W	314	$11,997
LED Fixture - replacing FLT12, 400W - 1000W	3,355	$230,142
LED Fixture - replacing FLT12, 400W - 1000W with OCC	10,355	$1,221,357
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W	1,428	$79,302
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W with OCC	5,142	$603,445
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W	6,454	$307,227
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	19,353	$1,469,500
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W	314	$222,690
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W with OCC	42	$26,015
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W	2,461	$585,360
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W with OCC	554	$106,879
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W	93	$16,812
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	697	$334,118
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W with OCC	8	$2,894
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	388	$332,745
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W with OCC	176	$143,951

LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	414	$597,568
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	23	$55,596
LED Fixture - replacing T12: 2ft - 8ft, 34W - 80W	1,448	$118,163
LED Fixture - replacing T12: 2ft - 8ft, 34W - 80W with OCC	2,800	$389,982
LED Replacement Lamp - replacing CFL Screw-in/Pin-based, 8W - 40W	128	$3,440
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W	2,714	$163,743
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W with OCC	559	$33,647
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W	782	$26,261
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W with OCC	64	$3,548
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W	11,850	$462,040
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	559	$21,757
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 150-1500W	63	$17,883
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W	4,763	$667,211
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W with OCC	309	$23,919
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, < 100W	8	$701
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	48	$14,643
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	13	$6,035
LED Retrofit Kit - replacing CFL, 8W - 40W	13	$171
LED Retrofit Kit - replacing FLT12, 400W - 1000W	1,012	$53,237
LED Retrofit Kit - replacing FLT12, 400W - 1000W with OCC	2,033	$161,790
LED Retrofit Kit - replacing FLT12: 2ft to 8ft, 34W - 80W	940	$35,435
LED Retrofit Kit - replacing FLT12: 2ft to 8ft, 34W - 80W with OCC	1,020	$66,825
LED Retrofit Kit - replacing FLT5: 2ft to 8ft, 14W - 54W	4	$181
LED Retrofit Kit - replacing FLT5: 2ft to 8ft, 14W - 54W with OCC	1,060	$103,395
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W	3,199	$118,404
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	6,708	$344,538
LED Retrofit Kit - replacing Halogen/Incandescent lamp, 20-150W	344	$68,240
LED Retrofit Kit – replacing Halogen/Incandescent lamp, 20-150W	1,337	$223,274
LED Retrofit Kit - replacing Halogen/Incandescent lamp, 20-150W with OCC	6	$900
LED Retrofit Kit – replacing Halogen/Incandescent lamp, 20-150W with OCC	35	$4,501
LED Retrofit Kit - replacing Metal Halide/High Pressure Sodium lamp, < 100W	40	$6,384
LED Retrofit Kit - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	59	$9,758
Total	**95,489**	**$9,497,604**

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 (410) 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
608	410	± 10.85%

Table 5-15: Prescriptive Lighting Program Verification Findings

Count Correction	Location Correction	Hours Correction	Wattage Correction
0	0	0	0

A total of 251 sampled projects did not include sufficient information to complete a verification of all measures: many lighting models used simple 7-digit codes as identifiers, making verification impossible. All other line items in the project were verified. Since the same lighting models appeared in many projects, verification could be extrapolated to non-sampled projects, resulting in a much higher verification percentage than the reported minimum 10.85%.

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.
- 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 are 15,161,166 kWh with a realization rate of 93.7%, 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

- Collect information for both lighting make and model. Current documentation only captures lighting model and many line items only provide a 7-digit model number, which is not sufficient to perform verification of these items.
- 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 an 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 5-16 summarizes the measures offered under this program.

Table 5-16: 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 5-17: Prescriptive HVAC VFD Program Verified Electric Savings

Measure	PY2024 Participation (Projects)	Expected Savings	Adjusted Savings	Verified Savings	Realization Rate
VFDs on Clean Air Systems	1	51,100	73,972	73,972	144.8%
VFDs on Exhaust Systems	1	30,660	41,139	41,139	134.2%
Totals	**2**	**81,760**	**115,111**	**115,111**	**140.8%**

The following table summarizes the incentive costs associated with the program.

Table 5-18: Prescriptive HVAC VFD Program Incentives

Measure	Measure Count	Total Electric Incentives
VFDs on Clean Air Systems	1	$7,023
VFDs on Exhaust Systems	1	$5,420
Total	**2**	**$12,443**

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. Verification of project documents included data points such as quantity,

motor horsepower, installation location and costs of the equipment. Table 5-19 shows the project population, the number of projects checked and the overall precision.

Table 5-19: Prescriptive HVAC VFD Program Verification Precision

Population	Sampled	Precision
2	2	±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 RTF VSD 3.0. Specific application and horsepower were taken into account when selecting verified savings estimates. RTF deemed savings estimates are larger than those assumed in Avista tracking data, resulting

5.3.3.3 Verified Savings

The Evaluators reviewed and applied the current RTF UES values to verified tracking data to estimate net program savings for this measure. The verified savings for the program is 115,111 kWh with a realization rate of 140.8%, as displayed in Table 5-17.

5.3.4 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 5-20 summarizes the measures offered under this program.

Table 5-20: 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 5-21: Grocer Program Verified Electric Savings

Measure	PY2024 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
1/20HP_ECM replacing 1/20HP_Shaded Pole	2	3,016	3,016	3,016	100.0%
20W_ECM replacing 20W_Shaded Pole	2	2,057	2,057	2,057	100.0%
Walk-In Cooler Evaporator Fan Motor - 1/15 HP Shaded Pole to 1/15 HP ECM	4	10,656	10,656	10,656	100.0%
Walk-In Freezer Evaporator Fan Motor - 1/15 HP Shaded Pole to 1/15 HP ECM	1	5,310	5,310	5,310	100.0%
Evaporator Fan ECM Motor Controller - Walk-In - Low Temp - >44 Watt - 1 or 2 motors/controller	2	608	608	608	100.0%
Evaporator Fan ECM Motor Controller - Walk-In - Medium Temp - >44 Watt - 1 or 2 motors/controller	2	1,376	1,376	1,376	100.0%
Medium Temp_ECM replacing Shaded Pole_10 to 15 W output power	5	7,126	7,126	7,126	100.0%
Low Temp_ECM replacing Shaded Pole_10 to 15 W output power	4	7,050	7,050	7,050	100.0%
Total	**22**	**37,199**	**37,199**	**37,199**	**100.0%**

The following table summarizes the incentive costs associated with the program.

Table 5-22: Grocer Program Incentives

Measure	Measure Count	Total Electric Incentives
ECMs on Evaporator Fans	4	$200
ECM Replacing Evaporator PS and PSC	54	$4,200
Totals:	**58**	**$4,400**

The Evaluators summarize the program-specific and measure-specific impact analysis activities and results for the Grocer Program in the section below.

5.3.4.1 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. Data points checked between project applications and program tracking including measure specification, quantity and measure cost values.

Table 5-23 shows the project population, the number of projects checked and the overall precision.

Table 5-23: Verification Precision

Population	Sampled	Precision
15	15	±0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Grocer Program.

5.3.4.2 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 were finalized. Final verified savings were calculated by applying the appropriate UES to a census of measures.

5.3.4.3 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 37,199 kWh with a realization rate of 100.0%, as displayed in Table 5-21.

5.3.5 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 5-24 summarizes the measures offered under this program.

Table 5-24: 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 5-25: Prescriptive Shell Program Verified Electric Savings

Measure	PY2024 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Attic =< R11 to R30-R44	1	492	492	492	100.0%
Attic =< R11 to R45+	4	8,884	8,884	8,884	100.0%
Wall =< R4 to 19+	2	6,887	6,887	6,887	100.0%
Totals	**7**	**16,263**	**16,263**	**16,263**	**100.0%**

The following table summarizes the incentive costs associated with the program.

Table 5-26: Shell Program Incentives

Measure	Measure Count (Square Feet Installed)	Total Electric Incentives
Attic =< R11 to R30-R44	529	$529
Attic =< R11 to R45+	16,196	$7,171
Wall =< R4 to 19+	1,691	$2,114
Total	**18,416**	**$9,814**

The Evaluators summarize the program-specific and measure-specific impact analysis activities and results for the Prescriptive Shell Program in the section below.

5.3.5.1 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. Data points checked between project applications and program tracking include R-levels, square footage of installation, HVAC configuration and measure cost values. Below, Table 5-27 shows the project population, the number of projects checked and the overall precision.

Table 5-27: Prescriptive Shell Program Verification Precision

Population	Sampled	Precision
7	7	±0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Prescriptive Shell Program.

5.3.5.2 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 2022 Avista TRM, in place at the time the savings goals for the program were 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 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 16,263 kWh with a realization rate of 100.0%, as displayed Table 5-25.

During the evaluation, the Evaluators noticed that building fuel types did not include indicators as to whether gas heated facilities used electric air conditioners. Both facility heating and cooling equipment information should be included in tracking data.

5.3.6 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 5-28 summarizes the measures offered under this program.

Table 5-28: Green Motors Program Measures

Measure	Impact Analysis Methodology
Motor Rewind (Industrial)	Avista TRM 2024 UES

In PY2024 there were no participation or claimed kWh savings from the Green Motors Program.

Table 5-29: Green Motors Program Electric Savings

Measure	PY2024 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Total	**0**	**0**	**0**	**0**	**N/A**

5.3.7 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.

Table 5-30 summarizes the measures rebated in PY2024 under this program.

Table 5-30: 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
	Fryer	RTF Fryers
	Griddle	RTF Griddle
	Hot Food Holding Cabinet	RTF HFHC
	Ice Machine	RTF Ice Makers
HVAC	Heat Pumps	Engineering algorithm
	Mini/Multi Split	Engineering algorithm

The following table summarizes the verified electric energy savings for the Midstream Program impact evaluation.

Table 5-31: Non-Residential Midstream Program Verified Electric Savings

Measure	PY2024 Participation (units)	Expected Savings (kWh)	Verified Savings (kWh)	Realization Rate
Combination Oven	6	35,777	41,411	115.7%
Convection Oven	3	5,984	5,982	100.0%
Dishwasher	7	40,615	43,342	106.7%
Fryer	1	3,812	872	22.9%
Griddle	1	1,823	2,455	134.7%
Hot Food Holding Cabinet	1	398	398	100.0%
Ice Machine	8	3,184	3,184	100.0%
Mini/Multi Split	70	81,009	68,870	85.0%
Heat Pumps (Split/Packaged)	8	6,981	5,636	80.7%
Total	**105**	**179,583**	**172,150**	**95.9%**

The following table summarizes the incentive and non-incentive costs associated with the program.

Table 5-32: Non-Residential Midstream Incentives

Measure	Measure Count	Incentive Costs
Combination Oven	6	$14,100
Convection Oven	4	$4,200
Dishwasher	7	$11,640
Fryer	1	$3,600
Griddle	1	$1,850
Hot Food Holding Cabinet	1	$250
Ice Machine	12	$3,675
Mini/Multi Split	74	$42,500
Heat Pumps (Split/Packaged)	8	$3,000
Totals	**114**	**$84,815**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Midstream Program in the section below.

5.3.7.1 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 5-33 shows the project population, the number of projects checked and the overall precision.

Table 5-33: Non-Residential Midstream Program Verification Precision

Population	Sampled	Precision
86	86	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.

5.3.7.2 Impact Analysis

Once verification was completed, to estimate program savings for these measures the Evaluators reviewed and applied the appropriate UES values from the Regional Technical Forum (RTF). If a measure was not covered by the RTF then a UEF from the Avista TRM was used as the source for verified savings, followed by the California eTRM (CA eTRM) as a third appropriate source. Unit energy savings sourced from the and were taken from measure package versions in place at the time of program planning.

Verified savings for food service equipment was taken from RTF and CA eTRM workbooks and is specific to the equipment configuration(s).

Savings for Mini/Multi Splits, Package/Unitary/Split HVAC Equipment and Water Source Heat Pumps was calculated using standard engineering algorithms, with equipment-specific inputs for capacity and efficiency, and EFLH values from the Midstream planning workbook. Savings calculations for storage and tankless water heaters were carried out in the same way, using actual equipment specifications and prescriptive water use estimates for each building type, based on regional use data.

5.3.7.3 Verified Savings

The verified savings for the program were 172,150 kWh with a realization rate of 95.9%, as displayed in Table 5-32.

- **Fryers:** The source of expected savings is unclear. Verified savings were sourced from the RTF and reflect electric savings for a ‘standard vat-sized fryer.
- **Mini/Multi Splits:** The Evaluators were unable to fully recreate expected savings, though for 45 new construction projects, a 7.1 was used as a baseline HSPF. While 7.1 is a weighted average representing existing heating equipment types (ER and gas) for retrofit projects where the true baseline is unknown. For new construction projects, the baseline s the current building/energy code, 7.5. This alone does not fully describe all differences between expected and verified savings, but is a systematic contributor the deviation.
- **Split and Packaged Heat Pumps:** The Evaluators were unable to determine how expected savings were calculated. Using identical methodology to program planning materials, the Evaluators calculated ‘expected’ savings which would yield near 100% realization rates, but claimed savings estimates did not correspond with any known method for determining savings. Simply put, claimed savings were roughly half the results of using other methods.

5.3.8 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 PY2024, the Site-Specific Program accounted for the second largest share of non-residential expected savings, or roughly 18.5% 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 5-34: Site-Specific Program Verified Electric Savings

PY2024 Participation	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
18	5,335,550	5,185,350	97.2%

The Site-Specific Program displayed verified savings of 5,185,350 kWh with a realization rate of 97.2% against the expected savings for the program. Below, Table 5-36 breaks savings into Lighting and Non-Lighting:

Table 5-35: Site-Specific Program Lighting and Non-Lighting Savings

Savings Source	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Lighting	327,812	291,696	89.0%
Non-Lighting	5,007,737	4,893,654	97.7%
Total	**5,335,550**	**5,185,350**	**97.2%**

Table 5-36: Site-Specific Program Incentives

Type	Count of Projects	Incentives
Lighting	7	$76,878
Non-Lighting	11	$1,085,599
Total	**18**	**$1,162,476**

The Evaluators summarize the program-specific and measure-specific impact analysis activities and results for the Site-Specific Program in the section below.

5.3.8.1 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 5-37 summarizes the strata boundaries and sample frames for the Site-Specific Program.

Table 5-37: Site-Specific Program Sample Design

Descriptor	Stratum 1	Stratum 2	Stratum3	Stratum 4	Stratum 5	Totals
Strata boundaries (kWh)	< 10,000	10,001 - 50,000	50,001 - 300,000	300,001 - 1,000,000	> 1,000,001	
Number of projects	2	6	6	2	2	**18**
Total kWh savings	10,181	146,679	826,572	1,209,772	3,142,346	**5,335,550**
Average kWh Savings	5,091	24,447	137,762	604,886	1,571,173	**296,419**
Standard deviation of kWh savings	2,312	13,667	75,579	28,512	604,617	**525,934**
Coefficient of variation	0.454	0.559	0.549	0.529	0.385	**1.774**
Final design sample	2	3	2	2	2	**11**

The highest-savings was specifically selected for verification and analysis. Verified sampling precision is ±8.20% at 90%.

Table 5-38: Site-Specific Program Sample Summary

# Sites in Population	Review Sample Size	Precision
18	11	8.14% at 90%

5.3.8.2 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 sites to verify measure installation and operating parameters, as well as building parameters such as square footage and HVAC configurations. The Evaluators conducted site visits at 4 of the 11 sampled sites, with two projects occurring at the same site.

5.3.8.3 Impact Approaches

Eighteen (18) 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 in the sections below.

5.3.8.4 Site-Level Realization

Adjusted and verified savings were developed for each sample site. The realization rates for sites within each stratum were then applied to the non-sampled sites within their respective stratum. Table 5-39 presents realization at the site level, with Table 5-40 presenting results at the stratum level.

