2022 Washington Electric
Energy Efficiency Annual Conservation Plan

November 1, 2021

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 contained within 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 at avistacorp.com.

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Avista Utilities' *Annual Conservation Plan* (*ACP*) is provided consistent with RCW 19.285.040 and WAC 480-109.120(2), as well as requirements outlined in Commission Order No. 01 in Docket No. UE-190912, approving Avista's 2020-21 *Biennial Conservation Plan* (*BCP*) with conditions.

As Avista begins to implement the various initiatives contained in the Clean Energy Transformation Act (CETA), the Company looks forward to expanding these efforts to more customers in future years. In 2022, the Energy Efficiency team will work to ensure that vulnerable populations and highly affected communities (together, Named Communities) have access to low-cost educational and energy efficiency resources. Avista is excited about the new opportunities that come with CETA's emphasis on energy assistance.

For the 2022-23 biennium, Avista continues its commitment of delivering reliable energy service along with the choices that matter most to its customers. The Company has aligned its priorities regarding its efforts toward making the transition to clean energy and the impacts that such a transition may have on customers; as such, 2022 and 2023 will focus on exploring avenues to provide more benefits, as well as reaching customers who have not been served before. Avista puts its communities first, and the goal for 2022-23 is to guarantee that those with the highest need are served in an adequate and transformative way. With the transition to clean energy, Avista will ensure equitable benefits are realized by Named Communities within its service territory.

The COVID-19 pandemic remains a persistent and difficult challenge. Avista's customers have experienced significant hardships – further highlighting the need to focus on keeping energy affordable. As Avista ends its current biennium, it has become evident that new avenues for reaching customers are needed. Avista's energy efficiency portfolio continues to be an effective tool for lowering customers' overall energy usage, but economic factors still prevent some from participating in meaningful energy efficiency upgrades. The planned activities for 2022 focus on new paths toward energy efficiency and exploring ways of connecting with customers outside of traditional prescriptive channels.

The 2022 *ACP* represents program efforts made by the Company to achieve its expected eligible acquisition savings for the first year of the 2022-23 biennium, along with providing details on energy efficiency-related initiatives. For 2022, Avista has identified estimated conservation savings of 48,475 megawatt-hours (MWh) from local efforts as well as 4,818 MWh from regionally acquired savings through the Northwest Energy Efficiency Alliance (NEEA),[1] combining for a total estimate of 53,293 MWh.

Table 1 provides the estimated conservation achievement (in MWh) and anticipated expenses for each market sector in Avista's program portfolio, as well as expenses for Evaluation, Measurement, and Verification (EM&V). The total expense for 2022 is estimated to be $21,682,053. Included in this amount is an estimated $1 million for new pilot programs, $1.3 million to fund NEEA regional market transformation efforts, and $390,369 related to EM&V and Conservation Potential Assessment (CPA) engagements. Avista has proposed to invest an additional $2 million into Named Community projects focusing on providing resources to address excess energy burden and benefits toward its Customer Benefit Indicators (CBIs) as identified in the Company's Clean Energy Implementation Plan (CEIP). The proportion of total utility expenditures returned to customers in the form of direct benefit is 73 percent, which is higher than in the prior biennial period due to the additional efforts toward Named Communities.

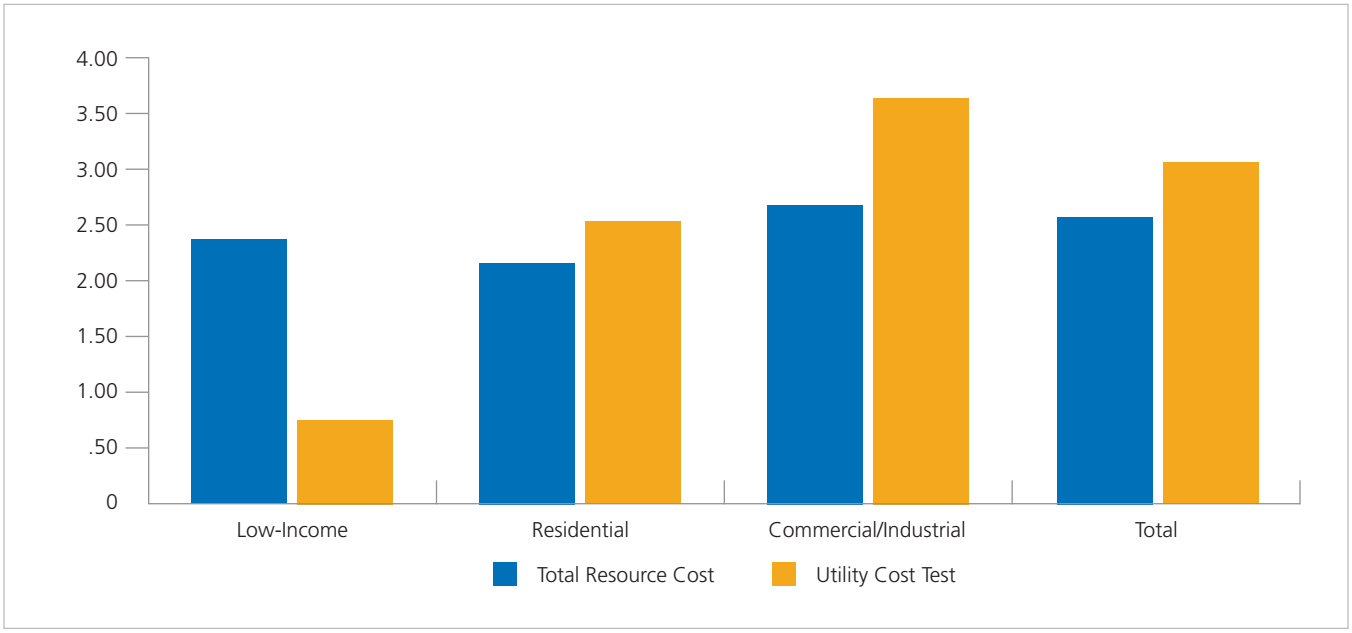
1) To achieve consistency with other Washington investor-owned utilities, Avista has included "Program Measures" and savings from "Codes & Standards Measures."

TABLE 1 – 2022 PORTFOLIO SAVINGS AND BUDGET BY SECTOR

	MWh	Budget
Low-Income Programs	790	$ 2,085,404
Residential Programs	8,484	$ 3,039,156
Commercial/Industrial Programs	39,200	$ 11,809,123
Energy Efficiency Pilot Programs	TBD	$ 1,000,000
EM&V/CPA	–	$ 390,369
NEEA	4,818	$ 1,358,000
Named Community Investments	TBD	$ 2,000,000
Total	**53,293**	**$ 21,682,053**

Cost-effectiveness is a key indicator of Avista's energy efficiency portfolio performance, and while Avista pursues all cost-effective measures, the Company also retains flexibility in its program design so that meaningful energy efficiency can be attained by all customers. Avista's Energy Efficiency Program is inclusive of a segment that targets efforts toward income-qualified customers, providing a higher level of benefit (incentive) to these more vulnerable populations. Figure 1 illustrates a summary of the portfolio cost-effectiveness for each sector and in total.

FIGURE 1 – PORTFOLIO COST-EFFECTIVENESS



	Low-Income	Residential	Commercial/ Industrial	Total
Total Resource Cost	2.41	2.19	2.65	2.56
Utility Cost Test	0.77	2.51	3.62	3.07

Introduction

The 2022 *ACP* outlines Avista's conservation offerings and its approach to energy efficiency, and provides details on verifying and reporting savings. The Company's plan is based on two key principles: the first is to pursue all cost-effective kWh savings by offering financial incentives for implementing energy-saving measures, with a simple financial payback of over one year; the second is to use the most effective mechanism to deliver energy efficiency services to customers. These mechanisms are varied and include (1) prescriptive programs or standard offers such as high-efficiency appliance rebates, (2) site-specific or customized analyses at customer premises, (3) market transformational or regional efforts with other utilities, (4) low-income weatherization services through local Community Action Partnership (CAP) agencies, (5) low-cost/no-cost advice through a multi-channel communication effort, and (6) support for cost-effective appliance standards and building codes.

This *ACP* is intended to represent a continuous planning process. Avista is committed to maintaining and enhancing meaningful stakeholder involvement within this process. Over the course of the following year, revisions and updates to the plan are to be expected as part of adaptively managing the energy efficiency portfolio.

The Company's programs are delivered across a full spectrum of customers, virtually all of whom have the opportunity to participate in – and a great many having already benefited from – the program offerings. All customers, including non-participants, benefit indirectly through enhanced cost efficiencies as a result of this portfolio approach.

The business planning process for the Avista program portfolio builds on the electric *Integrated Resource Plan* (*IRP*) and CPA processes. These are overall resource planning processes completed every two years that integrate energy efficiency and generation resources into a preferred resource scenario. The purpose of the business plan is to create an operational strategy for reaching the aggregate targets identified within the *IRP* in a manner that is cost-effective – and that considers all aspects of customer value.

The budgetary projections established within the plan are applied in a separate mid-year process to revise the conservation tariff rider funding mechanisms contained within the Schedule 91 electric tariff. The tariff rider surcharges are periodically adjusted with the objective of moving these balances toward zero.

Washington I-937 Acquisition Target for the 2022-23 Biennial Period

The Energy Independence Act (EIA) requires utilities to establish a minimum electric acquisition standard for conservation resources for each designated biennium. For 2022-23, Avista's EIA target is 101,566 MWh, which represents the overall conservation to be obtained by the Company before the additional five percent decoupling threshold[2] of 5,078 MWh. The total conservation goal is 106,644 MWh. The Avista-specific conservation goal, which removes 10,512 MWh in savings derived from NEEA, is 96,132 MWh. To arrive at the EIA penalty threshold of 91,054 MWh, the five percent decoupling penalty is removed from the Avista-specific conservation goal. Energy savings acquisitions attributed to Avista through regional market transformation have been included in the acquisition target; they have been excluded, however, from the EIA penalty threshold.

TABLE 2 – BIENNIAL CONSERVATION TARGET

2022-23 Biennial Conservation Target (MWh)	
CPA Pro-Rata Share	101,566
EIA Target	**101,566**
Decoupling Threshold	5,078
Total Utility Conservation Goal	**106,644**
Excluded Programs (NEEA)	(10,512)
Utility Specific Conservation Goal	**96,132**
Decoupling Threshold	(5,078)
EIA Penalty Threshold	**91,054**

Since the EIA target was established based on Northwest Power and Conservation Council (NWPCC or the Council) methodologies and the Council's Regional Technical Forum (RTF) Unit Energy Savings (UES) values, those same methodologies and savings are employed, to the extent possible, in measuring the savings eligible to achieve that target. The planning effort has, with a few isolated exceptions, adopted the same approach in order to generate the best prediction of how 2022 Portfolio performance will be retrospectively measured. The use of RTF UES values also assists in the management of the Company's EM&V expense by reducing the expenses associated with impact evaluation. The relationship between the regional utilities and the RTF is, however, a symbiotic one, and any impact evaluations performed on a current RTF measure will be shared with the RTF to help improve the quality of the regional deemed UES.

2) As part of the General Rate Case Settlement Agreement in Docket Nos. UE-140188 and UG-140189, the Company agreed, in consideration of receiving a full electric decoupling mechanism, to increase its electric energy conservation achievement by five percent over the conservation target approved by the Commission, beginning with the 2016-17 biennial target.

Clean Energy Transformation Act Target

The CEIP outlines Avista's path toward its goal of making the transition to clean energy in compliance with Clean Energy Transformation Act (CETA). CETA outlines requirements for utilities in Washington to eliminate coal-fired resources from electric power supply by 2025, attain a carbon neutral electric supply by 2030, and achieve 100 percent non-emitting electricity supply by 2045. Along with these goals, specific targets are to be set for Energy Efficiency Programs.

Avista's specific target is informed by its *IRP*, which is also used to set its biennial target for the EIA. There are, however, differences in these target calculations. The CEIP encompasses 2022-25, a four-year period which is well past the biennial period of 2022-23. To account for this, Avista extended its pro rata share of savings over the 10-year period and applied it to a four-year span. This methodology is consistent with the approach used for EIA target setting. Avista then included the decoupling commitment of an additional 5 percent on top of that pro rata amount. However, since the intent of this target focuses on all available conservation, and because it doesn't include a penalizable target, all available conservation is included in the CEIP target, and the target is not adjusted for NEEA savings as shown with the EIA target. The resulting target for the four-year period is 213,289 MWh.

TABLE 3 – CLEAN ENERGY IMPLEMENTATION PLAN SPECIFIC TARGET

CEIP Energy Efficiency Specific Target (MWh)	
CPA Pro-Rata Share (4-year)	203,132
Decoupling Threshold (5% of Target)	10,157
Total CEIP Energy Efficiency Target	**213,289**

Per the requirements of the CEIP, Avista developed CBIs and associated metrics as a measurement of impact for the communities it serves. These metrics are not based solely on energy conservation but rather on ensuring that customers in Named Communities equitably benefit from the transition to clean energy. The *ACP* provides details pertaining to the programs developed that will support Avista's CEIP efforts for the 2022-25 period.

CLEAN ENERGY TRANSFORMATION ACT

Senate Bill (SB) 5116, otherwise known as the Clean Energy Transformation Act, was approved by the Washington State Legislature in 2019. As initial CETA rulemaking concluded in late 2020, Avista commenced its CETA implementation activities by creating and engaging with a newly formed Equity Advisory Group (EAG). The EAG will be a permanent advisory group tasked with providing input and guidance on a wide variety of Avista programs and initiatives to ensure that all such endeavors are approached with an equity perspective. The EAG's initial engagements focused on identifying and defining Named Communities within Avista's service territory and on developing Customer Benefit Indicators (CBIs).

Customer Benefit Indicators

In accordance with WAC 480-100-610(4)(c), Avista worked closely with the EAG to develop a comprehensive set of CBIs that will measure the Company's progress toward the equitable distribution of the benefits of the transition to clean energy. In an effort to center the voices and opinions of EAG members, Avista retained an outside facilitator to lead this CBI development process, which first identified CBIs then asked EAG members to prioritize CBIs based on their own experiences and energy needs. After an initial set of CBIs was proposed, Avista gathered input from the public through multiple interactive sessions with customers, stakeholders, and equity partners. The CBIs selected by the EAG, with input from the general public, include the following:

- Participation in Company programs
- Number of energy-burdened households
- Availability of methods/modes of outreach and communication
- Named Community clean energy
- Named Community investment
- Outage duration
- Proximity of energy generation
- Outdoor air quality
- Greenhouse gas emissions
- Avista employee diversity
- Supplier diversity
- Indoor air quality

For 2022-23, Avista's Energy Efficiency Program will focus its efforts on addressing these CBIs as the Company continues to pursue solutions that help customers meet their energy needs. Further details regarding how these efforts will be approached are contained within this *ACP.*

Energy Burden Reductions for Low-Income Customers

As part of its 2020-21 *BCP* Conditions,[1] Avista has committed to develop a plan and conduct the research necessary to achieve sustained energy burden reductions for low-income households. The Company contracted with a third-party consultant, Empower Dataworks, to perform an Energy Burden Assessment to understand the distribution of energy burden across its service territory among different customer segments, as well as any gaps that may exist in program funding and service.

Initial results of this assessment indicate that Avista's low-income customers have a total assistance need of approximately $25 million per year, which is inclusive of both energy efficiency and bill assistance. This is the amount required to eliminate high energy burden for all low-income customers. To maintain consistency with other energy burden requirements specified in CETA, the definitions of "energy assistance need" and "low income" follow those defined in the rulemaking process led by the Department of Commerce and made into law in WAC 194-40-030. "High energy burden" customers are those who pay more than 6 percent of their household income on their electricity bill if they use electric heat, or 3 percent if they heat with natural gas.

The assessment is not yet complete, but initial analysis indicates that funding levels for energy assistance programs are at a sufficient level relative to the energy assistance need. The assessment does not recommend significant changes to overall program budgets, given that current levels would be sufficient to meet Avista's energy burden reduction goals under CETA. The assessment recommends, instead, that funding allocation among programs be reviewed to ensure an optimal mix of short- and long-term energy burden reduction. It has also revealed that these funds are generally not targeted at high-burden customers specifically. While Avista's customers benefit from approximately $18 million per year in dedicated Low-Income Program budgets (this includes approximately $3 million per year in LIHEAP funds), high-burden customer energy bills in particular are being reduced by only $5.5 million per year, compared to approximately $12 million per year in bill reduction for low-income customers with less energy burden. In 2022, Avista will work with partner agencies to better identify customers with high energy burdens. The Company will then explore targeted outreach and marketing strategies to reach them and provide much-needed assistance.

In the meantime, Avista has already committed to various initiatives aimed at prioritizing energy assistance to low-income households with high energy burden in this upcoming biennium, as described in further detail below.

First, Avista has identified over $4.5 million per year (21 percent of the total conservation budget) toward the Low-Income Energy Efficiency, Multifamily Weatherization, and Direct Install Programs. The latter does not require income qualification as part of the application process, but 65-77 percent of its participants would qualify as low-income. Avista will also continue to take advantage of state funding through its Community Energy Efficiency Program.

Second, Avista intends to integrate the equity and energy burden considerations into our standard program evaluations (both low-income and non-low-income), as outlined in Section VIII.

Third, Avista will report on equity and energy burden metrics in the *ACP*s provided during the biennium, as they become available through evaluations and assessments. These metrics will also be discussed with the advisory group in order to improve the energy burden reduction performance of our programs.

1) UE-190912 – Attachment A to Order 01, Section 9a

Finally, Avista has already begun the background research required to plan and design better energy burden reduction programs and initiatives through the ongoing energy burden assessment described above.

Avista is also exploring a number of future actions intended to bolster its programs and help prioritize high-burden customers. These actions fall under the categories of (1) energy burden-focused program planning and evaluation, (2) improving access of high-burden customers to existing programs and piloting new programs/initiatives, and (3) reviewing funding allocations. In addition to these programmatic goals, Avista has overarching goals related to closer integration between conservation and direct assistance programs and better collaboration with its Community Action Partners. A more detailed description of the actions under consideration is included in Appendix F.

Prioritization of High-Benefit Energy Efficiency Measures for Named Communities

As part of Avista's efforts to equitably distribute energy and non-energy benefits within Named Communities, Avista has started to quantify non-energy impacts of existing programs. In Avista's initial Non-Energy Impacts (NEI) study, the final report of which is attached as Appendix D to this *ACP*, each measure in Avista's portfolio has been analyzed for applicable non-energy impacts. These NEI values carry with each measure a level of benefit received by the participant, by society, or to the utility. Avista, in partnership with its third-party vendor DNV, has quantified these benefits and attached them to applicable measures in its portfolio.

These NEI values are on a per-kilowatt-hour basis which, when weighing measures that are most successful, creates a baseline for understanding the impacts of each offering. As a result of this analysis, low-income measures carry the highest non-energy impact values, with the highest of these NEI values derived from impacts to health and safety of participants. Specifically, these highest values were seen in upgrades to windows, doors, insulation, and air infiltration. In addition, HVAC measures such as installation of ductless heat pumps (DHPs), air source heat pumps, and heat pump water heaters (HPWH) also carry a significant NEI value.

In mapping NEIs to Customer Benefit Indicators (CBIs), Avista has determined that the bulk of low-income and residential NEIs have the most impact on the following CBIs: indoor air quality, number of energy-burdened households, and Named Community investment. A further discussion of NEI benefits appears on page 85. With these results, Avista's *ACP* will prioritize these measures in Named Communities.

While NEI values provide additional benefits of the installation of efficient equipment and weatherization, they do not directly address barriers that exist within these communities. Initial costs of equipment and installation remain as a primary reason for non-participation. For 2022, Avista plans to provide more fully funded offerings in an effort to remove this barrier.

As part of this prioritization, Avista proposes several approaches for Named Communities, with fully funding insulation common to each approach. Avista will also provide customers in Named Communities with incentives for HVAC and water heating that exceed its current offerings in its Prescriptive Programs. While a higher incentive approach may not cover the total cost of heating equipment, Avista anticipates that the rebate amounts will be greater than the incremental costs between baseline efficiency and high-efficiency options. This will enable customers to lower their energy burden while minimizing the capital outlay.

New Approaches to Reaching Customers in Named Communities

In addition to a renewed focus on measures with the highest NEI values for Named Communities, Avista is making a significant commitment during the 2022-25 CEIP implementation period to pursuing new methods for reaching customers in Named Communities. These programs will have a focus on lowering customers' energy burden while also creating space for community input, advocacy, and ownership, respecting that customers best understand the needs of their own communities.

Avista is proposing to provide funding toward new Named Community projects in the amount of $2 million annually over the CEIP four-year period. This body of funding will be used specifically to address obstacles that have been barriers to participation in efficiency programs for members of Named Communities. Program goals will focus primarily on energy burden reductions, but will also aim for air quality improvements, health and safety benefits, and enhancing reliability for customers. To allow for this plan, Avista had made modifications to its tariff rider to allow flexibility in its program design, and make it possible to offer fully funded conservation solutions for a broader group of customers than Avista has historically reached with its fully funded programs for low-income customers.[2] The sections below describe each program Avista plans to fund under this initiative:

Community Identified Projects

Estimated Annual Budget: $500,000

This program will use a modified Participatory Budgeting Process[3] in which Avista will fund community projects selected by the EAG. Community members in Avista's Washington service territory can nominate projects for consideration by the EAG, and although Avista will help facilitate and support this process by assisting the EAG in the development of selection criteria and considering input from the Energy Efficiency Advisory Group (EEAG) to inform the process, the EAG would ultimately be responsible for project selection. The nomination and selection process will be developed beginning in Q1 of 2022, with a goal of initial project selection by mid-2022. Avista sees this program as a way to empower community members, as represented by the EAG, to make changes where they see the most need.