Table 5-39: Site-Specific Expected, Adjusted and Verified kWh Savings by Sampled Project

Project ID	Expected Savings (kWh)	Verified Savings (kWh)	Realization Rate
SSOP_140807	3,456	872	25.2%
SSLP_138273	6,725	6,725	100.0%
SSLP_140329	16,913	16,913	100.0%
SSLP_140390	22,941	22,941	100.0%
SSOP_140225	33,718	33,718	100.0%
SSLP_128331	99,774	59,558	59.7%
SSLP_111655	155,461	159,561	102.6%
SSOP_107281	378,651	412,391	108.9%
SSOP_143029	831,121	831,327	100.0%
SSOP_77417	1,143,644	1,143,644	100.0%
SSOP_82450	1,998,702	1,934,101	96.8%
Total	**4,691,106**	**4,621,751**	**98.5%**

Table 5-40: Site-Specific Summary of kWh Savings by Sample Stratum and Overall

Stratum	Expected Savings (kWh)	Verified Savings (kWh)	Realization Rate
1	10,181	7,598	74.6%
2	146,679	146,679	100.0%
3	826,572	709,611	85.8%
4	1,209,772	1,243,718	102.8%
5	3,142,346	3,077,745	97.9%
Total	**5,335,550**	**5,185,351**	**97.2%**

Table 5-41: Site-Specific Summary of kWh Savings by End Use

Savings Source	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Lighting	327,812	291,696	89.0%
Non-Lighting	5,007,737	4,893,655	97.7%
Total	**5,335,550**	**5,185,351**	**97.2%**

5.3.8.5 Discussion of Non-100% Realization

Below are brief explanations of differences between claimed and verified savings for projects with realization rates that are not 100%.

- **SSOP_140807 –** Verified savings were measured with a whole-facility billing analysis. Measured savings were lower than calculated ex-ante savings. Discrepancies in savings could not be traced because the implementer did not provide the calculations used to develop initial savings estimates. Low RRs suggest either that occupant behavior has changed since the implementation of the project or that the initial analysis did not adequately capture the relationship (or lack thereof) between energy usage and exterior temperature.
- **SSOP_140225 –** A whole-facility billing analysis was completed and produced statistically significant savings, however the estimates greatly exceeded expectations (693.9% of expectations), or indeed what can reasonably be expected in savings from the refrigeration measures installed. This indicates the significant other changes, such as additional equipment or changes in occupancy took place conflating results. The evaluators examined projects documents and calculated prescriptive savings estimates based on available data. While documentation did not provide the level of detail to fully replicate expected savings, verification estimates were similar to and corroborated claimed savings, thus the results of this project are considered to be 100% realization.
- **SSLP_128331 –** An error in project record keeping assigned savings attributable only to lighting HVAC savings (as a result of the reduced load on the HVAC system). These misplaced savings artificially inflated savings expectations. While no other corrections or changes were made, this lowered the verified savings to 59.7%.
- **SSLP_111655 –** Expected savings for seven interior lighting line items could not be exactly recreated, ranging between 98.5% and 104.4% of savings expectations. Using verified input data, the Evaluators calculated savings to be 102.6% of expectations.
- **SSOP_107281 –** The discrepancy in savings are likely a result of minor differences in billing analysis specification (the Evaluators used linear regression, Implementer used alternative

method), and/or inputs: Historical weather data source (ADM used NOAA, Implementer used alternative source), and normalization (ADM normalized usage to TMYx data, Implementer did not perform any usage normalization). Results verified savings are 108.9% or expectations.

- **SSOP_82450 –** The discrepancy in motor replacement savings is likely due to the inclusion of low-RPM data points from the raw SCADA data in the binning process. The discrepancy in cooling blower savings is likely due to rounding. Combined, these produce 96.8% of expected savings.

5.3.8.6 Verified Savings

The Site-Specific Program in total displays a realization rate of 97.2% with 5,185,350 kWh verified electric energy savings in the Idaho service territory, as displayed in Table 5-40.

5.3.9 Building Operator Certification

The C&I Building Operator Certification Program is being offered by Avista in the 2024-2025 biannual period. This program is offered to encourage building operator certified (BOC) credentialed operators to save electricity and natural gas in buildings they manage while reducing electrical demand. The BOC program has consistently produced positive documented energy savings and has proved to be cost effective. Third party evaluators have assessed and documented the BOC's energy savings impacts[10].

The Evaluators used the BOC independent impact evaluation completed by NEEA, approved by the Washington Utilities and Transportation Commission to estimate verified electric impacts for the program.

Table 5-42 summarizes the electric measures offered under this program and corresponding impact M&V methodology source, for each building operator certification completed in PY2024.

Table 5-42: Building Operator Certification Program UES Sources

Measure	Impact Analysis Savings Section(s)
Building Operator Certification – Electric	WUTC approved BOC's energy savings impacts[11]
Building Operator Certification – Natural Gas	

The independent study by Navigant[12] indicates annual savings of roughly 119,000 kWh per operator. The assumed measure life is five years, meaning that the methodology assigns savings for five years beginning in the year of certification for each operator. If a student receives a Level 2 certification or a certification renewal, then the measure life extends for five years from the most recent date of certification. The WUTC approved BOC document stipulates "Active building operator refers to building operators who have obtained a new certification or renewed a previous certification within the past 5 years". The Evaluators applied these third-party results to each building operator who has completed a certification within the past 5 years. The following table summarizes the verified electric energy savings for the BOC Program impact evaluation.

Table 5-43: BOC Program Verified Electric Savings

Measure	PY2024 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Building Operator Certification	1	119,000	119,000	119,000	100.00%
Total	1	**119,000**	**119,000**	**119,000**	**100.00%**

The following table summarizes the incentive and non-incentive costs associated with the program.

Table 5-44: BOC Incentives

Measure	Participant Count	Total Incentive Costs
Building Operator Certification	1	$0
Total	**1**	**$0**

[10] https://www.theboc.info/wp-content/uploads/2020/08/2020-BOC-Energy-Savings-FAQ_1.0.pdf
[11] https://www.theboc.info/wp-content/uploads/2020/08/2020-BOC-Energy-Savings-FAQ_1.0.pdf
[12] https://www.theboc.info/pdf/Eval-E11-223_LTMT.pdf

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the BOC Program in the section below.

5.3.9.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the BOC Program. The Evaluators reviewed all incented course and non-course applications, completion dates, and results. The Evaluators found a total of one building operator certifications were completed in 2024.

5.3.9.2 Verified Savings

The Evaluators reviewed and applied the appropriate NEEA electric impacts approved by the WUTC estimate customer-level and program-level savings for this program. The verified savings for the program were 119,000 kWh with a realization rate of 100.0%, as displayed in Table 5-43.

6. Appendix A: Billing Analysis Results

This appendix provides additional details on the billing analyses conducted for each program.

6.1 Home Energy Audit Program

The results of the billing analysis for the Home Energy Audit are provided below. Table 6-1 shows customer counts for customers considered for billing analysis (i.e. customers present in each the Washington Electric, Washington Gas, Idaho Electric, and Idaho Gas service territories) 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 to acquire the maximum number of customers possible. The billing analysis on individual measures resulted in statistically significant electric impacts. The following section reports the combined analysis.

Table 6-1: Measures Considered for Billing Analysis, Home Energy Audit Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
Home Energy Audit	✓	1,505*	✓

*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, Home Energy Audit Program

Measure	Data Restriction	# of Treatment Customers	# of Control Customers
Home Energy Audit	Starting Count	1,505	50,000
	Install Date Range: January 1, 2022 to June 30, 2024	1,427	49,766
	Incomplete Post-Period Bills (<6 months) and incomplete Pre-Period Bills (<9 months)	636	41,717
	Ending Count (Matched by PSM)	633	1,198

For the combined measures, the covariate balance shows moderate differences between the treatment and control groups before and after matching. Control usage seems to be substantially lower than

treatment usage before matching; however, after running PSM, treatment and control groups are very similar on aggregate.

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 except January, 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 Home Energy Audit Program Washington and Idaho

Month	Average Daily Usage (kWh), Control	Average Daily Usage (kWh), Treatment	T Statistic	Std Error	P-Value	Reject Null?
Jan	38.80	36.55	2.07	1.20	0.04	Yes
Feb	35.51	33.94	1.57	1.14	0.12	No
Mar	30.35	29.54	0.96	0.99	0.34	No
Apr	24.98	24.24	0.87	0.89	0.38	No
May	21.46	21.32	0.15	0.72	0.88	No
Jun	22.69	23.05	-0.50	0.80	0.62	No
Jul	26.92	27.56	-0.66	0.99	0.51	No
Aug	25.68	25.81	-0.11	0.93	0.91	No
Sep	21.36	20.73	0.88	0.78	0.38	No
Oct	24.25	22.96	1.58	0.91	0.12	No
Nov	33.05	31.29	1.42	1.38	0.16	No
Dec	37.71	35.44	1.55	1.60	0.12	No

Table 6-4 provides customer counts for customers in the final regression model, weighted by full program year participation. That is, if a customer received a home energy audit on July 1, 2024, the savings applied to the customer is half of the full impact displayed from the regression analysis after double counted savings removal.

Table 6-4: Weighted Participants, Home Energy Audit Program

Measure	# of Treatment Customers	Weighted Customers
Washington Electric	271	123
Idaho Electric	120	57
Washington Gas	851	411
Idaho Gas	263	130
Total	**1,505**	**721**

The table below provides annual savings per customer for the Home Energy Audit Program for the PPR model. The PPR model was selected for ex post savings because it provided the best fit for the data (highest adjusted R-squared). Savings are statistically significant at the 90% level for the combined measures but the adjusted R-squared shows the model provided a poor fit for the data.

Table 6-5: Regression Savings, Home Energy Audit Program

Annual Savings per Customer across WA and ID census (kWh)	Adjusted R-Squared	Model
212.91	0.81	PPR

After extrapolating regression coefficients to ID electric customers, the Evaluators identified 10,618.77 kWh in savings across 57 weighted treatment customers for an average annual savings of 186.29 kWh. Double counted savings were then subtracted from that per-customer total. The table below provides annual savings per Avista ID electric customer for the Home Energy Audit Program after removing double counted savings from other downstream programs. Total double counted program savings was estimated to be 1,200.73 kWh, or approximately 11% of observed savings through billing analysis. After removing double counted savings from ID electric program impacts, the total program savings were verified to be 9,418.03 kWh, or 165.23 kWh per customer per year, or 1.6% of annual electric household consumption.

Table 6-6: Double Counted Savings Removed, Home Energy Audit Program

Treatment Customers	Weighted Treatment Customers	Annual Savings per Customer, Regression Estimate (kWh)	Program Impacts Regression Model (kWh)	Program Double Counted Savings (kWh)	Program Verified Savings (kWh)
120	57	165.23	10,618.77	1,200.73	9,418.03

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 in PY2023. Because a simple verification survey was not completed in PY2024, the Evaluators utilized the response results from PY2023 for the PY2024 project completion in-service rates.

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[13]

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%

[13] Four contractors or construction companies were not asked these questions.

8. Appendix C: Site-Specific M&V Reports

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 building's 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

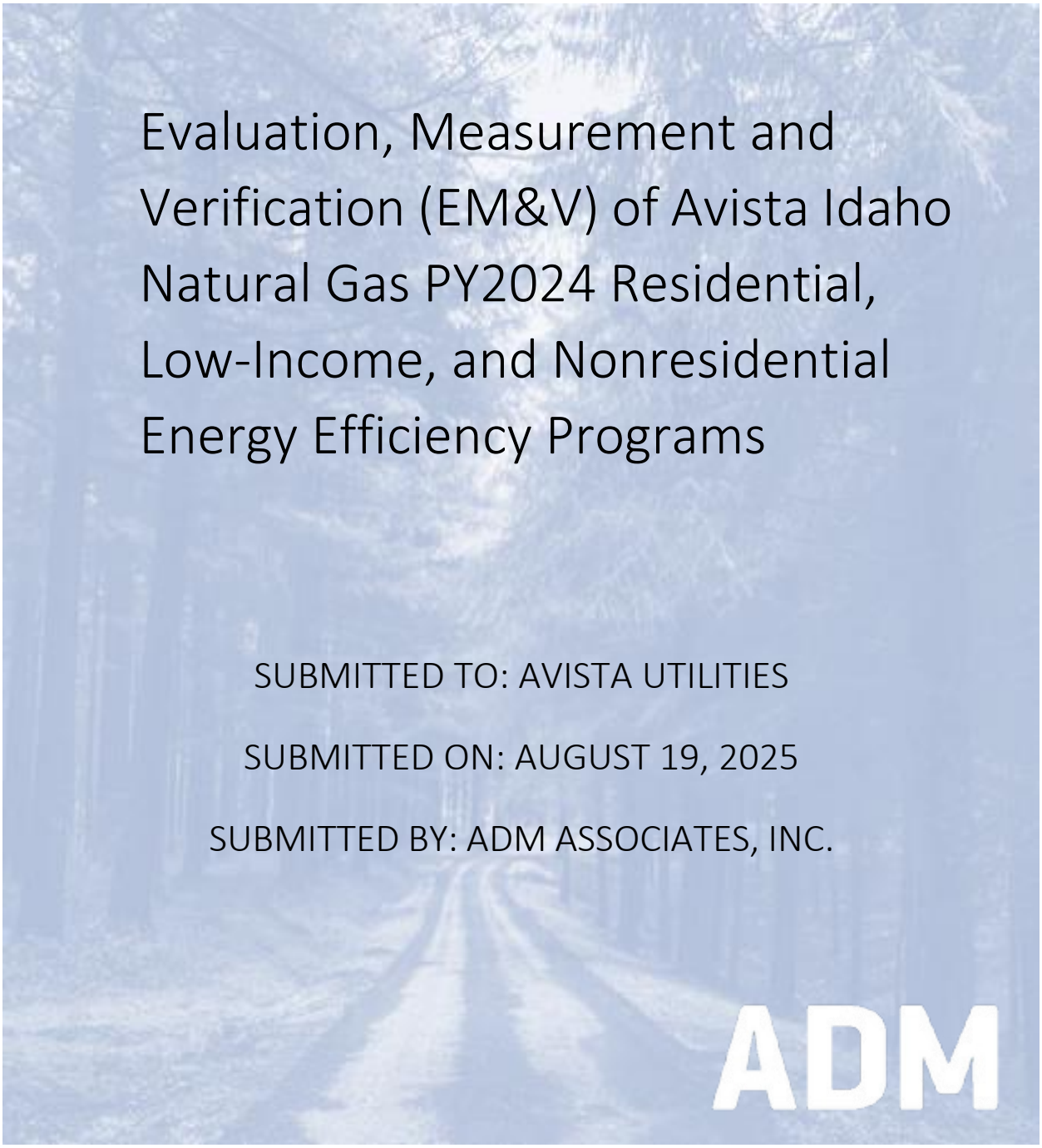
Unit Type	kW	ON Hours	Quantity (Space Heaters)	Annual Savings
Wall	16.5	5,510	6	544,874
Mobile	4.5	5,510	3	74,385
			Total:	**619,259**

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%**



ADM Associates, Inc
3239 Ramos Circle
Sacramento, CA 95827

Avista Utilities
1411 E. Mission Ave.
Spokane, WA 99252

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 2024 program year (PY2024) portfolio of programs for Avista Corporation (Avista) in the Idaho service territory. The evaluation was administered by ADM Associates, Inc. (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 PY2024. The Residential portfolio savings amounted to 185,712 Therms with a 226.22% realization rate. The Low-Income portfolio savings amounted to 1,380 Therms; however, the Evaluators did not conduct an impact evaluation for this sector and present the savings claimed for reporting purposes. The Nonresidential portfolio savings amounted to 33,187 Therms with a 92.7% 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
Shell	18,414.11	21,429.50	116.38%
Fuel Efficiency[1]	NA	NA	NA
ENERGY STAR Homes[2]	NA	NA	NA
Appliances	11,973.57	19,967.99	166.77%
Midstream	51,706.71	144,314.62	279.10%
Home Energy Audit	0	NA	NA
On Bill Repayment	0	NA	NA
Total	**82,094.39**	**185,712.11**	**226.22%**

Table 1-2: Low-Income Expected Savings by Program

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Low-Income	1,380.11	NA	NA
Total	**1,380.11**	**NA**	**NA**

[1] The Fuel Efficiency Program displayed a verified Therms penalty of 5,620.00 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 PY2024.