Multifamily Building Split Incentives

Estimated Annual Budget: $750,000

Many customers with high energy burdens are renters. Therefore, the problem of split incentives in multifamily scenarios needs to be addressed. In an effort to tackle this issue and encourage landlords to make efficiency investments in their rental units, Avista plans to pilot incentives for landlords who own multifamily rental properties in Named Communities. The Company is proposing a focused approach that could include the following elements:

- Full funding of insulation measures such as attic, wall, and floor without min/max *R value* requirements for existing insulation
- A higher incentive for windows and doors
- A 50 percent funding of total cost incentive for ductless heat pumps, water heaters, and thermostats

2) See Docket No. UE-210399 for these revisions to Avista's tariff Schedule 90.

3) Participatory budgeting is a democratic process in which community members decided how to spend part of a budget.

- Directing its Multifamily Direct Install Program, which installs low-cost measures in multifamily units, toward buildings in Named Communities.

To expedite adoption of this effort, Avista will not require that insulation, windows, and doors be installed by a contractor if property owners are adequately capable of performing the installation correctly. Avista will work with its engineering team and its stakeholder group to create a list of requirements that include proper sealing, distribution of blow-in insulation, and other requirements to ensure that projects are successful.

Table 4 summarizes the incentives made available for the multifamily segment.

TABLE 4 – MULTIFAMILY BUILDING SPLIT INCENTIVES FUNDING LEVELS

Resources/Measures	Per-Unit Funding
Attic Insulation	Fully Fund
Floor Insulation	Fully Fund
Wall Insulation	Fully Fund
Insulated Doors	Fully Fund
Low-E Storm Windows	Rebate
Low-E Windows	Rebate
Line Voltage T-stats	Rebate
Ductless Heat Pumps	Rebate
Heat Pump Water Heaters	Rebate
Direct-Installation LED, Showerheads, Aerator	Fully Fund

Throughout the next biennium, Avista will test several new methods for reaching landlords. Within its Energy Burden Reduction Strategy, for example (provided in Appendix F), Empower Dataworks suggests a "Landlord-Targeted Energy Efficiency" pilot approach that implements a split incentive for HVAC and water heating measures. Learnings from this multifamily pilot have the potential to be used in subsequent years and combined with Empower Dataworks' concept to serve more rental scenarios such as single family homes, duplexes, triplexes, etc.

Health and Safety for Manufactured and Mobile Homes

Estimated Annual Budget: $400,000

Avista has a strong history of working with community partners to address energy needs in customers' homes, and addressing health and safety matters has been an integral part of those efforts. To the extent possible, Avista has funded repairs to homes that are associated with the installation of efficiency-related equipment. For this program, Avista is proposing that health and safety funds be made available to manufactured and mobile home communities without the requirement that the repairs be made in association with an energy efficiency project. Rather, the qualifying metric for this program will be if the repair leads to energy burden reductions. This modification will address untreated homes, owned or rented by Avista customers, that suffer from a significant shell, function, or structure deficiency and that may not otherwise have been treated with measures due to the previous qualification constraints.

Avista is allocating an annual amount of $400,000 to be reserved for these projects. The Company will work through appropriate considerations for customers who lease mobile homes from another party, in addition to working with its marketing team on successful approaches for engaging communities and collaborating with its EAG to identify geographic areas on which to focus outreach efforts. While health and safety will be the emphasis of this program, Avista will also offer insulation measures for dwellings that are in an extreme state of disrepair or that currently have inadequate insulation levels.

TABLE 5 – HEALTH AND SAFETY FOR MANUFACTURED AND MOBILE HOMES FUNDING LEVELS

Resources/Measures	Per-Unit Funding
Health and Safety	Fully Fund
Ductless Heat Pumps	Rebate
Attic Insulation	Fully Fund
Floor Insulation	Fully Fund
Wall Insulation	Fully Fund
Insulated Doors	Fully Fund
Low-E Storm Windows	Fully Fund
Low-E Windows	Fully Fund
Heat Pump Water Heaters	Rebate

Single-Family Weatherization

Estimated Annual Budget: $250,000

The single-family segment represents the largest number of customers with an energy burden requirement. For these customers, resources are available through CAP agencies for those who are income-qualified. Avista's Low-Income Program provides full funding for numerous measures; it is, however, intended to serve all communities.

For customers within Named Communities, Avista will provide full funding for insulation measures and higher incentive amounts for doors and windows, which is consistent with its Low-Income Program. This segment does not, however, have an income qualification requirement. Avista will also explore ways to link this program offering with its On-Bill Repayment (OBR) Program, which provides low-interest financing for energy-efficient equipment.

Prioritization of how funds will be distributed has yet to be determined and Avista intends to work with its EAG and EEAG to further develop the design of the Single-Family Program.

TABLE 6 – SINGLE-FAMILY WEATHERIZATION FUNDING LEVELS

Resources/Measures	Per-Unit Funding
Attic Insulation	Fully Fund
Floor Insulation	Fully Fund
Wall Insulation	Fully Fund
Insulated Doors	Rebate
Low-E Storm Windows	Rebate
Low-E Windows	Rebate

Incentives for Businesses and Organizations Serving Named Communities

Estimated Annual Budget: $100,000

Avista will invest in making efficiency improvements for nonprofit community organizations, religious organizations, and businesses that serve members of Named Communities. This program aligns with feedback received from the EAG: that customers would like to see more neighborhood-level investments, which, in turn, may make more resources available to provide additional benefits to the communities that these businesses and organizations serve. The program could provide site-specific offerings at a higher rebate than currently offered, as well as building audits and other plan offerings such as grid integration through the Connected Communities Project described later in this plan (page 80), or other distributed energy projects that might be identified as priorities in the Named Communities Investment Fund.

TABLE 7 – INCENTIVES FOR BUSINESSES AND ORGANIZATIONS SERVING NAMED COMMUNITIES FUNDING LEVELS

Resources/Measures	Per-Unit Funding
Custom Projects	Rebate
Floor Insulation	Rebate
Wall Insulation	Rebate
Insulated Doors	Rebate
Low-E Storm Windows	Rebate
Low-E Windows	Rebate

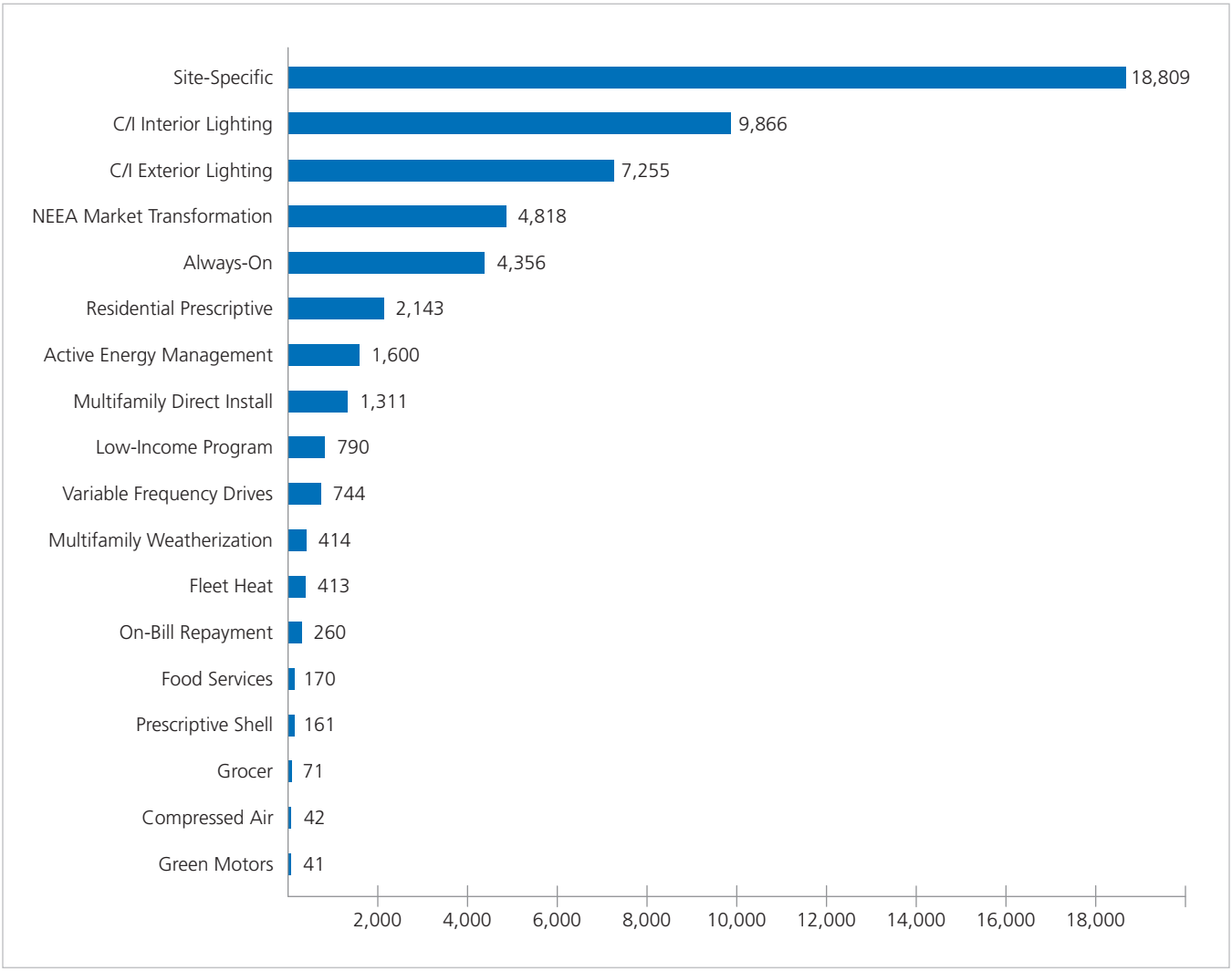
Initially, Avista will aim to fully distribute funding for each of the new offerings listed above in accordance with the estimated budget for each. When excess funds are available in one program, Avista may elect to transfer funds to another program to support more identified need. Funds may be borrowed from the second year of the biennium if necessary (e.g., 2023 funding, up to the allotted $2,000,000, can be used in 2022 if funds are exhausted in a given program area).

ENERGY EFFICIENCY PORTFOLIO OVERVIEW

Avista's energy efficiency portfolio is composed of residential, low-income, and commercial/industrial programs.

For 2022, the Company anticipates approximately 53,293 MWh of I-937 qualified savings from its program offerings. These savings are derived from utility-specific conservation, including regional efforts from NEEA. Figure 2 illustrates the major categories from which those savings are achieved.

FIGURE 2 – SAVINGS FROM ENERGY EFFICIENCY PROGRAMS (MWH)



Overall Energy Efficiency Budget Projections

A compilation of the total energy efficiency budget is assembled at the completion of the planning process. The placement of the budget compilation at the close of the process is consistent with Avista's commitment to achieve all cost-effective energy efficiency measures and to maximize the value of the portfolio without budgetary constraints. This process assumes that prudently incurred expenditures will be fully recoverable through the conservation tariff rider and that revisions in the tariff rider surcharge will be timely enough to maintain a materially neutral tariff rider balance. The budget is thus a product of the planning process and not a planning objective. The Company recognizes that customer demand and market factors exist outside of the budgeting process and that forecasted expenses may be higher or lower than actual results. The forecasted budget does not represent an expectation or commitment to limit expenses to the planned amounts.