Table 1-3: Nonresidential Verified Impact Savings by Program

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Shell	3,600	3,600	100.00%
Midstream	26,804	24,769	92.4%
Site-Specific	5,408	4,818	89.10%
Total	**35,812**	**33,187**	**92.7%**

Table 1-4 summarizes the gas programs offered to Residential, Low-Income, and Nonresidential customers in the Idaho Avista service territory in PY2024 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	Shell	✓		Avista TRM/RTF UES
Residential	ENERGY STAR® Homes	✓		Avista TRM/RTF UES
Residential	Appliances	✓		Avista TRM/ RTF UES/Billing Analysis
Residential	Midstream	✓		RTF UES/Billing Analysis
Low-Income	Low-Income	✓		Avista TRM
Nonresidential	HVAC	✓		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 185,712 therms with a realization rate of 226.22%.
- The **Residential Portfolio** impact evaluation resulted in a realization rate of 226.22% due to improvements in the **Midstream Program** estimation of savings. The largest contributor to the high Midstream Program realization rate was the calculation of gas furnace savings via a billing analysis, instead of a deemed savings methodology. The Evaluators' billing analysis found that

efficient gas furnace installation was associated with average annual savings of 90.0 therms per household, which is nearly triple the ex-ante expected savings. The Evaluators would recommend Avista calculate expected furnace savings based on billing analysis data in the future. For other Midstream Program measures, Avista resolved PY2023 recommendations for the program implementer to incorporate 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. PY2024 results show a marked improvement in expected savings calculations methodology from the previous year. The Evaluators recommend Avista and the Midstream Program implementer continue incorporating Regional Technical Forum (RTF) market practice baselines to estimate regional savings for non-furnace measures. Additionally, the Appliance Program displayed 166.77% realization rate due to a smart thermostat billing analysis indicating higher than expected savings for the measure, the largest contributor to savings for the Appliance Program.

- In PY2023, the Evaluators conducted verification surveys via web survey to collect information from customers who participated in the **Appliances Program**. For the purposes of this report, the PY2023 survey response results were used to estimate in-service rate adjustments in the PY2024 evaluation, as survey efforts were not completed in PY2024. 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 Evaluators will conduct a full survey effort in PY2025, once per biennium.
- The **Shell Program** displayed verified savings of 21,430 therms with a realization rate of 116.38% against the expected savings for the program. The realization rate for the natural gas savings in the Shell Program deviates from 100% due primarily to the fact that RTF unit energy saving (UES) values are differentiated by heating type and climate zone, while Avista TRM prescriptive savings values are less granular. In addition, in a few instances, ex-ante savings were primarily claimed as electric while ex-post verified savings were claimed for gas following space heating type verification. Furthermore, missing verified R-values, square footage, and appropriate measure of units (square footage) from sampled projects led to variation in realization rate for each measure type.
- The **ENERGY STAR Homes Program** displayed no participation in PY2024 and therefore no impact evaluation was conducted on the program.
- The **Fuel Efficiency Program** gas impacts are not claimed in the Idaho Gas report, however, the Evaluators found that the program resulted in a 5,620 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 **Appliance Program** displayed a realization rate of 166.77% with 19,968 therms saved in PY2024. The realization rate for the natural gas savings in the Appliance Program is greater than

100% due to the billing analysis conducted for smart thermostats, the largest contributor to savings through the Appliance Program. However, the Evaluators also note discrepancies between the Avista TRM and RTF UES Savings values for smart thermostats and errors with the clothes washer claimed savings.

- The **Midstream Program** displayed a 279.10% realization with 144,314.62 therms saved. The Evaluators conducted a billing analysis to calculate verified gas furnace savings and that yielded average annual savings of 90.0 therms per furnace, nearly triple Avista's ex-ante estimates. Across all furnaces this contributed to verified savings of 139,326 with a realization rate of 298.14%. For all other Midstream measures there was a marked improvement in expected savings calculations methodology from the previous year. The Evaluators reviewed the Energy Solutions implementer expected savings values along with verified tracking data to estimate net adjusted program savings for those measures. To calculate verified savings, the Evaluators ran a billing analysis for furnaces and for all other measures utilized industry-standard engineering algorithms using purchased equipment efficiency values and RTF-defined market practice baseline values, where appropriate.
- The **Home Energy Audit Program** was evaluated by attempting a census billing analysis to estimate the impacts of the education efforts of the Home Energy Audit Program. However, this effort did not result in statistically significant natural gas impacts. The Evaluators recommend re-attempting a billing analysis in PY2025 with additional participant data.

1.2.1.2 Low-Income Programs

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

- The Evaluators did not complete an impact evaluation of the Low-Income Program in PY2024 and therefore do not estimate verified savings for the program or sector. However, for reporting purposes, the Evaluators summarize Avista's claimed savings for the program in PY2024.

1.2.1.3 Nonresidential Programs

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

- There was no participation in the **HVAC program** during PY2024.
- The verified savings for the **Shell program** are 3,600 Therms with a realization rate of 100.0%, as displayed in Table 5-5. Evaluators did not find any deviations from the Avista TRM UES.
- The verified savings for the **Midstream program** are 24,769 Therms with a realization rate of 92.4%.
- The verified savings for the **Site-Specific Program** are 4,818 Therms with a realization rate of 89.1%.

1.2.2 Recommendations

The following section details the Evaluator's recommendations resulting from the program evaluations for 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 found a handful of instances in which the rebated equipment did not meet the program minimum requirements for efficiency. The Evaluators recommend Avista check the source AHRI documentation and product level documentation to verify efficiency prior to incentivizing installation of the measure. For example, eight smart thermostats did not qualify for RTF savings.
- In the **Shell Program**, the Evaluators found that verified attic insulation, wall insulation, and window measure savings displayed varying realization rates at the project level primarily due to differences between the granularity of the Avista TRM and RTF prescriptive savings values. The RTF differentiates savings by heating type, R-value, and climate zone while Avista provides more generalized savings estimates. With appropriate weighting, such generalized savings estimates can be valid; however, several Shell Program savings values currently presented in the Avista TRM do not seem to align perfectly with average participant characteristics. This discrepancy between Avista and RTF savings categorization granularity led to a low realization rate for attic insulation and window measures. The Evaluators recommend Avista update the Avista TRM value to reflect a more accurate weighted average of participation home characteristics. The Evaluators also found that some window measures contained discrepancies in unit quantity and attic insulation projects that did not clearly provide R-Values in the documentation provided. Additionally, three window projects did not provide sufficient documentation to verify square footage or even the quantity of windows and two sliding glass door projects were found to claim 16.7 kWh and Therms savings. Based on these findings, the Evaluators recommend Avista verify the project meets the insulation or efficiency requirements through documentation provided in project applications and request additional information if the original documentation does not summarize the efficiency and square footage of the project being completed. The Evaluators also recommend Avista conduct measure-level verification efforts to ensure proper fuels are being claimed in the tracking datasets.
- In the **Appliances Program**, the Evaluators recommend Avista update the clothes dryer Avista TRM value to correctly assign 1.60 therms savings for the measure, as reflected in the RTF. Currently, the Avista TRM reflects 2.72 therms/unit. Additionally, The Evaluators recommend Avista update the front load clothes washer Avista TRM value to correctly convert 119.99 kWh/unit to 2.40 therms/unit. Currently, the Avista TRM reports 6.03 therms/unit.
- The Evaluators note that the RTF defines an annual savings of 11.7 therms for all gas smart thermostat measure specifications defined in the Connected Thermostats RTF workbook. Although this finding did not impact the realization rate of the program in PY2024 due to

statistically significant savings identified for smart thermostats through the billing analysis method, the Evaluators recommend Avista update the assumed claimed savings values in the Avista TRM to avoid discrepancies in future smart thermostat savings calculations.

- The Evaluators also found one sampled smart thermostat model that did not meet the minimum RTF qualifications for savings, although Avista had assigned the maximum savings value to that project. The Evaluators recommend Avista verify each smart thermostat model meets the RTF requirements for regional savings compared to the market practice baseline or provide a list of qualified products for customers to select from when participating in this program.
- The Evaluators recommend Avista estimate natural gas savings for the **Midstream Program's** gas furnace measure based on billing analysis results. The Evaluators 2024 gas furnace billing analysis yielded annual savings of 90.0 therms, for a 298.14% realization rate for the measure. Furnace installation by Avista customers in Idaho seems to be associated with substantially higher gas savings than reported by the RTF Residential Gas Furnace UES workbook. To maximize the accuracy of reported savings, future ex-ante savings estimates should likely be based on billing analysis results instead of deemed savings.
- The Evaluators recommend Avista and the Midstream Program implementer continue incorporating Regional Technical Forum market practice baseline to estimate regional savings for all non-furnace measures in the **Midstream Program**. Were the same measures rebated downstream instead of midstream, savings would be evaluated via a comparison of efficient technology against market practice baselines in the Pacific Northwest. As such, the Evaluators believe relying on regional market practice baselines a valid methodology that should be used to estimate and evaluate non-furnace Midstream measures moving forward.
- The Evaluators recommend re-attempting a billing analysis in PY2025 for the **Home Energy Audit Program** with additional participant billing data.

1.2.2.2 Low-Income Programs

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

- The Evaluators did not complete an evaluation for the Low-Income Program in PY2024 and therefore do not have any recommendations currently.

1.2.2.3 Nonresidential Programs

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

- For the **Midstream Program**:
    - The Evaluators found that all measures claimed savings were calculated based on assumed average equipment sizing, whereas verified savings calculations were carried out using standard engineering algorithms. Although relative magnitudes of savings per project generally aligned with algorithm-based results, the Evaluators recommend the program implementers adjust assumed average sizing to better reflect program participant purchasing behaviors.

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 impacts as defined by the International Performance Measurement and Verification Protocols (IPMVP)[3] and the Uniform Methods Project (UMP)[4]:

- 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 to calculate the natural gas savings associated with measures installed and 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 overall portfolio-wide 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)[5]
- 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[6]
- International Performance Measurement and Verification Protocol (IPMVP) maintained by the Efficiency Valuation Organization (EVO) with sponsorship by the U.S. Department of Energy (DOE)[7]

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:

[3] https://www.nrel.gov/docs/fy02osti/31505.pdf
[4] https://www.nrel.gov/docs/fy18osti/70472.pdf
[5] https://rtf.nwcouncil.org/measures
[6] 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.
[7] 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 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 overlap across programs.

The Evaluators outline the approach to verifying, measuring, and reporting the residential portfolio impacts as well as summarizing potential program and portfolio improvements. The primary objective of the impact evaluation is to determine ex-post verified net energy savings.

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 2025 program year.

The Evaluators employed the following approach to complete impact evaluation activities for the programs. The Evaluators define three 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. Some billing analyses included billing data from nonparticipant customers as a control grup. 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.

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 applied billing analysis results to determine evaluated savings only for measures where savings could be isolated (that is, where sufficient participants could be identified who installed only that measure). Program-level realization rates for the Appliances and Midstream 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-checked 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 each 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.

2.2.2.1 Sampling Methodology

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

The Evaluators verified a sample of participating projects 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/businesses. 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[8], 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.

*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 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 in 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.

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:

- Shell Program
- Fuel Efficiency Program
- Appliances Program

[8] 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

- Midstream Program
- Shell Program (Nonresidential)
- Midstream Program (Nonresidential)

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 5.1.

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	Gas Population	Sample (With Finite Population Adjustment)*	Precision at 90% CI
Residential	Shell	520	68	90% ± 9.31%
Residential	Appliances	509	63	90% ± 9.71%
Residential	Midstream	89	89	90% ± 0.00%
Low-Income	Low-Income	39	NA	NA
Non-Residential	Shell	5	5	90% ± 0.00%
Non-Residential	Midstream	112	105	90% ± 9.27%

*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.

2.2.2.4 Survey-Based Verification

The Evaluators conducted survey-based verification for the Appliances Program in 2023 and applied those results for PY2024. 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 ±9.6% 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	Appliances	115	43	90% ± 9.6%

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.

2.2.2.5 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. 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 recommended 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 applied 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. When possible based on available data, 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. If relevant non-participant billing data was not available to develop a post-hoc control group, treatment-only billing analyses were conducted.

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 2024 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:

- Fixed effect Difference-in-Difference (D-n-D) regression model (recommended in UMP protocols)[9]
- Random effects post-program regression model (PPR) (recommended in UMP protocols)
- Gross billing analysis (treatment only)

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 2024 (and some of 2025, if available) and for one year prior to measure install dates (2023).

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 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.

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

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 02/19/2024 start date, overlapping bill 2 had a 02/25/2024 start date, and the previous bill had a 02/19/2024 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, 2024 through June 30, 2024) 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 and data availability. The model with the best fit (highest adjusted R-squared) was selected. The Evaluators utilized Model 3 to estimate energy savings if there was insufficient non-participant billing data to develop a comparable control group.

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 either Typical Meteorological Year (TMY) or current year 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. Depending on TMY data quality and whether the Evaluators hope to identify long-term average savings trends or specific current year estimates, TMY HDD/CDD or current year HDD/CDD can be used in savings extrapolation.

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 either Typical Meteorological Year (TMY) or current year 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. As detailed above, either TMY or current year HDD/CDD data can be used for extrapolation depending on whether the evaluators are interested in long-term savings trends or year-specific savings estimates.

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, if sufficient non-participant data is not available to develop a valid control group, gross savings can also be calculated via a treatment-only regression. 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
- $Month_t$ = Dummy variable indicating month of month *t*
- 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. If billing data for statistically comparable control customers (i.e., non-participant Avista customers with comparable usage to treatment customers) is not available, such gross savings analyses can provide reliable savings estimates. The gas furnace billing analysis was run as a treatment-only regression and current year (i.e., 2024) HDD data was used to extrapolate savings. While treatment-only models may not separate out the effects of national or regional events like a pandemic or recession, they still provide meaningful estimates of changes in energy usage associated with measure installation. Given that the COVID-19 pandemic is unlikely to dramatically affect customer energy usage as of PY2024, treatment-only models can provide valid estimates of the savings associated with many energy efficiency measures.

2.2.3.7 Billing Heating Load Estimation

In addition to the regression based IPMVP Option C billing analysis, the Evaluators often employ a heating load estimation billing analysis. Heating load estimation is a prime methodology for estimating savings associated with space heating measures such as boilers. 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[10]

[10] https://rtf.nwcouncil.org/measure/residential-gas-furnaces/

- 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). For treatment-only furnace savings calculations, the evaluators utilized a net-to-gross ratio of 1 based on the assumption that free ridership, spillover, and market effects for the ID gas furnace program were minimal. The Evaluators removed any customers participating in multiple energy efficiency programs prior to conducting the furnace billing analysis meaning spillover is unlikely. Furthermore, given that Idaho ended its COVID-19 public health emergency declaration on April 15, 2022, COVID-19 is unlikely to have affected 2024 furnace savings calculations.[11] Lastly, the only extreme weather event Idaho experience in 2023 and 2024 was a drought and heat wave, which unlike a blizzard, is unlikely to dramatically affect gas heating energy usage.[12]

[11] https://gov.idaho.gov/pressrelease/public-health-disaster-emergency-declaration-to-end-april-15/

[12] https://www.ncei.noaa.gov/access/billions/state-summary/ID

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 PY2024. 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
Shell	18,414.11	21,429.50	116.38%
Fuel Efficiency	0	0	-
ENERGY STAR Homes	0	0	-
Appliances	11,973.57	19,967.99	166.77%
Midstream	51,706.71	144,314.62	279.10%
Home Energy Audit	0	NA	NA
On Bill Repayment	0	NA	NA
Total Res	**82,094.39**	**185,712.11**	**226.22%**

In PY2024, Avista completed and provided incentives for residential natural gas measures in Idaho and reported total natural gas savings of 82,094.39 Therms, with verified savings of 185,712.11 therms, leading to an overall achievement of 226.22% 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

In PY2023, the Evaluators surveyed 2,229 unique customers that participated in Avista's residential energy efficiency program in the fall of 2023 using an email survey approach. The Evaluators did not complete surveying efforts in the PY2024 evaluation and therefore referenced simple verification responses from the PY2023 impact evaluation.