The overall 2022 budget projection is summarized in Table 8, which includes elements of the energy efficiency budget that have been designated as "supplemental" to indicate program elements that are not included in the cost-effectiveness calculation. These supplemental costs include NEEA funding, as well as funds for third-party CPA and EM&V studies.

TABLE 8 – ENERGY EFFICIENCY BUDGET SUMMARY

	2022 Washington Electric Budget	Supplemental Budget	Non-Supplemental Budget
Total Incentives and Direct Benefit to Customer	$ 12,935,721	$ 0	$ 12,935,721
Program Labor	$ 1,832,391	$ 0	$ 1,832,391
Pilot Programs	$ 3,000,000	$ 0	$ 3,000,000
Total Non-Labor/Non-Incentive	$ 3,913,941	$ 1,748,369	$ 2,165,572
Total	**$ 21,682,053**	**$ 1,748,369**	**$ 19,933,684**

Avista continues to track the proportion of total utility expenditures returned to customers in the form of direct incentives and benefits as a metric to guide the Company toward improved administrative efficiencies.

The amount included in the direct benefit figure includes not only the incentives paid to customers through monetary incentives for energy efficiency programs, but also the engineering time spent on customized projects for energy efficiency participants. While labor costs are generally not included as a direct customer benefits, the inclusion of the energy efficiency engineering team in an energy efficiency project provides customers with access to a valuable resource for identifying and implementing savings measures at their home or business.

TABLE 9 – PROPORTION OF FUNDS RETURNED TO CUSTOMERS THROUGH DIRECT BENEFITS

Utility Expenditures Returned to Customers via Direct Benefits	73%

Program-by-program details of the expected incentive expenditures for 2022 are provided in greater detail in Table 10.

Direct-incentive expenditures represent the estimated incentives that will be paid to customers directly or indirectly for participation in energy efficiency programs. The overall level of expense is highly correlated to programs' throughput and energy acquisition and, based on customer participation, the amounts are subject to change. Note that for some active programs, the benefit of the program offering is not based on the incentive value, but rather on identifying opportunities for energy efficiency projects. For those projects, any resulting incentive is included with its native program.

TABLE 10 – CUSTOMER DIRECT INCENTIVE EXPENDITURE DETAIL

Energy Efficiency Program	Direct Incentive Expenditures	
Low-Income Programs		
Low-Income	$	1,520,092
Total Low-Income Incentives	**$**	**1,520,092**
Residential Programs		
Residential Prescriptive	$	637,604
Multifamily Direct Install	$	706,250
Multifamily Weatherization	$	112,275
Total Residential Incentives	**$**	**2,442,129**
Commercial/Industrial Programs		
Interior Prescriptive Lighting	$	2,119,850
Exterior Prescriptive Lighting	$	1,655,000
Site-Specific	$	4,326,070
Site-Specific – DBtC	$	619,519
Prescriptive Shell	$	51,750
Variable Frequency Drives	$	4,960
Prescriptive Green Motor	$	120,000
Fleet Heat	$	26,025
Grocer	$	6,820
Food Services	$	33,426
Compressed Air	$	0
Total Commercial/Industrial Incentives	**$**	**8,973,500**
Total of All Incentives	**$**	**12,935,721**

Non-incentive expenses, including both non-supplemental and supplemental expenditures, are detailed to a lower level of aggregation and broken out by portfolio in Table 11. The expenses in Table 11 are allocated to programs based on the percentage of overall avoided cost achieved through each program's energy efficiency achievements. An exception to this allocation methodology is that third-party non-incentive payments are directly attributable to the programs they originate from.

TABLE 11 – NON-INCENTIVE UTILITY EXPENSE DETAIL

Expense Type	Washington Electric Portfolio	Washington Electric Supplemental Budget	Washington Electric Non-Supplemental Budget
Third-Party Non-Incentive Payments	$ 983,062	$ 0	$ 983,062
Labor	$ 2,451,910	$ 0	$ 2,451,910
EM&V	$ 253,445	$ 253,445	$ 0
Memberships	$ 63,000	$ 0	$ 63,000
Outreach	$ 126,000	$ 0	$ 126,000
Marketing	$ 504,000	$ 0	$ 504,000
Training/Travel	$ 6,300	$ 0	$ 6,300
Regulatory	$ 3,150	$ 0	$ 3,150
Scott Morris Center lease*	$ 83,160	$ 0	$ 83,160
Studies and Research	$ 63,000	$ 0	$ 63,000
Software†	$ 144,900	$ 0	$ 144,900
Conservation Potential Assessment	$ 136,924	$ 136,924	$ 0
General implementation	$ 189,000	$ 0	$ 189,000
Pilot Programs	$ 1,000,000	$ 0	$ 1,000,000
Named Community Investment Pilot	$ 2,000,000	$ 0	$ 2,000,000
NEEA	$ 1,358,000	$ 1,358,000	$ 0
Total	**$ 9,365,851**	**$ 1,748,369**	**$ 7,617,482**

* The Scott Morris Center is used in conjunction with pilot programs including Active Energy Management, the Tool Lending Library and is also intended to be a meeting place for public workshops and other learning resources.

† Software expenses have been estimated for the continued implementation of the iEnergy platform and anticipated enhancements to our existing platforms.

Residential Portfolio Overview

Avista's residential portfolio comprises several approaches to engage and encourage customers to consider energy efficiency improvements within their home. Prescriptive rebate programs are the main component of the portfolio, augmented by other interventions such as a Multifamily Direct Install Program, and supplemented by educational and outreach efforts such as a residential home energy audit. While the audit program is instrumental in identifying the need for weatherization, the associated savings from those efforts are captured within the Residential Shell Program.

The manufactured home segment is an important component within the residential portfolio, and many of the Company's 2022 program offerings are designed to provide incentives through its ENERGY STAR Manufactured Homes Program. ENERGY STAR Certified Manufactured Homes are required to be Northwest Energy Efficiency Manufactured (NEEM) Certified.

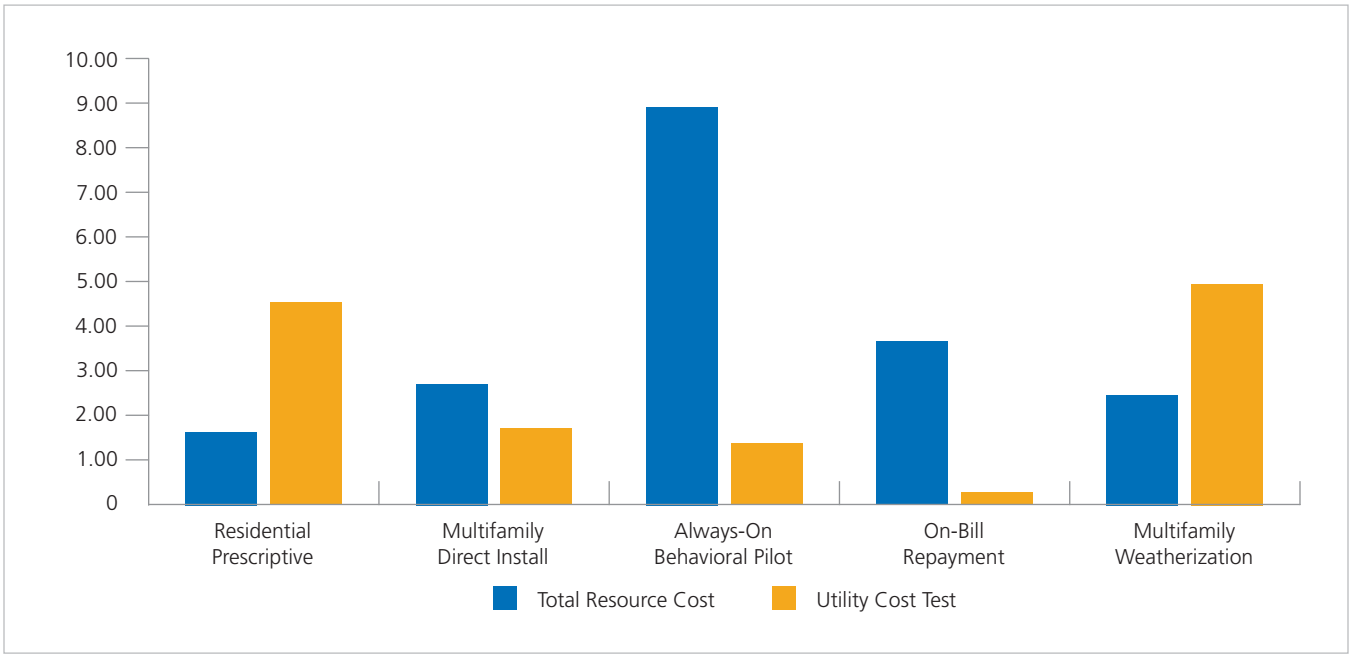
For 2022, Avista anticipates approximately 8,439,544 kWh to be achieved through residential programs with an expected spend of $3,031,656. Table 12 summarizes the 2022 residential program estimates.

TABLE 12 – RESIDENTIAL PROGRAMS OVERVIEW

Residential Programs	Electric Program Savings (kWh)	Expected Spend
ENERGY STAR Manufactured Homes	116,025	$ 52,860
Multifamily Direct Install	1,311,023	$ 803,739
HVAC	1,199,790	$ 471,018
Always-On Behavioral Pilot	4,356,000	$ 861,440
On-Bill Repayment	260,000	$ 279,503
Water Heat	233,605	$ 112,753
Shell	563,874	$ 273,761
Multifamily Weatherization	413,976	$ 169,208
Appliances	30,035	$ 14,874
Total Residential	**8,484,327**	**$ 3,039,156**

The program-by-program cost-effectiveness of the portfolio is graphically represented in Figure 3.

FIGURE 3 – RESIDENTIAL PROGRAMS COST-EFFECTIVENESS



Cost-Test	Residential Prescriptive	Multifamily Direct Install	Always-On Behavioral Pilot	On-Bill Repayment	Multifamily Weatherization
Total Resource Cost	1.68	2.83	8.95	3.72	2.39
Utility Cost Test	4.55	1.77	1.28	0.24	4.92

Residential Programs

Residential Multifamily Direct Install Program

General Program Description

The Multifamily Direct Install program partners with SBW Consulting to provide direct-installation measures to multifamily residences of five units or more. The program targets a hard-to-reach market of customers who rent rather than own their property, as well as property managers and owners. This program offers direct-installation measures to owners of multifamily buildings in order to make energy efficiency improvements and help tenants with energy costs.

Field installers coordinate with property managers of multifamily complexes to directly install energy-saving measures in tenant units. Installers also audit the complex for any eligible supplemental common-area lighting measures. Information for potential common-area lighting projects is passed on to lighting vendors contracted to work in various areas. Lighting contractors communicate with the property managers to audit and put together project data. Individual common-area lighting projects are completed after approvals by the building owner, Avista, and SBW.

The implementation of this program was paused in March of 2020 due to the COVID-19 pandemic. The program will resume a direct-installation process when public health protocols indicate that it is safe to do so.

Program Manager

Greta Zink

TABLE 13 – RESIDENTIAL MULTIFAMILY DIRECT INSTALL PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		1,311,023
Direct Benefit to Customer	$	706,250
Non-Incentive Utility Costs	$	97,489
Total Costs	$	803,739
Non-Energy Impacts	$	72,164
Cost-Effectiveness		
Total Resource Cost		2.83
Utility Cost Test		1.77

Program Eligibility

Multifamily complexes with Avista electric service are eligible for this program. SBW Consulting contacts property owners and managers to gauge interest and schedule audits of facilities and installation of tenant measures. At the time of the audit, it is determined whether there are also common-area lighting fixtures that might be eligible for the program. If common-area lighting is identified, it is passed to lighting contractors to put together a proposal for eligible fixtures, and installation is scheduled after approval. Table 14 shows the estimated annual savings and the value of the direct installation (direct benefit to customer, or DBtC) for the Multifamily Direct Install program. DBtC amounts represent the total cost of the program outside of allocated program administrative costs.

TABLE 14 – RESIDENTIAL MULTIFAMILY DIRECT INSTALL PROGRAM MEASURES AND DIRECT BENEFIT TO CUSTOMER

	Projected Participation	Annual Savings	Annual DBtC
Direct Installation – LED lighting, faucet aerators, and shower heads	3,745 Homes	1,311,023	$ 706,250

Products included in the direct-installation program include a site audit, various LED lamps, energy-efficient faucet aerators, smart power strips, and vending misers for common spaces.

Residential Prescriptive Programs

Prescriptive rebate programs use financial incentives to encourage customers to adopt qualifying energy efficiency measures. Customers must complete installation and apply for a rebate, submitting proper proof of purchase, installation, and/or other documentation to Avista. In prior program years, Avista required this to have been submitted within 90 days of project completion, but for our 2022 program year the Company is removing the 90-day requirement to provide more flexibility for customers. Customers can submit this form in hard copy, with several prescriptive measures also available to submit online at myavista.com.

Residential prescriptive programs are designed to provide rebates to single-family homes up to a four-plex. For multifamily (five-plex or larger), owners and developers may choose to treat the entire complex with an efficiency improvement through the Commercial Site-Specific program or single units with the multifamily program prescriptive approach.

Prescriptive programs have a strong presence and coordination with regional efforts such as those offered by NEEA. There are currently significant regional efforts active in the markets for consumer electronics, ductless heat pumps, and standard improvements for new heat pump water heating technologies. Avista has offered local rebates in support of many NEEA market transformation ventures and will continue to do so where opportunities for the application of these programs are cost-effective options.

Prescriptive measures do not require a pre-installation contract and offer a fixed incentive amount for eligible measures. Measures offered through prescriptive programs are evaluated based on the typical application of that measure by program participants. Prescriptive measures are generally limited to those that are low-cost, offer relatively homogenous performance across the spectrum of likely applications, and would not significantly benefit from a more customized approach. Specific plans for Avista's prescriptive programs are enumerated below.

During 2022, Avista will be developing a mid-stream appliance and other Energy Efficient Measures program with the assistance of a third-party developer and implementer. Currently, the Company is interviewing contractors that can provide this type of program and service. The goal of this program is to garner missed energy efficiency savings opportunities by steering the contractor/customer to more energy-efficient equipment options and by providing instant rebates at the distributor level and/or available at retail outlets. The contractors will use the rebates as one of their sales marketing tools. The mid-stream program will be communicated to customers through Avista's website and other external marketing efforts.

Residential Appliance Program

General Program Description

The Residential Appliance program helps promote the use of high-efficiency appliances for residential customers. Avista will offer incentives for the purchase and use of high-efficiency ENERGY STAR Certified clothes washers and vented clothes dryers. In 2022, ENERGY STAR Certified refrigerators and freezers will be added to the rebate options.

Program Metrics

Avista offers incentives on appliances through its prescriptive channels. For 2022, Avista anticipates higher customer participation than in past years resulting from the expanded list of measures offered by the program. Avista will offer rebates on refrigerators, freezers, and ENERGY STAR washers. No NEI values have been identified for appliance measures; it is expected, however, that those values will be identified in future studies.

TABLE 15 – RESIDENTIAL APPLIANCE PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		30,035
Incentives	$	12,500
Non-Incentive Utility Costs	$	2,374
Total Costs	$	14,874
Non-Energy Impacts	$	0
Cost-Effectiveness		
Total Resource Cost Test		2.15
Utility Cost Test		2.33

Program Eligibility

The appliance incentive requires that customers purchase and install a high-efficiency ENERGY STAR Certified clothes washer or dryer, refrigerator, or freezer.

TABLE 16 – RESIDENTIAL APPLIANCE PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit kWh Savings	Incentive
Standard Size Refrigerator and Refrigerator-Freezer – Bottom-Mounted Freezer – ESME	50 Unit	124	$ 100
Standard Size Freezer – upright – ESME	50 Unit	67	$ 50
ENERGY STAR Washer	50 Unit	120	$ 50
ENERGY STAR Dryer	50 Unit	290	$ 50

Incentive Revisions for 2022

For 2022, Avista revised its residential appliance offerings to allow for both top- and front-load washers to be eligible for the incentive program. In addition, Avista added refrigeration measures to its offerings. These incentives range from $50-$100 and will be available to customers through its prescriptive program.

Residential ENERGY STAR Manufactured Homes Program

General Program Description

The ENERGY STAR Certified Manufactured Homes program helps home buyers easily identify manufactured homes that are significantly more energy-efficient than standard construction. As code requirements have become more rigorous and builder practices have become more efficient, the ENERGY STAR program has modified its guidelines to ensure that certified manufactured homes represent a meaningful improvement over non-labeled manufactured homes.

Program Manager

Camille Martin

TABLE 17 – RESIDENTIAL ENERGY STAR MANUFACTURED HOMES PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		116,025
Incentives	$	35,000
Non-Incentive Utility Costs	$	17,860
Total Costs	$	52,860
Non-Energy Impacts	$	0
Cost-Effectiveness		
Total Resource Cost Test		2.56
Utility Cost Test		4.94

Program Implementation

The ENERGY STAR Certified Manufactured Home program promotes, to manufactured home builders and homeowners, a sustainable, low-operating-cost, environmentally friendly structure as an alternative to traditional home construction. ENERGY STAR manufactured homes provide energy savings beyond code requirements for space heating, water heating, shell, lighting, and appliances. Avista continues to support the regional program to encourage sustainable building practices.

The current customer descriptions of the programs, including primary program requirements, are available on the ENERGY STAR/eco-rated manufactured homes rebate form and NEEM Certification.

Program Eligibility

Any residential electric customer (Schedule 1) with an all-electric certified ENERGY STAR or eco-rated manufactured home is eligible, as well as any residential electric customer (Schedule 1) with a certified ENERGY STAR manufactured home with Avista electricity service for lights and appliances. This rebate may not be combined with other Avista individual measure rebate offers (e.g. high-efficiency water heaters).

TABLE 18 – RESIDENTIAL ENERGY STAR HOMES PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit kWh Savings	Incentive	
ENERGY STAR Certified Manufactured Homes	35	Unit	3,315	$	1,000

Residential HVAC Program

General Program Description

The Residential HVAC program encourages residential customers to select a high-efficiency solution when making energy upgrades to their home. This prescriptive rebate approach issues payment to the customer after the measure has been installed. Energy efficiency marketing efforts build considerable awareness of opportunities for improvements in customers' homes and drive customers to the Avista website for rebate information. Vendors generate participation in the program using rebates as a sales tool for their services. Utility website promotion, vendor training, retail location visits, and presentations at various customer events throughout the year are some of the other communication methods that encourage program participation.

Program Manager

Camille Martin

TABLE 19 – RESIDENTIAL HVAC PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		1,199,790
Incentives	$	343,750
Non-Incentive Utility Costs	$	127,268
Total Costs	$	471,018
Non-Energy Impacts	$	28,267
Cost-Effectiveness		
Total Resource Cost Test		1.24
Utility Cost Test		3.95

Program Eligibility and Incentives

Avista will continue to offer upgrades to electric heat for 2022. As part of the program eligibility requirements, customers must demonstrate a heating season electricity usage of at least 8,000 kWh, and less than 340 therms, for replacement of an electric straight resistance heater with air source heat pump and/or ductless heat pump system. Ductless heat pumps must be 10.0 HSPF or greater to qualify for an incentive.

TABLE 20 – RESIDENTIAL HVAC PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit kWh Savings	Incentive	
Smart Thermostats – DIY	300	Unit	749	$	125
Smart Thermostats – Contractor Installed	100	Unit	749	$	150
Air Source Heat Pump	160	Unit	3,090	$	1,000
Ductless Heat Pumps (with existing FAF)	50	Unit	2,698	$	525
Ductless Heat Pumps (displace zonal)	150	Unit	908	$	525

Incentive Revisions for 2022

Avista will increase the incentive for ductless heat pumps to encourage more participation in 2022. The incentive will be set to $525 but the Company will also begin incentivizing DHPs that are accompanied by a forced air furnace. This will encourage customers to install DHP on existing equipment that is less efficient and still realize lower energy costs.

TABLE 21 – RESIDENTIAL HVAC PROGRAM INCENTIVE REVISIONS FOR 2022

Measure Description	2021	2022
Ductless Heat Pumps	$ 500	$ 525

Residential Water Heater Program

General Program Description

Residential customers who use electric service for water heat may be eligible for rebates for the installation of a high-efficiency heat pump water heater. Efficiencies for water-heating equipment are verified according to the contractor invoice or the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). Avista's CPA has identified that a significant level of potential is estimated to come from HPWH measures and, as such, the Company has made modifications to its incentive structure to offer a higher incentive amount for customers wishing to pursue this measure.

Program Manager

Camille Martin

TABLE 22 – RESIDENTIAL WATER HEAT PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		233,605
Incentives	$	95,000
Non-Incentive Utility Costs	$	17,753
Total Costs	$	112,753
Non-Energy Impacts	$	557
Cost-Effectiveness		
Total Resource Cost Test		1.63
Utility Cost Test		2.30

Program Eligibility and Incentives

Customers taking service under Avista's residential electric service Schedule 01, who use electricity for water heating, may be eligible for a rebate. Supporting documentation required for participation includes, at a minimum, project invoices and AHRI certification. Efficiencies for water-heating equipment are verified according to the contractor invoice or AHRI.

TABLE 23 – RESIDENTIAL WATER HEAT PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit kWh Savings	Incentive
Heat Pump Water Heater	190 Unit	1,230	$ 500

Incentive Revisions for 2022

For 2022, Avista has made significant changes to its incentive levels for the heat pump water heater measure by increasing the rebate from $215 to $500.

TABLE 24 – RESIDENTIAL WATER HEAT PROGRAM INCENTIVE REVISIONS FOR 2022

Measure Description	2021	2022
Heat Pump Water Heater	$ 215	$ 500

Residential Shell Program

General Program Description

The shell program encourages residential customers to improve their home's shell or exterior envelope with upgrades to windows, storm windows, and insulation. This prescriptive rebate approach issues payment to the customer after the measure has been installed. Energy efficiency marketing efforts build considerable awareness of opportunities in the home and drive customers to the website for rebate information. Vendors generate participation in the program using rebates as a sales tool for their services. Utility website promotion, vendor training, retail location visits, and

presentations at various customer events throughout the year are some of the other communication methods that encourage program participation. Window rebates are being considered as part of a tiered energy efficiency approach for 2022.