The Evaluators surveyed customers that received rebates for HVAC, Water Heater, Shell, Small Home & MF Weatherization, and Appliance Programs in PY2023. For the purposes of this report, the results for the Appliance Program are summarized.

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. The Fuel Efficiency program was surveyed for 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 ±13.91% 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 ±9.6% 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	Appliances	115	27	90% ± 13.91%

Table 3-4: Mixed State-Level Simple Verification Precision by Program

Sector	Program	Population	Respondents	Precision at 90% CI
Residential	Appliances	115	43	90% ± 9.6%

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: 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 Appliance Programs in order to calculate verified savings. Additional insights from the survey responses are summarized in Appendix A: 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 Shell Program

The Shell Program provides incentives to customers for improving the integrity of the home 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 3-6 summarizes the measures offered under this program.

Table 3-6: Shell Program Measures

Measure	Description	Impact Analysis Methodology
G Attic Insulation With Natural Gas Heat	Attic insulation for homes heated with natural gas	RTF UES
G Energy Star Certified Insulated Door	Energy Star door replacement for homes heated with natural gas	RTF UES
G Floor Insulation With Natural Gas Heat	Floor insulation for homes heated with natural gas	RTF UES
G Sliding Glass Doors DIY with Natural Gas Heat	High-efficiency sliding glass door replacement for homes heated with natural gas- installed by the homeowner	RTF UES
G Sliding Glass Doors with Natural Gas Heat	High-efficiency sliding glass door replacement for homes heated with natural gas- installed by a contractor	RTF UES
G Storm Windows with Natural Gas Heat	High-efficiency storm window replacement for homes heated with natural gas	RTF UES
G Wall Insulation With Natural Gas Heat	Wall insulation for homes heated with natural gas	RTF UES
G Windows DIY Replc With Natural Gas Heat	High-efficiency window replacement for homes heated with natural gas- installed by the homeowner	RTF UES
G Window Replc With Natural Gas Heat	High-efficiency window replacement for homes heated with natural gas- installed by a contractor	RTF UES
G Multifamily Attic Insulation With Natural Gas Heat	Attic insulation for homes heated with natural gas	RTF UES
G Multifamily Energy Star Certified Insulated Door	Energy Star door replacement for homes heated with natural gas	RTF UES
G Multifamily Floor Insulation With Natural Gas Heat	Floor insulation for homes heated with natural gas	RTF UES
G Multifamily Sliding Glass Doors DIY with Natural Gas Heat	High-efficiency sliding glass door replacement for homes heated with natural gas- installed by the homeowner	RTF UES
G Multifamily Sliding Glass Doors with Natural Gas Heat	High-efficiency sliding glass door replacement for homes heated with natural gas- installed by a contractor	RTF UES
G Multifamily Storm Windows with Natural Gas Heat	High-efficiency storm window replacement for homes heated with natural gas	RTF UES
G Multifamily Wall Insulation With Natural Gas Heat	Wall insulation for homes heated with natural gas	RTF UES
G Multifamily Window DIY Replc With Natural Gas Heat	High-efficiency window replacement for homes heated with natural gas- installed by the homeowner	RTF UES
G Multifamily Window Replc With Natural Gas Heat	High-efficiency window replacement for homes heated with natural gas- installed by a contractor	RTF UES

The following table summarizes the adjusted and verified natural gas savings for the Shell Program impact evaluation.

Table 3-7: Shell Program Verified Natural Gas Savings

Measure	PY2024 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Attic Insulation With Natural Gas Heat	40	2,555.28	2,601.84	2,442.99	95.61%
G Energy Star Certified Insulated Door	31	133.35	152.41	152.41	114.29%
G Floor Insulation With Natural Gas Heat	7	145.12	145.12	314.47	216.70%
G Sliding Glass Doors DIY with Natural Gas Heat	5	116.90	116.90	109.18	93.39%
G Sliding Glass Doors with Natural Gas Heat	82	1,686.70	1,499.29	1,545.83	91.65%
G Wall Insulation With Natural Gas Heat	11	440.00	410.33	609.09	138.43%
G Window DIY Replc With Natural Gas Heat	25	764.67	681.59	557.76	72.94%
G Window Replc With Natural Gas Heat	310	12,484.49	14,970.12	15,173.61	121.54%
G Multifamily Attic Insulation With Natural Gas Heat	0	0.00	0.00	0.00	0.00%
G Multifamily Energy Star Certified Insulated Door	0	0.00	0.00	0.00	0.00%
G Multifamily Floor Insulation With Natural Gas Heat	1	21.36	3.72	10.63	49.77%
G Multifamily Sliding Glass Doors DIY with Natural Gas Heat	1	16.70	16.70	12.13	72.62%
G Multifamily Sliding Glass Doors with Natural Gas Heat	2	33.40	33.40	6.89	20.62%
G Multifamily Wall Insulation With Natural Gas Heat	1	13.02	9.30	24.33	186.88%
G Multifamily Window DIY Replc With Natural Gas Heat	0	0.00	0.00	0.00	0.00%
G Multifamily Window Replc With Natural Gas Heat	4	3.12	81.90	470.18	15,069.75%
Total	**520**	**18,414.11**	**20,722.62**	**21,429.50**	**116.38%**

The Shell Program displayed verified savings of 21,429.50 Therms with a realization rate of 116.38% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-8: Shell Program Costs

Measure	Incentive Costs
G Attic Insulation With Natural Gas Heat	$31,941.00
G Energy Star Certified Insulated Door	$3,800.00
G Floor Insulation With Natural Gas Heat	$5,442.00
G Sliding Glass Doors DIY with Natural Gas Heat	$1,680.00
G Sliding Glass Doors with Natural Gas Heat	$47,880.00
G Wall Insulation With Natural Gas Heat	$6,600.00
G Window DIY Replc With Natural Gas Heat	$10,184.18
G Window Replc With Natural Gas Heat	$318,531.88
G Multifamily Attic Insulation With Natural Gas Heat	$0.00
G Multifamily Energy Star Certified Insulated Door	$0.00
G Multifamily Floor Insulation With Natural Gas Heat	$267.00
G Multifamily Sliding Glass Doors DIY with Natural Gas Heat	$240.00
G Multifamily Sliding Glass Doors with Natural Gas Heat	$960.00
G Multifamily Wall Insulation With Natural Gas Heat	$139.50
G Multifamily Window DIY Replc With Natural Gas Heat	$0.00
G Multifamily Window Replc With Natural Gas Heat	$2,340.00
Total	**$430,005.56**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Shell Program in the section below.

3.2.1.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Shell Program.

3.2.1.2 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.

For each sampled measure, the Evaluators reviewed the number of units installed, square footage, and other key equipment characteristics such as insulation R-value.

The Evaluators identified two sampled Energy Star Door measures for which the ex-ante estimated savings were lower than the savings values included in the Avista TRM. One of these two instances appeared to be due to ex-ante savings accounting for a lower door quantity than was actually installed per tracking data. These ex-ante savings underestimations contributed to a 114% realization rate for Energy Star certified insulated doors as shown in Table 3-7.

3.2.1.3 Verification Surveys

The Evaluators conducted verification surveys of the residential Shell Program in PY2023. Based on the results of these surveys and the historically high in-service rates of weatherization programs, the Evaluators applied 100% in-service rates to all PY2024 Shell measures.

3.2.1.4 Impact Analysis

This section summarizes the savings results for the Shell Program. The Evaluators calculated adjusted savings for each measure using the active Avista TRM values and verified tracking data. The Evaluators calculated verified savings for the natural gas measures using the RTF UES values. The Evaluators conducted a billing analysis for measures where participation allowed. However, the billing analysis results were not used due to issues with statistical significance and unexpectedly low savings values. Therefore, the 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.

3.2.1.5 Verified Savings

The Shell Program in total displayed a realization rate of 116.38% with 21,429.50 therms verified natural gas savings in the Idaho service territory, as displayed in Table 3-7. The realization rate for the gas savings in the Shell Program deviates from 100% due primarily 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, missing verified R-values, square footage, and quantity of units from sampled projects led to variation in realization rate for each measure type.

The G Multifamily Window Replc With Natural Gas Heat measure had an extremely inflated realization rate (close to 15,070%) due to the fact that ex-ante savings were primarily electric for all four PY2024 participants. The ex-ante savings estimates appeared to assume electric space heating, while the Evaluators' document review process verified that all four participants had gas furnace space heating. This discrepancy in assumed space heating fuel type was the main factor that contributed to the extremely high realization rate for this measure.

The G Window Replc With Natural Gas Heat measure realization rate deviated from 100% because there were discrepancies in the documentation provided in terms of square footage and unit quantity verification. Many rebate forms only provided window type and the price. Square footage of the window area as well as the quantity of windows are essential inputs to calculate savings using the RTF UES workbook, so the Evaluators were forced to make assumptions to impute such missing data.

The lack of granularity in the Avista TRM and misalignment with average participant characteristics led to a low realization rate for attic insulation and window measures. The Evaluators recommend Avista update the Avista TRM value to reflect an accurate weighted average of participation home characteristics or apply different savings values based on customer heating zone (as is the case in the RTF UES workbooks).

3.2.2 ENERGY STAR® Homes Program

The ENERGY STAR® Homes Program provides rebates for manufactured homes within Avista's service territory that attain an ENERGY STAR® certification. This program is incentivized for ENERGY STAR® Eco-rated homes. Table 3-9 summarizes the measures offered under this program.

Table 3-9: ENERGY STAR® Homes Program Measures

Measure	Description	Impact Analysis Methodology
E ENERGY STAR Home - Manufactured, Gas & Electric	ENERGY STAR-rated manufactured home with gas and electric	RTF UES

The Energy Star Homes Program did not have any natural gas projects rebated in the Idaho Service Territory in PY2024.

3.2.3 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 have been 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 3-10: 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 5,620 therms and represents an 89.19% realization rate against the expected therms penalty amount of 6,301. The following table displays the therms penalty by measure.

Table 3-11: 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	11	-4,041	-4,939	-4,490	111.11%
E Electric To Natural Gas Furnace & Water Heat	4	-2,260	-2,260	-1,130	50.00%
Total	**15**	**-6,301**	**-7,199**	**-5,620**	**89.19%**

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 PY2024.

3.2.4 Appliances Program

The Appliances Program is a residential prescriptive program that offers incentives for customers to upgrade their existing clothes washers and dryers to ENERGY STAR-rated clothes dryers and washers. Primary multifamily homes with shared interior walls including apartments, duplexes, townhomes, and condos have no minimum usage requirement to be eligible for this program. However, Avista defines seasonal and recreational homes as ineligible.

This section summarizes the impact results of the Appliances Program evaluation. Table 3-12 summarizes the measures offered under this program.

Table 3-12: Appliances 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 Front Load Washer	ENERGY STAR-certified top loading clothes washer for residential homes	RTF UES
G Smart Thermostat DIY with Natural Gas Heat	ENERGY STAR-certified Smart Thermostat with DIY install for residential homes	RTF UES
G Smart Thermostat Paid Install with Natural Gas Heat	ENERGY STAR-certified Smart Thermostat with Paid Install for residential homes	RTF UES
G Multifamily Energy Star Rated Clothes Dryer	ENERGY STAR-certified clothes dryer for residential MF homes	RTF UES
G Multifamily Energy Star Rated Front Load Washer	ENERGY STAR-certified front-loading clothes washer for residential MF homes	RTF UES
G Multifamily Energy Star Rated Top Load Washer	ENERGY STAR-certified top loading clothes washer for residential MF homes	RTF UES
G Multifamily Smart Thermostat DIY with Natural Gas Heat	ENERGY STAR-certified Smart Thermostat with DIY install for residential MF homes	RTF UES
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	ENERGY STAR-certified Smart Thermostat with Paid Install for residential MF homes	RTF UES

The following table summarizes the verified natural gas savings for the Appliances Program impact evaluation.

Table 3-13: Appliances Program Verified Natural Gas Savings

Measure	PY2024 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Energy Star Rated Clothes Dryer	16	40.80	40.80	24.00	58.82%
G Energy Star Rated Front Load Washer	64	385.92	385.92	153.60	39.80%
G Energy Star Rated Top Load Washer	10	54.27	0.00	0.00	0%
G Smart Thermostat DIY with Natural Gas Heat	153	4,219.86	4,219.86	7,283.96	172.61%
G Smart Thermostat Paid Install with Natural Gas Heat	252	6,899.76	6,899.76	11,865.07	171.96%
G Multifamily Energy Star Rated Clothes Dryer	0	0.00	0.00	0.00	0%
G Multifamily Energy Star Rated Front Load Washer	0	0.00	0.00	0.00	0%
G Multifamily Energy Star Rated Top Load Washer	0	0.00	0.00	0.00	0%
G Multifamily Smart Thermostat DIY with Natural Gas Heat	5	133.20	133.20	229.06	171.97%
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	9	239.76	119.88	412.30	171.96%
Total	**509**	**11,973.57**	**11,799.42**	**19,967.99**	**166.77%**

The Appliances Program displayed verified savings of 19,967.99 Therms with a realization rate of 166.77% against the expected savings for the program. The following table summarizes the incentive costs associated with the program.

Table 3-14: Appliances Program Costs

Measure	Incentive Costs
G Energy Star Rated Clothes Dryer	$750.00
G Energy Star Rated Front Load Washer	$3,200.00
G Energy Star Rated Top Load Washer	$450.00
G Smart Thermostat DIY with Natural Gas Heat	$18,270.99
G Smart Thermostat Paid Install with Natural Gas Heat	$38,719.35
G Multifamily Energy Star Rated Clothes Dryer	$0.00
G Multifamily Energy Star Rated Front Load Washer	$0.00
G Multifamily Energy Star Rated Top Load Washer	$0.00
G Multifamily Smart Thermostat DIY with Natural Gas Heat	$599.99
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	$1,350.00
Total	**$63,340.33**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Appliance Program in the section below.

3.2.4.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Appliances Program.

3.2.4.2 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 Section 2.2.2.3.

The Evaluators found all Appliances Program rebates to have project documentation with the associated model number and efficiency values in either 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.

The Evaluators found six Smart Thermostat projects that did not qualify based on Energy Star Requirements. The Evaluators assigned 0 therms savings to these projects accordingly.

3.2.4.3 Verification Surveys

In PY2023, the Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measures as described in Section 2.2.2.4. 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 conducted in PY2023 were used to calculate ISRs for the measures offered in the Appliance Program in PY2024. 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.

Table 3-15 displays the ISRs for each of the Appliances Program 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 ±9.6% precision at the 90% confidence interval for the program.

Table 3-15: Appliances 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 3-15 to each rebate to quantify verified savings for each measure.

3.2.4.4 Impact Analysis

This section summarizes the verified savings results for the Appliances 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.

3.2.4.5 Billing Analysis

The results of the billing analysis for the Appliances Program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2. Table 3-16 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 Energy Star Rated Front Load Washer and Smart Thermostat with Natural Gas Heat billing analyses include customers in both Washington and Idaho service territories to gather the maximum number of customers possible for precise savings estimates.

Table 3-16: Measures Considered for Billing Analysis, Appliances Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
G Energy Star Rated Front Load Washer	✓	141*	✓
G Smart Thermostat with Natural Gas Heat	✓	1,083*	✓

*This count includes rebates from Washington and Idaho

The final number of customers in each treatment and control group are listed in Table 3-17.

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 3-17 provides annual savings per customer for the G Smart Thermostat with Natural Gas Heat measure, including both single family and multifamily homes. The regression results for the G Energy Star Rated Front Load Washer measure were not statistically significant, therefore measure savings were not included. Model 2 (PPR) was selected as the final model for the Appliance Program as it provided the highest adjusted R-squared among the regression models. Savings are statistically significant at the 90% level and the adjusted R-squared shows the model provided an excellent fit for the data (adjusted R-squared ≥ 0.90).

Table 3-17: Measure Savings, Appliances Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
G Smart Thermostat with Natural Gas Heat	536	2,550	46	42	50	0.92	Model 2: PPR

The Evaluators found the G Smart Thermostat with Natural Gas Heat measure displayed a statistically significant verified savings value of 46 Therms per year. The Evaluators applied these estimated savings for single family and multifamily natural gas smart thermostat measures rebated through the program.

3.2.4.6 Verified Savings

The Appliances Program in total displays a verified savings of 19,967.99 Therms with a realization rate of 166.77% in the Idaho service territory, as displayed in Table 3-13.

The realization rate for the natural gas savings in the Appliances Program deviates from 100% due to the 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 aligned with the RTF UES value.

The Evaluators recommend Avista update the clothes washer Avista TRM value to correctly assign 1.60 therms savings for the measure, as reflected in the RTF. Currently, the Avista TRM reflects 2.72 therms/unit. Additionally, The Evaluators recommend Avista update the front load clothes washer Avista TRM value to correctly convert 119.99 kWh/unit to 2.40 therms/unit. Currently, the Avista TRM reflects 6.03 therms/unit. The combination of these adjustments contributed to the downward adjustment to verified savings for the program.

The Evaluators found that about 96% of the PY2024 expected savings were attributed to Smart Thermostat measures in the ID Appliances program. The Evaluators conducted a billing analysis for this measure, combining single family and multifamily participants to ensure a robust sample. The Evaluators verified statistically significant savings for this measure at 46 therms per unit. This savings value was applied to the population of smart thermostat rebates, which drove the realization rate to 172% For the program, compared to the claimed savings value of 26.64 therms per unit from the Avista TRM.

The Evaluators also found one sampled smart thermostat model that did not meet the minimum RTF qualifications for savings, although Avista had assigned the maximum savings value to that project. The Evaluators recommend Avista verify each smart thermostat model meets the RTF requirements for regional savings compared to the market practice baseline or provide a list of qualified products for customers to select when participating in this program.

3.2.5 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 furnaces
- Residential natural gas boilers
- Residential natural gas storage tank water heaters
- Residential natural gas tankless water heaters

The nonresidential midstream measures and impact evaluation results are presented in Section 3.2.5. 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 PY2024. Table 3-18 summarizes the measures offered under this program.

Table 3-18: Midstream Program Measures

Measure	Description	Impact Analysis Methodology
G Natural Gas Furnace	High efficiency natural gas furnace installation	Treatment-only Billing Analysis
G Natural Gas Boiler	High efficiency natural gas boiler installation	RTF UES
G Natural Gas Storage Tank Water Heater	High efficiency natural gas water heater installation	RTF UES
G Natural Gas Tankless Water Heater	High efficiency natural gas water heater installation	RTF UES

Sufficient Avista customers purchased a natural gas furnace in 2024 for the Evaluators to calculate verified natural gas savings via a billing analysis. This billing analysis found that furnace installation in 2024 was associated with annual gas savings of ~90.0 therms per household.

The following table summarizes the estimated electric energy savings for the Midstream Program impact evaluation.

Table 3-19: Midstream Program Verified Natural Gas Savings

Measure	PY2024 Units	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Realization Rate
G Natural Gas Furnace	1,548	46,731.65	47,870.32	139,326.10	298.14%
G Natural Gas Boiler	2	403.90	404.06	404.06	100.04%
G Natural Gas Storage Tank Water Heater	1	15.12	25.41	25.41	167.98%
G Natural Gas Tankless Water Heater	89	4,556.03	4,559.05	4,559.05	100.07%
Total	**1,640**	**51,706.71**	**52,858.84**	**144,314.62**	**279.10%**

The Midstream Program displayed estimated savings of 144,314.62 Therms with a realization rate of 279.10%. The following table summarizes the incentive costs associated with the program.

Table 3-20: Midstream Program Costs by Measure

Measure	Incentive Costs
G Natural Gas Furnace	$696,600.00
G Natural Gas Boiler	$1,800.00
G Natural Gas Storage Tank Water Heater	$125.00
G Natural Gas Tankless Water Heater	$11,125.00
Total	**$709,650.00**

The Evaluators describe the impact evaluation tasks completed for this program in the subsections below.

3.2.5.1 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 2.2.2.3.

The Evaluators found the tracking data 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 RTF UES baselines necessary to calculate verified savings for the census of rebated equipment in the program. The Midstream tracking data is tracked and delivered separately from the remaining residential portfolio, often demonstrating extensive detail on product characteristics.

3.2.5.2 Verification Survey

The Evaluators did not conduct verification surveys for the Midstream Program in PY2024 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.

3.2.5.3 Impact Analysis

For the natural gas furnace measure, the Evaluators calculated savings via a treatment-only billing analysis as detailed in Section 2.2.3.6. This billing analysis yielded verified savings of 90.0 therms for Idaho customers installing furnaces in 2024. The Evaluators calculated verified savings for all other residential Midstream measures through industry standard engineering algorithms. When employing these engineering algorithms, the Evaluators incorporated Regional Technical Forum-defined market practice baselines from the appropriate RTF workbooks in place at the time of the biennium plan for the Midstream Program.

3.2.5.4 Billing Analysis

This section details the billing analysis results for the residential gas furnace measure. As detailed above, the Evaluators conducted a treatment-only regression billing analysis to determine gas furnace savings. This analysis was identical to the one outlined in the Model 3: Gross Billing Analysis, Treatment-Only Regression Model section above. Of note, savings were extrapolated using current year (as opposed to TMY) HDD data so that the Evaluators would present the most accurate assessment of the gas saved by participating Avista customers as of 2024 (and early 2025).

After data cleaning and preprocessing, 337 customers were included in the furnace billing analysis. The regression had an adjusted R-squared of 0.78 suggesting the model predicts energy usage well. The following table outlines key results associated with the regression.

Table 3-21. Furnace Billing Analysis Results

Measure	Treatment Customers in Analysis	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared
Natural Gas Furnace	337	90.00	74.81	105.20	0.78

Ultimately, the billing analysis yielded annual gas savings of 90.00 therms per household. This savings value is consistent with other gas furnace analyses the Evaluators have conducted.

3.2.5.5 Verified Savings

The Evaluators reviewed the 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 employed a billing analysis or utilized industry-standard engineering algorithms using purchased equipment efficiency values and RTF-defined market practice baseline values, where appropriate. The Midstream Program displayed a 279.10% realization with 144,314.62 therms saved, as displayed in Table 3-19. This shows a marked improvement in expected savings calculations methodology from the previous year.

In particular, the furnace verified gas savings calculated via billing analyses were substantially higher than ex-ante expected savings, leading to a 298.14% realization rate. The Evaluators recommend Avista estimate furnace savings based on billing analysis results. The furnace billing analysis the Evaluators ran suggests that Avista's Idaho customers have substantially higher gas savings than RTF estimates. Updating ex-ante savings estimates to reflect these findings seems worthwhile.

For other Midstream measures, the Evaluators would recommend Avista continue incorporating Regional Technical Forum market practice baseline values to estimate regional savings. Because downstream measures of the same category are similarly evaluated by comparing against market practice baseline in the Pacific Northwest, the Evaluators deem this counterfactual scenario is relevant for a midstream delivery channel offering incentives for the same equipment and recommend this methodology to estimate and evaluate non-furnace Midstream measures moving forward.

3.2.6 Home Energy Audit Program

The Residential Home Energy Audit Program is designed to educate and generate interest in efficiency in general and, more specifically, in Avista's portfolio of residential energy efficiency and renewable-energy programs. The Evaluators completed a billing analysis of the census of participants to identify the educational impact of the program on customers' energy usage behaviors while removing savings claimed and verified from other program participation. The following table summarizes the verified natural gas energy savings for the Home Energy Audit Program impact evaluation.

Table 3-22: Home Energy Audit Program Verified Natural Gas Savings

Measure	PY2024 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Home Energy Audit	263	NA	NA	NA	NA
Total	**263**	**NA**	**NA**	**NA**	**NA**

The Evaluators were unable to identify and estimate statistically significant natural gas savings in the participant population through observed billing data. Avista did not estimate claimed savings for this program, and therefore the realization rate is not applicable to the program. The following table summarizes the incentive costs associated with the program.

Table 3-23: Home Energy Audit Program Costs by Measure

Measure	Incentive Costs
Home Energy Audit	$0.00
Total	**$0.00**

The Evaluators summarize the program-specific impact analysis activities, results, conclusions, and recommendations for the Home Energy Audit 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 Home Energy Audit Program.

3.2.6.2 Database Review & Document Verification

Before conducting the billing analysis, the Evaluators conducted a database review for the Home Energy Audit Program. The Evaluators reviewed the list of participants of the Home Energy Audit Program in PY2024. The Evaluators identified participating customers with natural gas service in the Idaho service territory. The Evaluators found no duplicate participants in the project data and found that program data appropriately reflected customer rate information.

3.2.6.3 Verification Surveys

The Evaluators did not conduct verification surveys for the Home Energy Audit Program in PY2024.

3.2.6.4 Impact Analysis

The Evaluators conducted the following impact evaluation methodologies to attempt to estimate verified net energy savings in the Residential Home Energy Audit Program:

- Billing Analysis with counterfactual group (IPMVP Option C)

This program provides direct install measures to customers. The Avista auditor may provide recommendations for improvements that may be rebated through Avista's programs. In addition, the Avista auditor may also provide recommendations for home improvements that Avista does not currently incent for. Therefore, in order to capture this combination of effects, ADM conducted a billing analysis with a counterfactual group selected via propensity score matching.

The measures rebated by the customer through other Avista channels were removed from the average household billing analysis results, in order to remove double counting effects. Due to the participation rate, the Evaluators included Washington Electric, Washington Gas, Idaho Electric, and Idaho gas participants in the census billing analysis. However, the Evaluators found the billing analysis did not result in statistically significant natural gas impacts for the program. This is likely due to high variance in participating household energy usage and combined with the small magnitude of potential behavioral savings, a large treatment group is often recommended to identify a small treatment effect. The Evaluators will attempt to estimate statistically significant savings through billing analysis in PY2025 using extended participant data.

3.2.6.5 ***Verified Savings***

The Evaluators conducted a census billing analysis to estimate the impacts of the education efforts of the Home Energy Audit Program. However, this effort did not result in statistically significant natural gas impacts[13]. The Evaluators recommend re-attempting a billing analysis in PY2025 with extended participant data.

[13] The Evaluators successfully quantified electric impacts through the Home Energy Audit Program, reflected in the Idaho Electric Impact Evaluation Report.

3.2.7 On Bill Repayment Program

The On-Bill Repayment/Financing Program provides on-bill repayment/financing programs for residential and small business customers. Avista's on-bill repayment (OBR)/financing program returned as an offering after a half decade hiatus. In 2023 Avista started offering customers access to OBR through its partner the Puget Sound Cooperative Credit Union (PSCCU). OBR, through PSCCU, offers lower rate loans for energy-efficient projects to homeowners and business owners 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 Program and that can therefore be served directly through the partnering community action agencies.

Avista does not claim energy savings for OBR, as the savings associated with any measure installed using OBR financial support is claimed through the relevant and native Avista program. However, Avista intends to claim additional educational and behavioral impacts through the OBR Program.

During the PY2024 impact evaluation, the Evaluators did not conduct an impact evaluation for the On Bill Repayment Program. The Evaluators intend to conduct an impact evaluation of this program in PY2025, as it is a "low risk" program. Additionally, there was no program participation for Idaho customers in PY2024.

Table 3-24: On Bill Repayment Program Claimed Natural Gas Savings

Measure	PY2024 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
On Bill Repayment	0	NA	NA	NA	NA
Total	**0**	**NA**	**NA**	**NA**	**NA**

Avista does not quantify expected savings for the OBR Program. The following table summarizes the incentive costs associated with the program.

Table 3-25: On Bill Repayment Program Claimed Costs by Measure

Measure	Incentive Costs
On Bill Repayment	$0.00
Total	**$0.00**

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 did not complete an impact evaluation on Avista's Low-Income Program. However, the Low-Income Program will be evaluated in PY2025. For the purposes of this report, the expected savings claimed by Avista is summarized in this section for the Low-Income Program. 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	1,380.11	NA	NA
Total Low-Income	**1,380.11**	**NA**	**NA**

In PY2024, Avista completed and provided incentives for low-income gas measures in Idaho and achieved total natural gas savings of 1,380 Therms.

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

As specified in the previous section, the Evaluators did not complete an impact evaluation on Avista's Low-Income Program. For the purposes of this report, the expected savings claimed by Avista is summarized in this section for the Low-Income Program. Table 4-2 summarizes the measures offered under this program.

Table 4-2: Low-Income Program Measures

Measure	Impact Analysis Methodology
G Air Infiltration	Avista TRM
G Attic Insulation With Natural Gas Heat	
G Duct Insulation	
G Duct Sealing	
G Exterior Doors	
G Floor Insulation	
G Health Safety and Repair	
G Natural Gas Furnace	
G 50 Gallon Natural Gas Water Heater	
G Tankless Natural Gas Water Heater	
G Window Replc With Natural Gas Heat	

Table 4-3 summarizes the claimed natural gas savings for the Low-Income Program.

Table 4-3: Low-Income Program Claimed Natural Gas Savings

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Air Infiltration	2	24.46	NA	NA	NA
G Attic Insulation With Natural Gas Heat	2	210.6	NA	NA	NA
G Duct Insulation	1	7	NA	NA	NA
G Duct Sealing	2	40.34	NA	NA	NA
G Exterior Doors	2	19.32	NA	NA	NA
G Floor Insulation	1	78.68	NA	NA	NA
G Health Safety and Repair	9	0	NA	NA	NA
G Natural Gas Furnace	14	871.36	NA	NA	NA
G 50 Gallon Natural Gas Water Heater	2	14.1	NA	NA	NA
G Tankless Natural Gas Water Heater	1	66.5	NA	NA	NA
G Window Replc With Natural Gas Heat	3	47.75	NA	NA	NA
Total	**39**	**1,380.11**	**NA**	**NA**	**NA**

The following table summarizes the incentive costs associated with the program.

Table 4-4: Low-Income Program Costs

Measure	Incentive Costs
G Air Infiltration	$168.92
G Attic Insulation With Natural Gas Heat	$3,363.75
G Duct Insulation	$110.40
G Duct Sealing	$271.00
G Exterior Doors	$1,355.00
G Floor Insulation	$1,253.82
G Health Safety and Repair	$55,332.25
G Natural Gas Furnace	$106,501.09
G 50 Gallon Natural Gas Water Heater	$8,367.15
G Tankless Natural Gas Water Heater	$4,188.30
G Window Replc With Natural Gas Heat	$5,118.05
Total	**$186,029.73**

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 PY2024. 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 2024, 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	No PY2024 Participation			
Shell	3,600	3,600	3,600	100.0%
Midstream (NR)	26,804	25,594	24,769	92.4%
Site-Specific	5,408	5,408	4,818	89.1%
Total	**35,812**	**34,602**	**33,187**	**92.7%**

In PY2024, Avista completed and provided incentives for non-residential natural gas measures in Idaho and reported total natural gas energy savings of 33,187 Therms. All programs exceeded savings claims, leading to an overall achievement of 92.7% 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 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
Shell	5	5	±0.0%
Midstream[14]	112	105	±9.27%
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 is 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.

[14] 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 PY2024 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

In PY2024 there were no participation or claimed kWh savings from the Prescriptive HVAC Program.

Table 5-4: Prescriptive HVAC Program Verified Natural Gas Savings

Measure	PY2024 Participation (Savings Units)	Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Realization Rate
Totals:	**0**	**0**	**0**	**0**	**N/A**

5.2.2 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 5-5 summarizes the measures rebated in PY2024 under this program.