Program Manager

Camille Martin

TABLE 25 – RESIDENTIAL SHELL PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		563,874
Incentives	$	151,354
Non-Incentive Utility Costs	$	122,407
Total Costs	$	273,761
Non-Energy Impacts	$	1,440
Cost-Effectiveness		
Total Resource Cost Test		2.71
Utility Cost Test		6.54

Program Eligibility and Incentives

Residential electric customers whose energy usage is greater than 8,000 kWh are eligible to apply for this incentive. Storm windows (interior/exterior) must be new and ENERGY STAR-rated. Windows must have a U-factor rating of .29 or lower. The window rebates will be considering a tiered efficiency incentive approach for 2022.

TABLE 26 – RESIDENTIAL SHELL PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit kWh Savings	Incentive	
Windows	20,000	sq. ft.	20	$	4.00
ENERGY STAR Certified Storm Windows	308	sq. ft.	11.51	$	3.00
Wall Insulation	10,000	sq. ft.	1.50	$	0.75
Floor Insulation	2,200	sq. ft.	1.00	$	0.75
Attic Insulation	75,000	sq. ft.	1.50	$	0.75
ENERGY STAR-Rated Doors	50	Unit	606	$	100

Incentive Revisions for 2022

As a component of Avista's 2022 offerings, ENERGY STAR-rated doors have been added to our list of incentivized measures. Through our low-income program, this offering has been proven to be instrumental in lowering energy burden by addressing leaks in the home due to drafts or inadequate insulation values in the door. For 2022, the incentive for ENERGY STAR-rated doors will be $100.

Small Home and Multifamily Residential Weatherization

General Program Description

For 2022, Avista has put forth additional efforts to target customers with significant barriers to entry in energy efficiency-related programs. The multifamily residential program is dedicated to providing weatherization measures for small homes and multifamily dwellings. Avista's programs have historically had a minimum-use requirement for participation that ensured that weatherization programs remained cost-effective. With the reinstatement of weatherization measures in the 2020-21 biennium, the Company has observed that some customers who request weatherization measures have not been able to participate due to the minimum-use requirements. The small home and multifamily weatherization program does not have such a requirement, and can offer Shell measures based on UES values from the RTF. Also included in this program are line voltage thermostats, which, while not considered a weatherization measure, allow customers to have more control over their heating usage and have therefore been included as an offering within this program.

Program Manager

Camille Martin

TABLE 27 – SMALL HOME AND MULTIFAMILY WEATHERIZATION PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		413,976
Incentives	$	112,275
Non-Incentive Utility Costs	$	56,933
Total Costs	$	169,208
Non-Energy Impacts	$	13,407
Cost-Effectiveness		
Total Resource Cost Test		2.39
Utility Cost Test		4.92

Program Eligibility

The small home and multifamily weatherization program is designed to provide an opportunity for customers who have not been able to participate previously due to minimum annual energy use or dwelling-type restrictions for residential units of five or more. To be eligible, you must be an Avista customer with electric service through Schedule 01.

TABLE 28 – SMALL HOME AND MULTIFAMILY WEATHERIZATION PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit kWh Savings	Incentive	
Attic Insulation R0-R38 HZ2 zonal	5,000	sq. ft.	1.00	$	0.75
Attic Insulation R0-R49 HZ2 zonal	5,000	sq. ft.	1.05	$	0.75
Wall Insulation R0-R11 HZ2 zonal	5,000	sq. ft.	2.72	$	0.75
Floor Insulation R0-R19 HZ2 zonal	5,000	sq. ft.	1.30	$	0.75
Floor Insulation R0-R30 HZ2 zonal	5,000	sq. ft.	1.74	$	0.75
Insulated Door R2.5-R5 HZ2 zonal (ENERGY STAR-rated or insulated R5)	5,000	sq. ft.	3.54	$	0.60
Low-E Storm Window	3,000	sq. ft.	24.47	$	4.05
Windows	3,000	sq. ft.	21.65	$	4.00
Line Voltage Communicating Thermostat	100	Unit	91.50	$	20.00
Line Voltage Thermostat	100	Unit	76.00	$	20.00
Ductless Heat Pump 9.0 or greater with Resistance Heat	20	Unit	1,300.00	$	400.00
Smart Thermostats – DIY	50	Unit	650.00	$	125.00
Smart Thermostats – Contractor-Installed	50	Unit	650.00	$	150.00
Heat Pump Water Heater	50	Unit	1,100.00	$	500.00
Smart Thermostats – DIY	20	Unit	748.50	$	125.00
Smart Thermostats – Contractor-Installed	20	Unit	748.50	$	150.00
Ductless Heat Pumps (displace zonal)	5	Unit	908.00	$	525.00
Air Source Heat Pump	5	Unit	3,090.25	$	1,000.00
Heat Pump Water Heater	5	Unit	1,229.50	$	500.00

Residential Pilot Programs

As described in WAC 480-109-100(1)(a)(iv), utilities must engage in adaptive management of conservation portfolios to ensure that those portfolios respond appropriately to changing market conditions during a biennium. Adaptive management of a conservation portfolio includes conducting pilot programs of new technologies or new approaches to engage customers in conservation, pursuant to WAC 480-109-100(1)(c).

Avista is continuously evaluating new technologies and new approaches for attaining energy savings. As the Company pursues all cost-effective kWh and therms, piloting new programs allows both Avista and its customers to explore new avenues for obtaining energy savings. For 2022, the Company is exploring multiple pilot programs for residential customers. These pilot programs are in addition to those Avista is launching related to CETA (page 8), as well as pilot programs designed for commercial/industrial customers (page 70). The progress of these new and pilot programs is shared regularly with the Advisory Group.

Residential Home Energy Audit Pilot Program

The Home Energy Audit Pilot program is designed to educate and drive customer engagement around conservation and promote Avista's energy efficiency programs and renewable-energy options. Energy savings are captured for direct-installation measures. Additional energy savings have been observed during the pilot as a result of program participants implementing recommended efficiency measures. Some of these measures qualify for Avista rebates, and savings are captured through those programs.

Key components of this program are providing customers with a home assessment from a knowledgeable and qualified energy inspector, direct installation measures to encourage customer interest, marketing efforts to drive customers to the program, and ongoing work with trade allies to ensure that customer demand can be met. The Avista website also communicates program requirements and highlights opportunities for customers.

Program Implementation

Taking advantage of previous Home Energy Audit program experience and aligning with industry best practices, Avista launched a pilot home energy audit program in 2019. Audits were performed on 61 homes during the pilot period, ending early in 2020. Approval to expand to full program status was received from both Washington and Idaho late in the first quarter of 2020. As a result, Avista proceeded to implement the program and created an RFP to recruit contract auditors. The RFP was ultimately not issued, however, due to the suspension of the program resulting from the COVID-19 pandemic. Avista plans to proceed with the full program when pandemic-related work restrictions are lifted.

During the suspended period, Avista has responded to requests for audits by offering a virtual audit, coupled with follow-up phone discussions on customer data inputs and report recommendations, using the same reporting tool that is utilized for the normal audit service. Two customers agreed to the virtual audit initially, but due to the various pitfalls of the virtual audit experience, have since opted to wait for the in-home program to resume. Otherwise, the majority of interested customers have declined the virtual offer and have opted to wait for an in-person audit.

Program Eligibility

This program is applicable to residential customers who use Avista electricity or natural gas as their primary heating source in Washington and Idaho.

Measures and Incentives

A comprehensive and detailed home energy assessment report that includes specific energy savings measures targeted to specific homes is provided to each customer who participates, as well as direct installation and leave-behind materials.

AeroBarrier Pilot Program

Reducing air leaks in a new-construction home results in sustainable benefits with increased comfort, reduced energy usage, and lower energy bills. Many builders recognize and promote this, but there are several value-based builders who choose not to meet air-seal code requirements. Avista is targeting all builders for this pilot and will track demographics of each to determine the value and future potential for this program. Avista has categorized builders into the following groups.

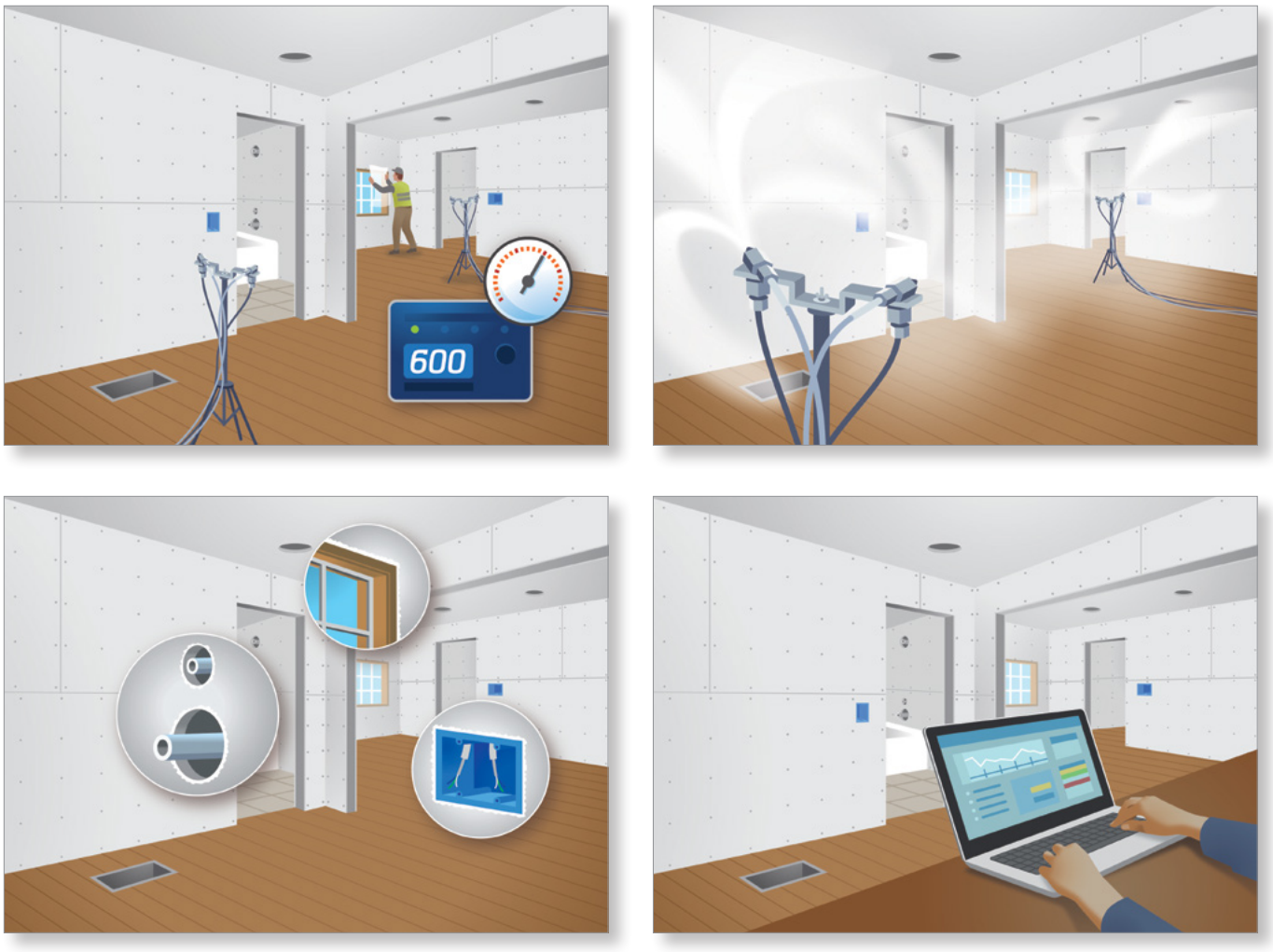
TABLE 29 – AEROBARRIER PILOT PROGRAM NEW CONSTRUCTION BUILDER GROUPS

Group	Type	Characteristics
1	Ready for NetZero	Consistently build to ENERGY STAR and NetZero standards
		Builder team familiar with how to achieve good results
		Typical air tightness targets are between 1.5 & 2.5 ACH(50)*
2	Performance Builders	Regularly build to above code air tightness
		Select members on builder team knowledgeable about air testing
		Typical air tightness targets are between 2.0 & 3.0 ACH(50)
3	Code Minimum	Prescriptive path home builders
		Often struggle to meet air tightness test to meet code
		Typical air tightness levels +5.0 ACH(50)

*ACH is air changes per hour (a way of rating the air tightness of a building).