Table 5-5: 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 5-6: Prescriptive Shell Program Verified Natural Gas Savings

Measure	PY2024 Participation (Projects)	Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Realization Rate
Attic =< R11 to R30-R44	1	432	432	432	100.0%
Attic =< R11 to R45+	3	2,018	2,018	2,018	100.0%
Wall =< R4 to R11-R19	2	853	853	853	100.0%
Wall =< R4 to 19+	1	297	297	297	100.0%
Totals	**7**	**3,600**	**3,600**	**3,600**	**100.0%**

The following table summarizes the incentive costs associated with the program.

Table 5-7: Prescriptive Shell Program Costs by Measure

Measure	Measure Count (Square Feet Installed)	Incentive Costs
Attic =< R11 to R30-R44	4,800	$4,800
Attic =< R11 to R45+	15,520	$18,954
Wall =< R4 to R11-R19	3,556	$3,556
Wall =< R4 to 19+	824	$1,030
Totals	**24,700**	**$28,340**

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.

5.2.2.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Shell Program. The Evaluators reviewed all rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.3. Data points checked between project applications and program tracking data include R-levels, square footage of installation, HVAC configuration 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 Shell Program Verification Precision

Population	Sampled	Precision
7	7	±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.

5.2.2.2 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.

5.2.2.3 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 3,600 therms with a realization rate of 100.0%, as displayed in Table 5-6. Evaluators did not find any deviations from TRM UES.

5.2.3 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 3.2.5 the residential portion.

Table 5-9 summarizes the measures rebated in PY2024 under this program.

Table 5-9: Non-Residential Midstream Program Measures

Category	Measure	Impact Savings Methodology
Food Service	Combination Oven	RTF Combination Ovens
	Convection Oven	RTF Convection Ovens
	Dishwasher	DOE CFS Calculator
	Fryer	RTF Fryers
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 5-10: Non-Residential Midstream Program Verified Therms Savings

Measure	PY2024 Participation (Measures)	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Realization Rate
Boiler	2	4,966	4,966	4,945	99.6%
Combination Oven	2	534	534	534	99.9%
Convection Oven	3	384	384	384	100.0%
Dishwasher	4	678	678	678	100.0%
Fryer	18	6,284	5,621	5,621	89.5%
Furnace	87	9,787	9,787	10,988	112.3%
Instantaneous Water Heater	10	2,745	2,471	1,358	49.5%
Storage Water Heater	4	1,427	1,345	261	18.3%
Total	**130**	**26,804**	**25,786**	**24,769**	**92.4%**

The following table summarizes the incentive costs associated with the program.

Table 5-11: Non-Residential Midstream Program Incentives

Measure	Measure Count	Incentive Costs
Boiler	2	$21,000
Combination Oven	2	$5,200
Convection Oven	3	$4,200
Dishwasher	4	$0
Fryer	18	$22,050
Furnace	87	$81,990
Instantaneous Water Heater	10	$5,989
Storage Water Heater	4	$3,599
Totals	**130**	**$144,027**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for the Midstream Program in the section below.

5.2.3.1 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 5-12 shows the project population, the number of measures checked and the overall precision.

Table 5-12: 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.

5.2.3.2 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 were calculated using standard engineering algorithms with project-specific specs and RTF inputs.

5.2.3.3 Verified Savings

The verified savings for the program are 24,769 Therms with a realization rate of 92.4%, as displayed in Table 5-10. Below, the Evaluators discussed measures whose realization rates differ significantly from 100%:

- **Fryers:** Expected savings were based on a general capacity category found in the RTF workbook, however the Evaluators used RTF UES workbooks to verify savings for this measure, which were specific to the equipment. The Evaluators applied the RTF capacity-specific UES to each project appropriately, which resulted in are slightly lower project-level savings than expected and claimed.
- **Instantaneous Water Heaters:** Claimed savings were calculated based on therms saved per input BTUh (rated) of the equipment and assumed average equipment sizing, whereas verified savings calculations were carried out using standard engineering algorithms, which include actual equipment specifications and annual water use.
- **Storage Water Heaters:** Similar to instantaneous water heaters, claimed savings were calculated based on Therms saved per input BTUh (rated) of the equipment and assumed average equipment sizing, whereas verified savings calculations were carried out using standard engineering algorithms, which include verified equipment specifications and annual water use.

5.2.4 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 PY2024 three 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 5-13: Site-Specific Program Verified Natural Gas Savings

PY2024 Participation	Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Verified Realization Rate
3	5,408	5,408	4,818	89.1%

The Site-Specific Program displayed verified savings of 4,818 Therms with a realization rate of 89.1% against the expected savings for the program.

Table 5-14: Site-Specific Program Costs

Program	Incentive Costs
Site-Specific	$18,928

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.

5.2.4.1 Sample Design

In their review, the Evaluators conducted reviews of all three natural gas savings projects completed during the PY2024 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 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 to two of the three project sites.

5.2.4.2 Impact Approaches and Verified Savings

SSOP 143056: The project is a music conservancy in a historic building. Existing windows were single pane with a U-value of 1 and SHGC of 1. A total of 214 ft^2 of existing windows were replaced with efficient double pain models with U-factors of 0.31 or 0.30 and a SHGC or .20 or 0.18, depending upon

the specific window. Window projects typically produce savings too low to measure using a facility-level regression analysis, so the Evaluators used engineering algorithms and weather specific to the facility's geographic location to verify expected savings estimates. In doing so, the Evaluators calculated 426 verified therms, leading to a 90.3% realization rate.

SSOP 140807: The project is a four-unit strip mall/freestanding retail facility whose owner increased insulation levels from R5 to R38 over 2,600 square feet in four suites. Verified savings were measured via billing data regression analysis. The results show only 369 of the expected 913 therms in savings, or 40.5%. The regression model showed an excellent fit and robust variables. Regressions of individual units show similar results. Materials used to develop expected savings were not available, thus the Evaluators are not able to determine the cause to the difference. Multiple factors could cause verified savings to be lower than expected, including changes in usage patterns of the facilities (such as a temporary closure) or a poorly sealed structure (which allows conditioned air to escape to unconditioned spaces).

SSOP 121987: The project is a ski and mountain bike resort whose owners replaced four (4) existing boilers with high efficiency models used to heat water primarily for the lodging portion of the resort. Project documents included the facility-level regression analysis used to produce expected savings. The Evaluators recreated the analysis and determined it to be conducted correctly and the savings to be statistically significant. Further, the Evaluators also performed a second analysis using engineering algorithms for boiler retrofits, whose results firmly support the results of the billing analysis. Verified savings are 4,023 therms, 100% of expectations.

Verified savings were developed for each site. Table 5-15 presents realization at the site level, with program-level savings.

Table 5-15: Site-Specific Expected, Adjusted and Verified Therm Savings by Project

Project ID	Expected Therm Savings	Verified Therm Savings	Realization Rate
SSOP_143056	472	426	90.3%
SSOP_140807	913	369	40.5%
SSOP_121987	4,023	4,023	100.0%
Totals	**5,408**	**4,818**	**89.1%**

5.2.4.3 Verified Savings

The Site-Specific Program in total displays a realization rate of 89.1% with 4,818 Therms verified natural gas energy savings in the Idaho service territory, as displayed in Table 5-16.

Table 5-16: Site-Specific Impact Summary

Expected Therm Savings	Adjusted Therm Savings	Verified Therm Savings	Realization Rate
5,408	5,408	4,818	89.1%

6. Appendix A: 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 in PY2023. As detailed previously, the Evaluators utilized the response results from this survey effort to incorporate in-service rates into the PY2024 verified savings estimates. A full process evaluation and verification survey effort will be implemented in PY2025.

Survey respondents confirmed installing between one and three measures that were rebated by Avista, displayed in Table 6-1. 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 6-1: 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 6-2. 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 6-2: Survey Respondent Home Characteristics[15]

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 1,000 ft^2	6.6%
	1,000-1,999 ft^2	42.4%
	2,000-2,999 ft^2	32.3%
	3,000-3,999 ft^2	13.5%
	4,000 ft^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%

[15] Four contractors or construction companies were not asked these questions.

APPENDIX C - 2024 COST-EFFECTIVENESS TABLES

Electric

Electric Portfolio

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 23,222,846	$ 28,252,370	0.82
UCT	$ 23,222,846	$ 16,510,052	1.41
PCT	$ 37,174,523	$ 25,693,995	1.45
RIM	$ 23,222,846	$ 18,633,116	1.25

Electric Portfolio (Without Low-Income)

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 23,097,518	$ 28,003,903	0.82
UCT	$ 23,097,518	$ 16,282,545	1.42
PCT	$ 36,835,495	$ 25,459,335	1.45
RIM	$ 23,097,518	$ 18,401,040	1.26

Commercial/Industrial

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 18,758,389	$ 26,148,400	0.72
UCT	$ 18,758,389	$ 15,135,905	1.24
PCT	$ 31,827,752	$ 24,081,858	1.32
RIM	$ 18,758,389	$ 17,086,053	1.10

Residential

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 4,339,129	$ 1,855,502	2.34
UCT	$ 4,339,129	$ 1,146,640	3.78
PCT	$ 5,007,744	$ 1,377,477	3.64
RIM	$ 4,339,129	$ 1,314,988	3.30

Low-Income

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 125,328	$ 248,467	0.50
UCT	$ 125,328	$ 227,507	0.55
PCT	$ 339,028	$ 234,660	1.44
RIM	$ 125,328	$ 232,075	0.54

NATURAL GAS

Natural Gas Portfolio

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 2,052,929	$ 1,660,247	1.24
UCT	$ 2,052,929	$ 1,962,187	1.05
PCT	$ 3,633,250	$ 1,020,983	3.56
RIM	$ 2,052,929	$ 2,090,636	0.98

Natural Gas Portfolio (Without Low-Income)

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 2,038,335	$ 1,452,188	1.40
UCT	$ 2,038,335	$ 1,773,443	1.15
PCT	$ 3,432,627	$ 815,639	4.21
RIM	$ 2,038,335	$ 1,901,087	1.07

Commercial/Industrial

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 238,463	$ 300,269	0.79
UCT	$ 238,463	$ 235,653	1.01
PCT	$ 429,759	$ 236,108	1.82
RIM	$ 238,463	$ 255,005	0.94

Residential

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 1,799,871	$ 1,151,918	1.56
UCT	$ 1,799,871	$ 1,537,790	1.17
PCT	$ 3,002,867	$ 579,530	5.18
RIM	$ 1,799,871	$ 1,646,082	1.09

Low-Income

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 14,594	$ 208,059	0.07
UCT	$ 14,594	$ 188,744	0.08
PCT	$ 200,624	$ 205,345	0.98
RIM	$ 14,594	$ 189,549	0.08

APPENDIX D – 2024 EXPENDITURES BY PROGRAM

Program	Electric	Natural Gas	Total
Energy Efficiency			
Low-Income/CEEP			
Low-Income	$ 213,700	$ 186,030	$ 399,730
Residential			
Shell	$ 161,589	$ 430,006	$ 591,594
Fuel-Efficiency	$ 30,300	$ -	$ 30,300
ENERGY STAR/NEEM Manufactured Housing Program	$ 26,000	$ -	$ 26,000
Appliances	$ 50,726	$ 63,340	$ 114,066
Midstream	$ 400,000	$ 709,650	$ 1,109,650
Home Energy Audit	$ -	$ -	$ -
On-Bill Repayment	$ -	$ -	$ -
Commercial/Industrial			
Prescriptive Lighting	$ 2,297,810	$ -	$ 2,297,810
Small Business Direct-Install Lighting	$ 9,497,604	$ -	$ 9,497,604
Commercial Prescriptive HVAC VFD Retrofit	$ 12,443	$ -	$ 12,443
Commercial Grocer	$ 4,400	$ -	$ 4,400
Commercial Shell	$ 9,814	$ 28,340	$ 38,154
Green Motors Rewind	$ -	$ -	$ -
Midstream	$ 84,815	$ 144,028	$ 228,843
Site-Specific	$ 1,162,477	$ 18,928	$ 1,181,405
Building Operator Certification	$ -	$ -	$ -
Energy Efficiency Total	$ 13,951,677	$ 1,580,322	$ 15,531,999
Market Transformation			
Northwest Energy Efficiency Alliance	$ 679,292	$ 188,004	$ 867,296
Market Transformation Total	$ 679,292	$ 188,004	$ 867,296
Other Programs and Activities			
General Implementation	$ 757,200	$ 27,639	$ 784,839
Labor Costs	$ 1,597,621	$ 223,797	$ 1,821,418
Marketing and Outreach	$ 285,997	$ 31,644	$ 317,642
Third-Party Implementation	$ 203,524	$ 130,423	$ 333,946
Pilot Programs	$ 4,941	$ 573	$ 5,513
EM&V/CPA	$ 144,091	$ 75,883	$ 219,974
Other	$ 30	$ 7	$ 37
Other Programs and Activities Total	$ 2,993,404	$ 489,966	$ 3,483,370
Grand Total	$ 17,624,373	$ 2,258,292	$ 19,882,664

APPENDIX E – 2024 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	34	Homes	20,703	$ 85,894	13	Homes	428	$ 12,840
HVAC	8	Units	44,074	$ 116,320	14	Units	871	$ 107,902
Water Heat	-	Units	-	$ -	3	Units	81	$ 12,670
Lighting	10	Units	62	$ 286	-	NA	-	$ -
Health and Safety	11	HHS	-	$ 23,003	9	HHS	-	$ 55,332
ENERGY STAR Refrigerator	1	Units	39	$ 2,005	-	NA	-	$ -
Low-Income Total	64		64,878	$ 227,507	39		1,380	$ 188,744
Residential								
Shell	899	Units (Measures)	107,769	$ 194,083	511	Units (Measures)	20,905	$ 487,919
ENERGY STAR/NEEM Manufactured Housing Program	26	Homes	77,951	$ 68,628	-	Homes	-	$ -
Multifamily Weatherization	65	Units (Measures)	108,911	$ 85,265	23	Units (Measures)	1,166	$ 8,204
Appliances	575	Units (Measures)	92,354	$ 53,240	495	Units (Measures)	19,327	$ 82,892
Midstream	897	Units (Measures)	1,891,168	$ 697,996	1,640	Units (Measures)	144,315	$ 958,776
Fuel-Efficiency	15	Units (Measures)	103,207	$ 47,308	-	NA	-	$ -
Home Energy Audit	120	Homes	9,418	$ 120	263	Homes	-	$ -
On-Bill Repayment	-	Units (Measures)	-	$ -	-	Units (Measures)	-	$ -
Residential Total	2,597		2,390,778	$ 1,146,640	2,932		185,712	$ 1,537,790
Commercial/Industrial								
Prescriptive Lighting	68,780	Units (Measures)	6,888,637	$ 2,822,203	-	NA	-	$ -
Small Business Direct-Install Lighting	618	Projects	15,161,166	$ 10,553,584	-	NA	-	$ -
Commercial Prescriptive HVAC VFD Retrofit	2	Projects	115,111	$ 18,096	-	Projects	-	$ -
Commercial Grocer	58	Projects	37,199	$ 7,659	-	Projects	-	$ -
Commercial Shell	7	Projects	16,263	$ 12,157	7	Projects	3,600	$ 34,495
Green Motors Rewind	-	Motor Rewind	-	$ -	-	NA	-	$ -
Midstream	105	Projects	172,150	$ 99,033	130	Projects	24,769	$ 176,961
Site-Specific	18	Projects	5,185,350	$ 1,619,545	3	Projects	4,818	$ 24,197
Building Operator Certification	1	Projects	119,000	$ 3,628	-	NA	-	$ -
Commercial/Industrial Total	69,589		27,694,876	$ 15,135,905	140		33,187	$ 235,653
Energy Efficiency Total	72,250		30,150,532	$ 16,510,052	3,111		220,279	$ 1,962,187

APPENDIX F – NEEA 2024 ANNUAL SAVINGS REPORT – ELECTRIC

Memorandum

March 26, 2025

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: Becky Walker, Chief Program Officer; Stephanie Rider; Director Portfolio Management, Data Strategy and External Reporting, Nathan Martinez, Director, Market Analytics, Research and Evaluation; Virginia Mersereau, Vice President of Corporate Strategy and Communications

FROM: Christina Steinhoff, Principal Planning Analyst, NEEA Data, Planning and Analytics

SUBJECT: Final 2024 Annual Savings Report

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 and businesses in the Northwest. At its heart, NEEA is a collaborative organization that works with all parts of the market to enable efficient technology choices for consumers: gathering and analyzing data to inform both regional power planning and utility programs, leveraging its relationships with mid and upstream market actors like manufactures and retailers, and improving how products are tested and perform in real life applications. Activities include:

- Providing data and insights to understand how the market is responding to the technology solutions to inform resource planning and identify new opportunities and product options for energy efficiency.
- Providing Avista with an up-to-date, neutral, and representative characterization of existing Northwest building stock and energy trends, which inform market transformation programs and identify opportunities for private sector investment.
- Leveraging trusted relationships with the supply chain to share insights on how well new technologies perform, save energy, and reduce waste.
- Creating product specifications to guide how companies can voluntarily adjust their products to be more efficient and meet various needs throughout the region, getting as much energy savings as possible while ensuring products deliver customer benefits. In tandem, NEEA works midstream with retailers and distributors to expand the range of customer options in Montana stores and collect information on what's being sold in Avista Utilities' Idaho service territory.
- Aggregating and leveraging the power of the region to identify and vet emerging technologies and then create the market conditions necessary for them to take hold. The

alliance also helps Avista Utilities Idaho capture energy savings through these voluntary interventions and by informing codes and standards that represent consumer and business needs.