The pilot program exclusively incentivizes the air-sealing method using the AeroBarrier product. This product differs from traditional air sealing practices that use spray foam, caulk, gaskets, and tape because AeroBarrier manufactures their product (acrylic sealant) from technology invented, and proven, by the U.S. Department of Energy (DOE) more than 20 years ago. The sealant is applied using sprayers throughout the home while it's under pressure, which delivers consistent results (shown in Figure 4).

FIGURE 4 – AEROBARRIER APPLICATION PROCESS



The pilot was launched in April 2021 to provide home builders with an incentive to seal new homes with AeroBarrier's product. Through this pilot, Avista intends to evaluate the cost-effectiveness of this method on up to 300 homes; to accomplish this, the pilot is expected to run for a one-year term.

Program Implementation

A comprehensive list of new home builders was created from publicly available historical building permit applications and internal trade ally lists. Marketing materials to bring awareness of this new pilot program were then mailed and/or emailed to this list of builders. In addition, Avista promoted the pilot to the Spokane Area Home Builder's Association at monthly meetings and provided leave-behind reference materials for this group to have on hand. Website content was also created and added to myavista.com for awareness and reference.

Program Eligibility

Eligible for the pilot rebate are builders of residential single-family new-construction homes in Idaho and Washington using an Avista fuel for space heating.

Customers who meet the eligibility requirements will receive a $100 per air change per hour at 50 pascals (ACH(50)) reduction from the pre-seal value or state building code level (whichever is less) per 1,000 square feet sealed, subject to the provision of required documents by the customer to Avista (either mailed or submitted electronically). However, online rebate processing is not currently within the scope of the pilot, as further review by Avista's technology team is still required. For the pilot, Avista will include a 50 percent adder to aid in removing the market barrier. Incentives will be capped at the total project cost.

TABLE 30 – AEROBARRIER PILOT PROGRAM INCENTIVE CALCULATION EXAMPLES

Location	Pre-ACH @ 50 Pascals	Post-ACH @ 50 Pascals	Incentive amount based on code of 5ACH(50) baseline ($100 + 50% added = $150 incentive/ACH(50) reduced per 1,000 ft sq.
Site 1 2500 sq. ft.	3.2	1.5	3.2 – 1.5 = 1.7 | 1.7 * $150 = $255
			$255 *2.500 = $637.50
Site 2 2500 sq. ft.	7.4	2.4	5 (code) – 2.4 = 2.6 | 2.6 * $150 = $390 | $390 * 2.500 = $975
Site 3 2500 sq. ft.	4.9	0.4	4.9 - 0.44 = 4.56 | 4.56 * $150 = $684
			$684 * 2.500 = $1,710

On-Bill Repayment/Financing Program

General Program Description

For almost four decades Avista has supported energy efficiency financing solutions throughout its service territory, with the last program ending in 2016. With the Company no longer offering on-bill repayment/financing programs in recent years, it was asked to review offering a new OBR program in 2021 for its Washington residential and small business customers. The request was made as part of the settlement stipulation in Avista's 2019 Washington General Rate Case (GRC) as provided below:

> *On-Bill Repayment/Financing Program – Avista will provide a proposal for the Energy Efficiency Advisory Group (EEAG) for on-bill repayment/financing programs for residential and small business customers (Schedules 01, 11, and 101). Avista will incorporate feedback from the EEAG in the final program designs by January 2, 2021. If Avista and the EEAG reach agreement on program terms and design, the Company will file the programs with the Commission such that the programs are implemented by September 30, 2021. Based on the outcome of discussions with the EEAG, the Company may file small business and residential programs together or individually with the Commission. The Company will file a status report with the Commission if agreement is not reached with the EEAG for programs offered to the enumerated customer classes by September 30, 2021. Development costs associated with this program will be recoverable from customers and means of recovery will be addressed in a future GRC.*

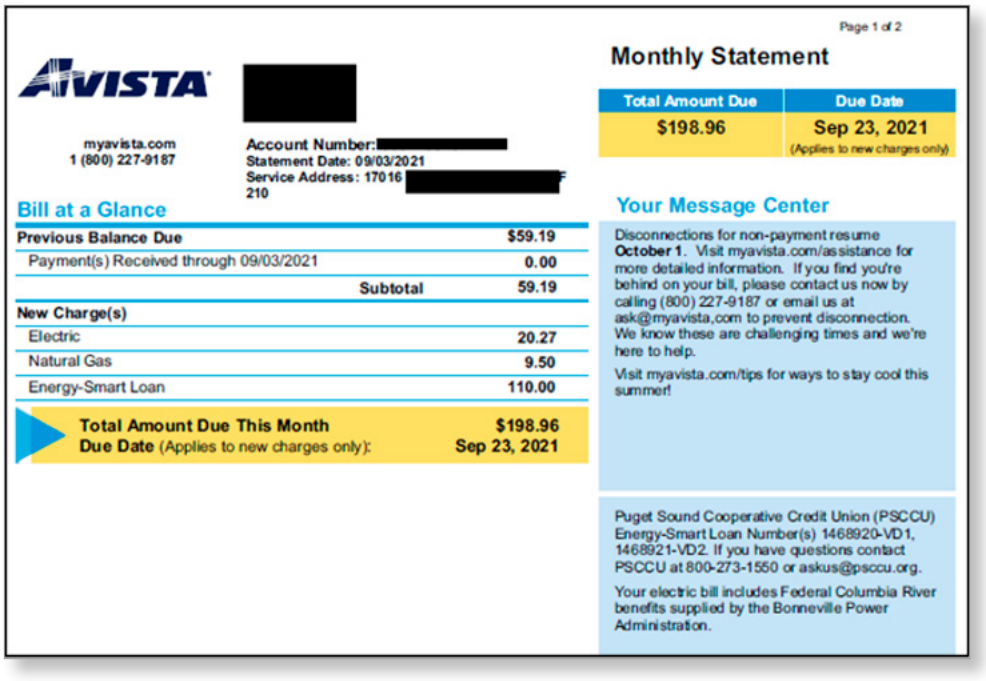
As a result of the request, Avista issued an RFP for a lending solution at the end of 2020, and with assistance from the EEAG, reviewed various OBR program solutions from bid respondents. After careful consideration and evaluation, Avista selected Puget Sound Cooperative Credit Union (PSCCU) as a partner to deliver a flexible funding solution for customers' energy efficiency projects. OBR will be available on October 1, 2021.[1]

OBR's program benefits are twofold. First, PSCCU offers Energy-Smart Loans for energy-efficient projects to home- and business owners in Washington State; their personalized underwriting practices and low interest rates allow participants to reap immediate benefits from energy efficiency upgrades. Paying the loan back on their Avista bill further provides participants with the ease and convenience of one less bill to manage.

1) See Docket Nos. UE-210399 and UG-210400.

Customers' Energy-Smart Loan installments are billed monthly as a line item on the Avista bill until either the term of the loan is completed or Avista is otherwise instructed by PSCCU to remove the loan from the bill. Extra principal payments or early loan payoffs are made directly to PSCCU.

FIGURE 5 – ON-BILL REPAYMENT/FINANCING BILL EXAMPLE



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AVISTA [redacted]

myavista.com
1 (800) 227-9187

Account Number: [redacted]
Statement Date: 09/03/2021
Service Address: 17016 [redacted] F
210

Monthly Statement

Total Amount Due	Due Date
$198.96	Sep 23, 2021 (Applies to new charges only)

Bill at a Glance

Previous Balance Due	**$59.19**
Payment(s) Received through 09/03/2021	0.00
Subtotal	**59.19**
New Charge(s)	
Electric	20.27
Natural Gas	9.50
Energy-Smart Loan	110.00
Total Amount Due This Month	**$198.96**
Due Date (Applies to new charges only):	**Sep 23, 2021**

Your Message Center

Disconnections for non-payment resume **October 1**. Visit myavista.com/assistance for more detailed information. If you find you're behind on your bill, please contact us now by calling (800) 227-9187 or email us at ask@myavista.com to prevent disconnection. We know these are challenging times and we're here to help.

Visit myavista.com/tips for ways to stay cool this summer!

Puget Sound Cooperative Credit Union (PSCCU) Energy-Smart Loan Number(s) 1468920-VD1, 1468921-VD2. If you have questions contact PSCCU at 800-273-1550 or askus@psccu.org.

Your electric bill includes Federal Columbia River benefits supplied by the Bonneville Power Administration.

PSCCU's favorable interest rates are further lowered by Avista subsidies to allow more customers access to energy efficiency project funding.