One outcome of NEEA's work over time is energy savings in Avista Utilities' Idaho service territory. For 2024, **NEEA is reporting 0.79 aMW of first-year energy savings.** This value is an increase of 16% over what NEEA reported in 2023.

Some of the highlights of NEEA's work bringing direct benefit to Avista Utilities' Idaho customers include:

- Adding two new distributors of efficient pumps in Idaho to the program, providing additional data and influence in the local market
- Working with manufacturers to bring low cost, efficient clothes dryers to the market
- Completing several studies that Avista Utilities can access to provide data and intel for their local efforts

This memo provides more information about:

1. **2024 savings estimates** based on the market transformation work of NEEA affecting Idaho and eastern Oregon over the past years.
2. **2023 Updates** based on new market and technical data showing additional savings in Avista Utilities' Idaho service territory.
3. **Other updates** highlighting work NEEA completed in 2024 to support Avista Utilities' Idaho energy and program planning needs.

Details about allocation, baseline, and technical assumptions are in the attached Excel spreadsheet.

Please contact Christina Steinhoff, Principal Analyst, at csteinhoff@neea.org with any questions about this report.

Final 2024 Savings Estimate Summary

NEEA estimates Avista Utilities' Idaho 2024 annual electric energy savings associated with its initiatives is 0.79 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).

Northwest Energy Efficiency Alliance
421 SW Sixth Avenue, Suite 600, Portland, OR 97204
503.688.5400 | Fax 503.688.5447

Table 1: 2024 Annual Report Savings Estimates (aMW)

	Idaho
Total	0.79
Residential	0.40
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]

2023 Annual Report Updates

NEEA updates its historical savings estimates based on new data. For 2023, the savings increased from 0.68 to 0.69 aMW based additional data. NEEA was able to match additional models to ENERGY STAR qualifying levels based on new data for both clothes dryers and televisions. Savings increased by 0.01 aMW.

More details about the updates are available in the attached spreadsheet *Variance_2023* worksheet.

2024 Highlights

NEEA works with all parts of the market to enable efficient technology choices for consumers: gathering and analyzing data to inform both regional power planning and utility programs, leveraging its relationships with mid and upstream market actors like manufactures and retailers, and improving how products are tested and perform in real life applications. This work brings more efficient products and options to the market, which are made available to consumers and business across the Northwest through their local utilities. The sections below highlight that work for 2024.

Consumer Products

NEEA works with extra-regional program administrators and national retailers to utilize midstream incentives that signal energy efficient options in the supply chain while gaining access to full-category sales data. The incentives encourage manufacturers and retailers to build, purchase, stock and promote high-efficiency products. Products include white goods, air cleaners,

[1] Net Market Effects is savings above the Naturally Occurring Market Baseline established at the start of a program net of utility program savings.

televisions and other home electronics. The data retailers provide allows NEEA to identify the most promising affordable energy efficiency opportunities and gain insights that improve energy test procedures, helping consumers distinguish between products. The program saw momentum for both laundry and television products in 2024.

- **Laundry**: The sales volume of residential laundry centers[2] has increased by 62% from 2023 to 2024 (41,000 regional sales in 2024), driven in large part by products that incorporate a heat pump dryer which make up 30% of the laundry center sales in 2024. NEEA influenced advancement of heat pump drying technology as part of its Super-Efficient Dryers program dating back to 2012. Additionally, the market share for ENERGY STAR dryers in the standalone market rose from approximately 45% to 47%. This change indicates an upward trend in market share growth for ENERGY STAR dryers.
- **Televisions:** NEEA is continuing to expand its data pipeline to effectively track the market adoption of ENERGY STAR version 9 televisions—a specification developed by NEEA and its partners. Using product test data that was recently published in the California Energy Commission's Appliance Efficiency Database and sales data NEEA purchases for the Northwest region, the Retail Products Portfolio program can estimate that as much as 26% of the sales meet the ENERGY STAR criteria. NEEA's Retail Products Portfolio is now adding televisions to its midstream program to increase certification levels and gather more market intelligence.

Water Heating

NEEA influenced early adoption of heat pump water heaters in the Northwest by promoting awareness of the product's benefits and building a strong foundation in the Northwest.[3] In May 2024, the Department of Energy published a final rule mandating a shift for most electric storage water heaters to heat pump technology by 2029. NEEA's ongoing engagement is crucial for addressing market barriers and preparing the region to adopt and benefit from the recently adopted federal standard. NEEA is supporting the Northwest market by working to strengthen the workforce and engage both regionally and nationally to identify solutions to increase adoption of these water heaters across the region, with particular focus on areas with slower adoption rates.

Space Heating

NEEA has been working in the residential space-heating market since the early 2000s starting with ductless heat pumps and now moving toward advanced heat pumps. The Ductless Heat Pumps

[2] A single product that does both washing and drying, either in the form of a connected, stacked machine or an all-in-one combo unit.

[3] NMR Group, Inc. 2023. Heat Pump Water Heater Market Progress Evaluation Report # 7.

program accelerated market acceptance and adoption of inverter-driven ductless heat pumps in electrically heated homes through establishing relationships with manufacturers, distributors, and retailers to enhance product design and availability. NEEA is now leveraging these relations to work on a set of low- and no-cost improvements that meaningfully increase installed heat pump system efficiency. In 2024, NEEA focused on building the market's awareness and capacity for competitively differentiating these advanced heat pump improvements, with efforts on several fronts.

NEEA's leadership and participation in 2024 contributed to updated specifications adopted into: 1) to the Consortium for Energy Efficiency Residential Electric HVAC Specification, 2) ENERGY STAR Product Specification v.6.2 for Central Air Conditioners and Heat Pump Equipment, and 3) the U.S. Department of Energy (DOE) amendment to the Federal test procedure for central air conditioners and heat pumps.

NEEA's Low Load Efficiency (LLE) laboratory research study was concluded, with six units tested in UL labs over the summer of 2024, followed by a physical "tear down" of units to help identify the mechanical source of LLE savings. These efforts actively engaged a broad spectrum of manufacturers, with the project receiving donated heat pumps from several manufacturers, along with manufacturer staff time to commission products on site. To fully leverage recent studies, NEEA has initiated updated field and lab data analysis and energy modeling to refine estimates of savings rates for advanced heat pump improvements. A Request for Proposals was launched in 2024 for this effort.

In December, NEEA kicked off a new collaboration of technical experts, two national laboratories and manufacturers to build consensus on a new heat pump connected commissioning specification. NEEA expects to report savings from this program in 2025/2026.

Commercial Lighting

NEEA engages commercial lighting manufacturers and their supply chain to enhance promotion and luminaire level lighting controls sales in the Northwest. In 2024, NEEA added a manufacturer to the program that serves Montana and Idaho territories. Including these sales made a significant difference to total observed sales. NEEA works with manufacturers by partnering with manufacturer representatives to educate lighting specifiers, lighting engineers and installers the capabilities and value of luminaire level lighting controls. Recently, NEEA influenced the Illuminating Engineering Society's Lighting Practice committee to add these controls to its Recommended Practice standards. Many lighting designers and building managers reference this standard when making lighting decisions.

New Construction

NEEA's efforts support and encourage innovation within the supply chain and inform voluntary specifications and codes ensuring that consumers and building owners have choices/options for products that are proven to perform well and save energy. In 2024, NEEA started a code compliance evaluation for Idaho commercial code. The study assesses the path(s) by which and degree to which code compliance is achieved with the amended 2018 International Energy Conservation Code (IECC) in newly constructed buildings and measures the energy performance of a subset of these buildings as compared with the average energy performance of buildings constructed under previous code. The results of the analysis and studies will inform NEEA's market intervention strategies for new construction including its training and education programs.

Emerging Technology

NEEA aggregates and leverages the power of the region, creating economies of scale to identify and vet emerging technologies, bringing forward new products that are proven to perform well and save energy. Two major products saw ENERGY STAR specification changes in 2024: Air Source Heat Pumps and Room Air Conditioners. NEEA provided support and suggestions for ENERGY STAR to amend the Air Source Heat Pump specification, increasing the performance stringency to achieve ENERGY STAR Most Efficient performance levels, which went into effect on December 4. NEEA also provided feedback to ENERGY STAR in developing a test method for room air conditioners with heat pump heating modes. This update went into effect in November and more accurately captures the energy efficiency benefits of the emerging category of room heat pumps.

Additionally, ENERGY STAR began revisions of the Residential Clothes Dryer Specification, in which NEEA provided substantial feedback and data from its numerous laundry efforts, including heat pump dryer testing, field laundry research, and laundry pair testing. Increasing the availability of high-performing efficient technologies in the market gives customers more and better options when it comes to the products and technologies they can purchase.

Building Stock Assessments

NEEA has five regional studies that hit milestones in 2024. The 2022 Residential Building Stock Assessment was completed, and the study's final report and datasets were posted to neea.org. The design phase of the 2025 Commercial Building Stock Assessment finished and the study began collecting data through commercial building site visits. The Home Energy Metering Study and Commercial Energy Metering Studies both completed their metering installations and continue to capture metering data on hundreds of buildings. Last, NEEA began designing a new study on motor-driven system characteristics named the 2027 Motor-Systems Stock Assessment.

Northwest Energy Efficiency Alliance
421 SW Sixth Avenue, Suite 600, Portland, OR 97204
503.688.5400 | Fax 503.688.5447

Market Data and Research

NEEA's Market Research and Evaluation team managed nearly 40 third-party research and evaluation studies to support alliance Market Transformation programs. Seven program market progress evaluations launched or concluded in 2024, including Manufactured Homes, Retail Product Portfolio, Extended Motor Products, Commercial and Residential Building Codes, Luminaire Level Lighting Controls, and two Commercial HVAC programs. These mixed method, longitudinal evaluations are instrumental to understanding the market opportunity for these measures, as well as for tracking NEEA's progress toward its Market Transformation goals. These evaluations together with several market research studies exploring emerging market transformation program themes including consumer use and attitudes toward connected consumer products and the market for agricultural pumps, can deliver high-value and actionable market intelligence for Avista Utilities going forward.

Northwest Energy Efficiency Alliance
421 SW Sixth Avenue, Suite 600, Portland, OR 97204
503.688.5400 | Fax 503.688.5447

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 and its partners. 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

March 27, 2025

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: Becky Walker, Chief Program Officer; Stephanie Rider; Director Portfolio Management, Data Strategy and External Reporting, Nathan Martinez, Director, Market Analytics, Research and Evaluation; Virginia Mersereau, Vice President of Corporate Strategy and Communications

FROM: Christina Steinhoff, Principal Planning Analyst, NEEA

SUBJECT: Final 2024 Annual Natural Gas Savings Report

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 and businesses in the Northwest. At its heart, NEEA is a collaborative organization that works with all parts of the market to enable efficient technology choices for consumers: gathering and analyzing data to inform both regional power planning and utility programs, leveraging its relationships with mid and upstream market actors like manufactures and retailers, and improving how products are tested and perform in real life applications. Activities include:

- Providing data and insights to understand how the market is responding to the technology solutions to inform resource planning and identify new opportunities and product options for energy efficiency.
- Providing Avista Utilities Idaho with an up-to-date, neutral, and representative characterization of existing Northwest building stock and energy trends, which inform market transformation programs and identify opportunities for private sector investment.
- Leveraging trusted relationships with the supply chain to share insights on how well new technologies perform, save energy, and reduce waste.
- Aggregating and leveraging the power of the region to identify and vet emerging technologies and then create the market conditions necessary for them to take hold. The alliance also helps the regional capture natural gas energy savings through these voluntary interventions and by informing codes and standards that represent consumer and business needs.

NEEA is currently building its portfolio for natural gas energy efficiency programs.

This memo provides more information about:

1. **2024 savings estimate** based on the early market transformation work of NEEA in commercial and residential new construction as well as its new Efficient Rooftop Units program.
2. **Regional Gas Portfolio Update** highlighting work NEEA completed in 2024 to build out the gas portfolio.

Please contact Christina Steinhoff at csteinhoff@neea.org with any questions about this report.

2024 Savings Estimate

NEEA estimates Avista Utilities' Idaho 2024 annual natural gas energy savings associated with its initiatives is 285,431 Annual Therms[1] (Table 1). The Efficient Rooftop Units program is still in early market development; so, no savings above baseline were tracked. Residential values are above a natural market baseline[2] and allocated based on service territory shares (Appendix A).

Table 1: 2024 Annual Report Net Market Effects Savings* Estimates (Annual Therms)

Commercial	-
Efficient Rooftop Units**	-
Residential	285,431
New Construction (Codes)	285,431
Total	285,431

*Net Market Effects = Total Regional Savings - Local Program Savings - Baseline Savings

** The Efficient Rooftop Units program is early in NEEA's Market Development phase (Appendix B), resulting is limited savings above the natural market baseline. Savings will increase and the program's market influence increases.

Regional Gas Portfolio Update

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 (Appendix B). Table 2 lists NEEA's expectations for gas savings. The following section provides more detail about the progress toward meeting these goals.

[1] The term Annual Therms refers to the fact that NEEA reports first-year savings only in order to represent a sustained reduction in load.

[2] NEEA estimates Baseline as the savings that would have occurred without NEEA, utility, and the Energy Trust of Oregon's market intervention.

Northwest Energy Efficiency Alliance
421 SW Sixth Avenue, Suite 600, Portland, OR 97204
503.688.5400 | Fax 503.688.5447

Table 2: Savings Expectations

Program	Products	Status
Commercial New Construction	Inform future codes in Idaho	NEEA's efforts support and encourage innovation within the supply chain and inform voluntary specifications and codes ensuring that consumers and building owners have choices/options for products that are proven to perform well and save energy. In 2024, NEEA started a code compliance evaluation for Idaho commercial code. The results of the analysis and studies will inform NEEA's market intervention strategies for new construction including its training and education programs.
Residential New Construction	Specific proposals advanced in 2018 International Conservation Code in Idaho & future codes	
Efficient Rooftop Units (ERTU)	Efficient Rooftop Units (ERTU)	The program accelerates the adoption of efficient gas rooftop units in the like-for-like replacement market while working to influence the adoption of improved test procedures. NEEA is reporting savings from this program. In 2024, NEEA updated the specification to emphasize a fuel-neutral approach focusing on ERTU cabinet design and shell measures. This adjustment should help to gain better attention in the supply chain to secure commitments to this product and increase speed of market adoption
Standards	Commercial Kitchen Equipment (WA)	NEEA compiles critical market data and insights that inform voluntary local, state, and federal standards. No additional savings from new standards occurred in 2024.
Advanced Commercial Water Heating	Gas Heat Pump Water Heaters	The program moved into the Program Development stage of NEEA's Initiative Lifecycle (**Appendix B**) and is investing in research and field demonstrations that will inform market transformation strategy while validating the product performance and energy savings. NEEA will report any savings from field demonstration projects in 2025, with additional savings starting as early as 2026.
Gas High-efficiency Dedicated Outdoor Air Systems (DOAS)	Gas High-efficiency Dedicated Outdoor Air Systems (DOAS)	This program will focus on transforming the market for commercial gas hydronic systems. Due to the ability to build off the market relationships and progress made by the existing Very High Efficiency (VHE) DOAS program in the electric portfolio, NEEA is expecting to propose this program for advancement directly into the Market Development phase of the Lifecycle (**Appendix B**) in 2025.
Residential Dual-fuel Heating Ventilation and Air Conditioning (HVAC)	Dual-fuel system with a heat pump and gas furnace with controller	This program will be brought forward for consideration to advance to the Program Development phase of the Initiative Lifecycle (**Appendix B**) in Q3 2025.

Northwest Energy Efficiency Alliance
421 SW Sixth Avenue, Suite 600, Portland, OR 97204
503.688.5400 | Fax 503.688.5447

Efficient Rooftop Units

The Efficient Rooftop Units program advanced to Market Development[3] in late 2022. The program's goal is to accelerate the adoption of efficient gas rooftop units in the like-for-like replacement market while working to influence the adoption of improved test procedures and more stringent federal standards.

In 2024, the program updated its measure specification to emphasize a fuel-neutral approach that focuses on the rooftop unit cabinet design and shell measures - cabinet insulation, low-leakage dampers, and heating/energy recovery. This new specification aligns with how builders select rooftop units where the heating type provided is an option after choosing product line and feature sets. The program made the change to enhance NEEA and partner influence to increase adoption of the most efficient options.

The program also worked to encourage manufacturers to develop and promote efficient rooftop units for the light commercial market. In 2024, one light commercial manufacturer designed and worked to bring an energy recovery ventilator product to market for use in their light commercial rooftop units. The manufacturer started production on initial products. NEEA continues to vet and support development of additional product lines to expand qualified choices to customers and drive down costs of efficient options.

Finally, the program completed a performance monitoring study for two efficient rooftop units installed in Portland in 2023. The study found that the efficient rooftop unit features contributed to the expected efficiency / energy savings, though it highlighted cost and compatibility barriers that need to be addressed to reach the like-for-like replacement market.

To measure savings, NEEA collects sales data annually from HVAC distributors and manufacturers in addition to data from the annual local utility program survey. NEEA is working to recruit additional distributors and manufacturer reps to gain a better view into efficient unit sales and expects improvement in market insight over time.

[3] The purpose of this phase is to create lasting market change through direct market interventions designed to remove barriers, leverage market opportunities and tap influencers and existing channels for diffusion. Interventions are strategic, planned and adaptively managed as market dynamics change and more information is gained. During annual planning, NEEA staff look for the most impactful market levers and activities that could bolster or accelerate the achievement of alliance MT goals.

Advanced Commercial Water Heating

NEEA's Advanced Commercial Water Heating program centers on utilizing gas heat pumps as the primary heat source in commercial central water heating systems. A gas heat pump functions by transferring heat from one area to another while intensifying the heat during this process. NEEA anticipates the technology will enable water heating applications to achieve efficiencies of greater than 1.0 Thermal Efficiency and hold the technical potential to save the Northwest region more than 22 million Therms over a 20-year projection.

NEEA completed market research in 2024 indicating that most decision makers see gas heat pumps as an exciting new option and are impressed with their features, such as good return on investment and low operating costs.[4] Findings from the research will inform NEEA's market transformation program planning and help identify key target markets for possible inclusion in future program efforts.

During 2025, NEEA is launching a North American Commercial Gas Hater Heating Market characterization funded by the North American Gas Heat Pump Collaborative and led by NEEA and is in the screening and selection process for 2 sites for field demonstrations of the technology.

Gas High-Efficiency Dedicated Outdoor Air Systems

NEEA's goal is to build a portfolio of the most impactful market transformation opportunities for HVAC systems across gas and electric technologies/practices. In 2024, NEEA started a plan to add a gas option to its Very High Efficiency Dedicated Outdoor Air System specification and program. The addition will allow NEEA to more swiftly transform the commercial market through broader market engagement and demand creation. NEEA expects to publish the first Market Progress and Evaluation report for the program in 2025.

Residential Dual-Fuel HVAC

This program is currently in the Concept Assessment phase of the Initiative Lifecycle (Appendix B). The solution would pair a heat pump with a gas furnace to deliver an efficient combined HVAC system. To date, NEEA has partnered on multiple dual-fuel modeling, lab and field-testing projects in addition to convening regional stakeholders to share information about the pilot projects underway. NEEA is expecting to build off these findings to bring forward a proposal to advance to the Program Development Phase in 2025.

[4] Lieberman Research. 2025. Market Research on Existing Water Heater in Select Commercial Buildings.

Efficient Residential Gas Water Heaters

In 2024, NEEA responded to policy directives in Washington by evolving the Natural Gas Market Transformation Portfolio to prioritize dual-fuel, fuel neutral, and commercial opportunities relevant to all funders. Because of this, as well as market headwinds that these products have been experiencing, NEEA is winding down activities in Efficient Residential Gas Water Heating. NEEA will continue engagement with North American Gas Heat Pump Collaborative, other utilities, and industry groups as a part of scanning to track the commercialization and market response to this product and its viability for inclusion in future building codes or product standards.

Northwest Energy Efficiency Alliance
421 SW Sixth Avenue, Suite 600, Portland, OR 97204
503.688.5400 | Fax 503.688.5447

Appendix A: Methodology to Forecast Savings

Allocation Methodology

NEEA allocates code savings for gas measures using a state/service territory approach (Table 3). The approach uses EIA residential consumer sales for Residential Codes and nonresidential volume for Commercial Codes.

Table 3: State Code Savings Allocation Share

Sector	WA	OR	ID
Residential	0.00%	0.00%	18.33%
Commercial	0.00%	0.00%	15.38%

NEEA used service territory allocations for the Efficient Rooftop Units savings because the program is new to the market and is tracking installations by service territory.

Baseline, Local Programs and Technical Assumptions

This report follows NEEA's method of measuring gas energy savings from market transformation efforts. The baseline is an estimate of market adoption without intervention by NEEA, 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 helps funders avoid double counting energy savings.

The technical assumptions come from third-party research including NEEA contracted research and the Regional Technical Forum. Details are available within the spreadsheet accompanying this memo.

Northwest Energy Efficiency Alliance
421 SW Sixth Avenue, Suite 600, Portland, OR 97204
503.688.5400 | Fax 503.688.5447

Appendix B: Initiative Life Cycle

NEEA has a robust stage-gate process for managing its programs called the "initiative lifecycle". The ILC provides a set of core business processes & tools that ensure standardized management of investment, risk and best practices. Figure 1 shows how initiatives move through the cycle (from left to right) as NEEA learns more about their promise and potential for the region, the barriers preventing that promise from being achieved, and ways to leverage the power of the region to remove those barriers.The end of each phase is marked by a formal management review called a milestone. NEEA formally solicits approval from Natural Gas Advisory Committees at key program milestones.

Figure 1: Initiative Lifecycle

Northwest Energy Efficiency Alliance
421 SW Sixth Avenue, Suite 600, Portland, OR 97204
503.688.5400 | Fax 503.688.5447

APPENDIX H – IDAHO FURNACE BILLING ANALYSIS MEMORANDUM

Avista Idaho Furnace Billing Analysis Memorandum

7/14/2025

Introduction

ADM Associates (ADM) conducted a billing analysis to assess the natural gas savings associated with Avista Utilities' (Avista) Idaho gas furnace program participants from 2022 through 2024. As detailed below, ADM tested a variety of diJerent data cleaning scenarios and regression models, but ultimately the analysis ADM selected suggested that furnace installation in Avista's Idaho service territory was associated with annual gas savings of 80.6 therms or 10.3% of average annual gas usage. This memorandum provides an outline of ADM's methodology, details scenarios tested, and presents final savings results.

Avista shared raw data with ADM that contained monthly bills from August 2021 through June 2025 for 9,105 customers installing gas furnaces between 2022 and 2025. After reviewing the raw data, ADM conducted a billing analysis that can be split into three components, standard data preprocessing, cleaning scenario testing, and regression analyses.

Standard Data Preprocessing

ADM follows a standard data preprocessing pipeline to ensure that only relevant customers with suJicient data are included in analyses. In the case of this analysis, preprocessing included the following steps:

1. Identify any customers in both the midstream and downstream billing datasets and assign them to only one. 355 customers in both datasets were removed from the downstream and included in the midstream dataset.
2. Remove customers who participated in other energy eJiciency programs during the analysis period, this decreased the billing data customer count from ~9,100 to ~6,100.
3. Remove customers who installed furnaces prior to 2022 or after 2024, these customers will inevitably have insuJicient billing data for analysis.
4. Filter billing data to only include gas usage. While filtering billing data ADM identified 89 customers who had bills with nearly identical usage for a given billing period, so an average of those bills was taken.
5. Calendarize billing data and remove any customers with > 1 day diJerence in total billed duration after calendarization.[1]
6. Remove bills with < 24 billed days or > 31 billed days. Each billed month included in ADM's analysis should be representative of nearly all if not all days of a month.

[1] Calendarization is a process by which raw customer bills are aggregated into clean monthly buckets.

7. Add heating degree day (HDD) and cooling degree day (CDD) weather data to billing data. ADM sources weather data from the National Oceanic and Atmospheric Administration's (NOAA) Global Hourly Integrated Surface Database.[2] Weather data from the closest available weather station to each customer zip code was used. HDD and CDD calculations assumed a 65°F setpoint.
8. Remove customers who had > 1 furnace installed based on available tracking data. While some of these customers could have suJicient billing data for analysis, ADM avoided potential confounding factors by excluding them.
9. Subset billing data to only include 12 months prior to and 12 months after furnace installation for each customer (i.e., 12 months of pre period and 12 months of post-period data).

Cleaning Scenario Testing

After running these nine data preprocessing steps, ADM then tested a variety of data cleaning scenarios and regression models. The data cleaning scenarios ADM tested involved varying the following five variables:

- Number of pre-period months of billing data required (e.g., 8, 10, or 12)
- Number of post-period months of billing data required (e.g., 8, 10, or 12)
- Customer track (e.g., downstream, midstream, or both)
- Customer state (e.g., ID, WA, or both)
- Customer furnace installation year (e.g., 2022, 2023, 2024, or all years)

Ultimately, ADM selected the following data cleaning scenario. To be included in the final regression analysis, customers had to have at least 10 months of pre-period and post-period billing data, could be a part of either track, and had to reside in Idaho. Within these parameters, ADM assessed savings results by furnace installation year and across all years combined.

Regression Analysis

ADM tested six diJerent regression models but selected the following one since it maximized adjusted R-squared across all cleaning scenarios and included both temporal and weather controls.

Equation 0-1. Fixed Effect Pre/Post Regression Model Specification

$$AAAAAA_{i,t} = \alpha\alpha_{\#} + \beta\beta_{\$}(PPPPPPPP)_{i,t} + \beta\beta_{\%}(HHAAAA)_{i,t} + \beta\beta_{\&}(PPPPPPPP \times HHAAAA)_{i,t} + \beta\beta_{\bullet}(MMPPWWPPhh)_{i,t} + \beta\beta_{(}(AACCPPPPPPCCCCCC\ AACCCCCCDD)_{i,t} + \varepsilon\varepsilon_{i,t}$$

[2] https://www.ncei.noaa.gov/data/global-hourly

Where:

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the analysis period
- $AAAAAA_{!"}$ = Average daily gas usage in month *t* for household *i*
- $PPPPPPPP_{!"}$ = A dummy variable indicating pre- or post-period designation during period *t* at facility *i*
- $HHAAAA_{!"}$ = Average heating degree days during period *t* at the nearest weather station to household *i*
- $MMPPMMPPh_{"}$ = A categorical variable indicating the month during period *t*
- $AACCPPPPPPCCCCCC\ AACCCCCCDD_{!}$ = a customer-specific dummy variable isolating individual household eJects
- $\varepsilon\varepsilon_{!"}$ = The error term
- $\alpha\alpha_{\#}$= The model intercept
- $\beta\beta_{\$)(}$ = CoeJicients determined via regression

Results and Conclusions

Results of this regression analysis by measure installation year and across all three years are presented below.

Table 1. Idaho Furnace Billing Analysis Results

Year	Customers Included in Analysis	Estimated Annual Savings (therms)	Percentage Savings	p-value
2022	43	58.59	7.01%	0.010
2023	491	75.66	9.50%	0.000
2024	337	90.00	11.81%	0.000
All (2022-2024)	**871**	**80.58**	**10.26%**	**0.000**

This billing analysis suggests that between 2022 and 2024, gas furnaces installed in Idaho and rebated by Avista were associated with savings of 80.6 therms annually. These savings were statistically significant at the 0.05 alpha, as were the savings for all years assessed individually. From 2022 to 2024, estimated savings seem to have steadily increased from 58.6 therms in 2022 to 75.7 therms in 2023 to 90.0 therms in 2024.

It is unclear exactly why estimated savings were substantially lower in 2022 than in 2024, but the small sample size of 43 customers in 2022 is likely a contributing factor. With only 43 customers included in that analysis, if a few of them took winter vacations in the pre-period (after not travelling during the COVID-19 pandemic) or had increased occupancy in the post-period, that could have contributed to decreased estimated savings. Furthermore, diJerences in baseline Annual Fuel Utilization EJiciency (AFUE) for customers installing furnaces in 2022 as compared to other years could have contributed to decreased estimated savings. While Avista does not track baseline

furnace AFUE (i.e., the eJiciency of furnaces being replaced) customers in 2022 might have had baseline furnaces with higher AFUEs than customers in 2023 or 2024. It is likely that some combination of these factors contributed to the 2022 furnace billing analysis yielding estimated savings of 58.6 therms.

An assessment of customer household geography did not reveal any dramatic diJerences by year. Across 2022, 2023, and 2024 most customers installing furnaces resided near Coeur d'Alene. Similarly, an analysis of Regional Technical Forum (RTF) Heating Zone distribution by year did not reveal dramatic diJerences in customer Heating Zone assignment. Collectively this indicates that geography is likely not the main cause of diJerences in furnace savings estimates by year. ADM also assessed the average eJicient AFUE (i.e., the eJiciency of newly installed furnaces) and did not identify any major diJerences by year. Customers in 2022 had an average eJicient AFUE of 0.956 while customers in 2023 and 2024 had average eJicient AFUEs of 0.957. This diJerence in average eJicient AFUE by year is small enough that it is unlikely to cause a substantial diJerence in savings.

Ultimately, this analysis suggests that as of 2024, furnace installations by Avista's ID customers yielded gas savings of 90.0 therms or around 11.8% of average annual gas usage. Furthermore, eJicient furnaces installed by Avista customers in Idaho between 2022 and 2024 seem to be associated with savings of 80.6 therms. These annual savings estimates are substantially higher than the single family household deemed savings estimates between 36.3 and 44.9 therms included in the RTF Residential Gas Furnace UES workbook v3.1.[3] Based on this analysis, in the future it may be most pragmatic for Avista to calculate furnace gas savings based on a pre vs. post billing analysis as opposed to either a post-only heating load estimation methodology or a deemed savings method per RTF data.

[3] https://rtf.nwcouncil.org/measure/residential-gas-furnaces/

Granite Lake, Athol, Idaho