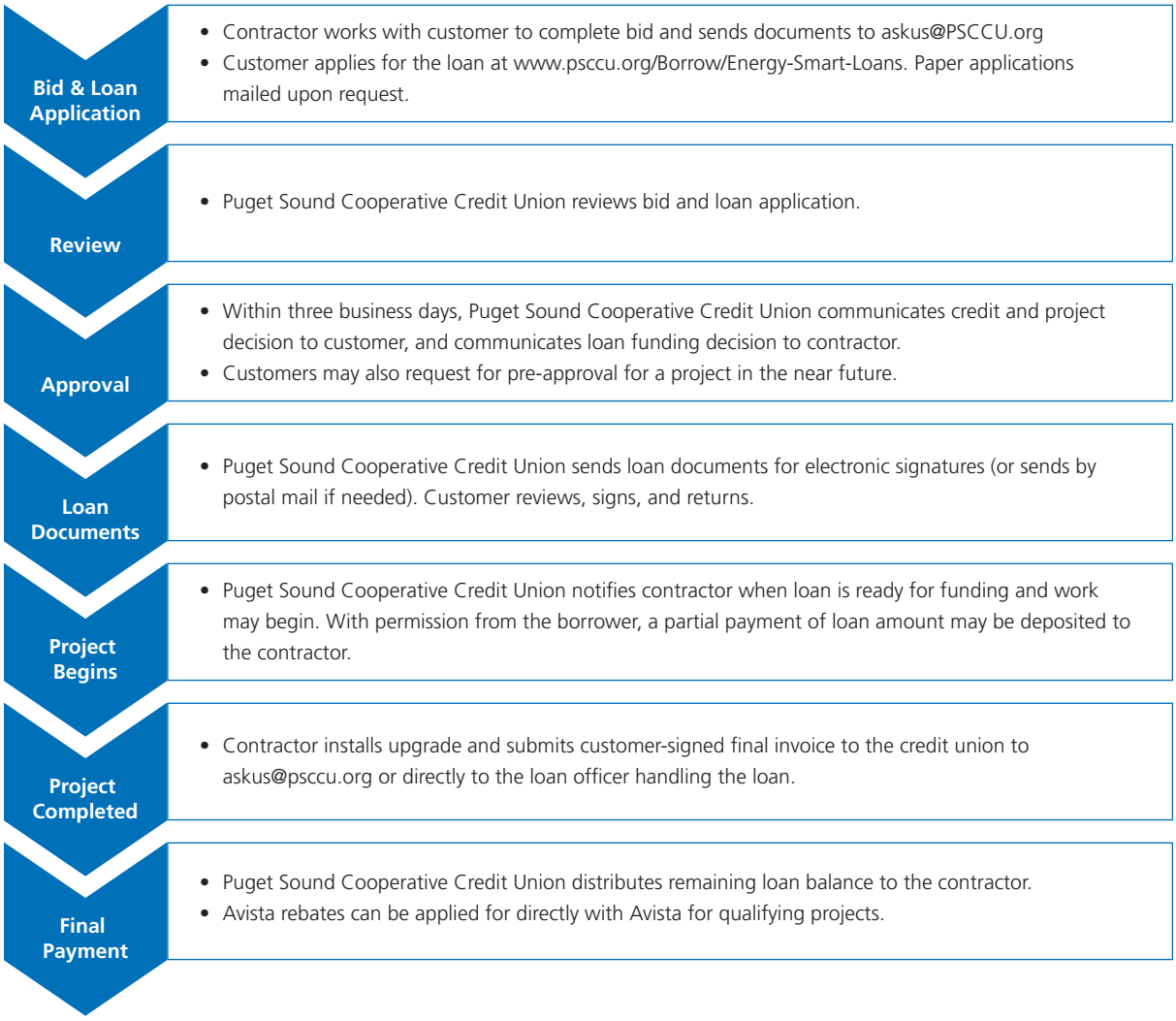
TABLE 31 – ON-BILL REPAYMENT/FINANCING PROGRAM RATES AND TERMS

	Residential	Small Business
Loan Amount	$1,000-$30,000 residential	$5,000-$65,000 small business
Interest Rate	Up to 5.00%	Up to 5.00 %
Term	Up to 15 or 20 years	Up to 15 years
Recording Fee	$225 UCC filing fee*	Varies*
Example	$12,000 loan at 5%, 180 payments of $95 each	

* Fees can be paid up front or added to the loan at the borrower's discretion.

Participation in the On-Bill Repayment Program is outlined below.

FIGURE 6 – ON-BILL REPAYMENT/FINANCING CUSTOMER PARTICIPATION JOURNEY



Energy-Smart Loans through Avista's On-Bill Repayment Program are intended for customers who are in need of assistance for upfront capital for the purchase of energy efficiency equipment and related labor. This customer segment is expected to include both income-qualified and residential customers. Processes to ensure income-qualified customers are directed to CAP agencies will be implemented. Income-qualified customers may apply for an Energy-Smart Loan and participate in the OBR program if they choose to do so after all other options have been shared with them.

Program Implementation

Avista's technical teams worked closely with its partner lender, PSCCU, to develop the integration specifications needed to support the accurate, timely, and secure sharing of information for billing and payment processing. This served as the foundation for testing in preparation for the October 1 launch date.

The key to the program's success is Avista's trade allies, who will help promote and deliver the program. Multi-channel Avista marketing efforts will also drive customers to the OBR program.

Program Eligibility

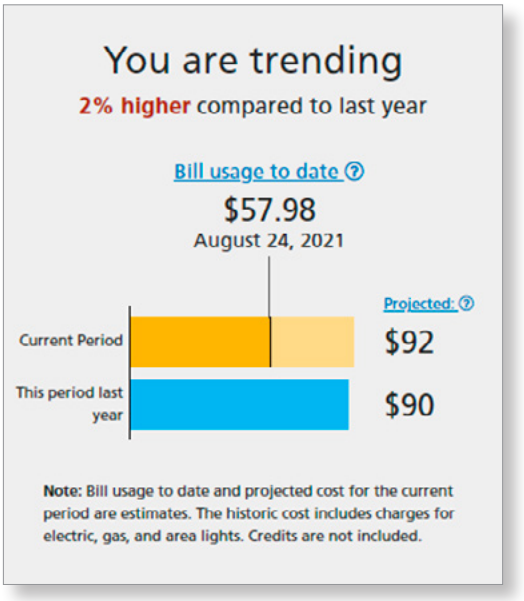
Residential and small business customers in owner-occupied buildings may be eligible for OBR; funded measures must be fueled by Avista. An eligible projects list created by Avista and supported by Washington State's Clean Energy Fund program guidelines is maintained on both Avista's and PSCCU's websites; customers can use it as a reference when considering this funding solution for their project.

Residential Always-On Load Behavioral Program

General Program Description

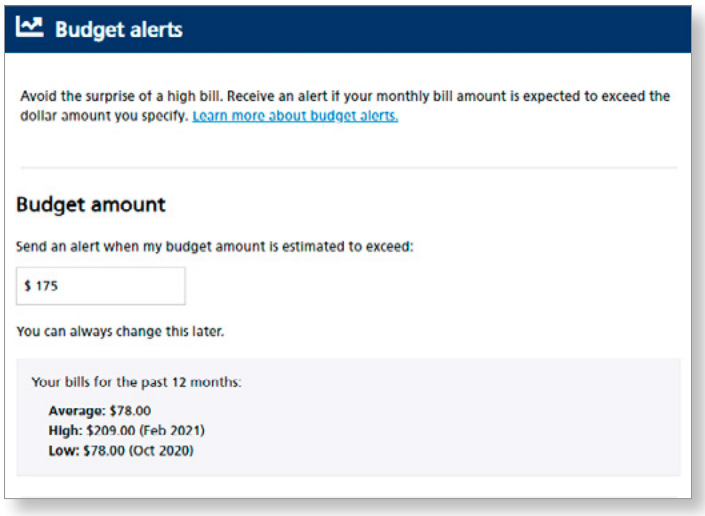
Avista completed installation of Advanced Metering Infrastructure (AMI) meters in its Washington service territory in 2021. This AMI deployment has presented numerous opportunities to enhance energy conservation opportunities for customers. They are currently able to access energy usage data through a customer portal, myavista.com, which uses AMI data to provide insights for customers to adaptively manage their energy consumption. Through the portal, they can see a projected monthly bill based on average daily usage. They can also view five-minute interval data, which allows them to understand their energy use profile in greater detail. Figure 7 shows a screenshot of a sample customer portal account summary.

FIGURE 7 – RESIDENTIAL ALWAYS-ON LOAD BEHAVIORAL PROGRAM CUSTOMER ACCOUNT PORTAL EXAMPLE



Avista has developed notifications that are sent to customers when their user-defined budget threshold is projected to be exceeded. Customers can log in at myavista.com or call customer service to define a budget threshold (e.g. $175). If the projected bill amount is predicted to exceed their chosen amount, Avista will alert the customer, via email or text, thus providing them with the opportunity to adjust usage to lower their monthly bill.

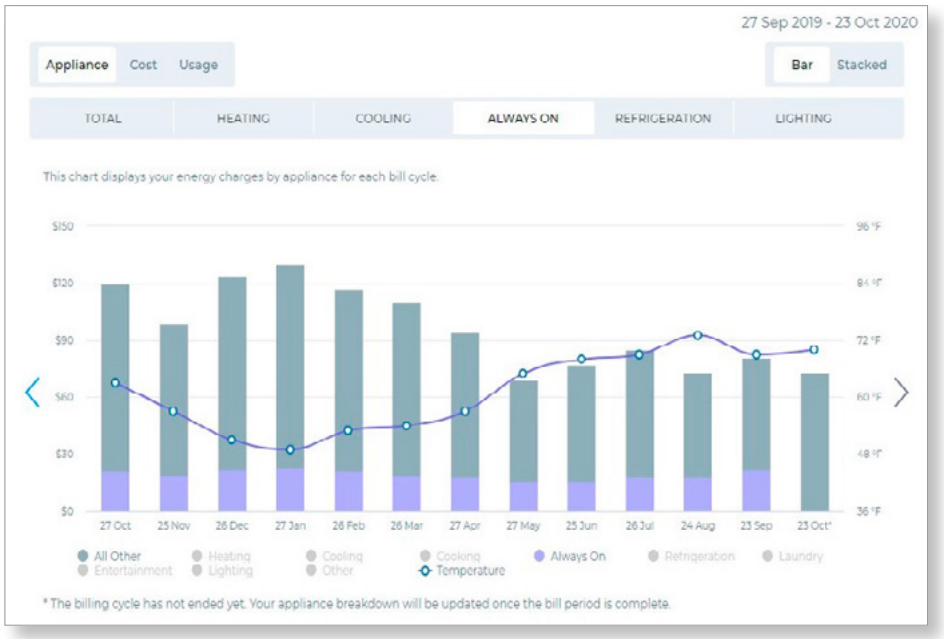
FIGURE 8 – RESIDENTIAL ALWAYS-ON LOAD BEHAVIORAL PROGRAM BUDGET ALERT EXAMPLE



Based on what was learned from Avista's previous experience with home energy reports and with the Sense Device Behavioral Pilot (2018-19) – which estimated that customers who were engaged with an energy savings application saved approximately 7 percent of baseline usage – Avista has identified a new opportunity to provide additional customer-facing value from the Washington AMI deployment. The targeted load behavioral program will use AMI-based non-intrusive load monitoring to identify the loads that are present within a residence. Load information will be shared with customers to better inform them of tailored energy efficiency solutions. Avista will use Bidgely's patented machine learning algorithms found in their Enterprise Analytics and CARE tools to develop these programs.

An example of an AMI-based load disaggregation is shown in Figure 9.

FIGURE 9 – RESIDENTIAL ALWAYS-ON LOAD BEHAVIORAL PROGRAM EXAMPLE



Program Implementation

The initial target of the program will be reductions in always-on load. This target was selected because, on average, 20 percent of a customer's bill can be attributed to always-on loads, and because calculations related to determining always-on loads are very accurate. An additional benefit of targeting always-on loads is that significant improvements can be achieved with low- or no-cost behavioral interventions, such as turning off computers when not in use. This pilot program will apply a randomized controlled trial that will test different approaches to reducing always-on consumption. Participants in the program will be assigned to one of three potential groups: two treatment arms and one control group. An initial communication to customers will include their personalized information regarding always-on usage, associated costs, tips to reduce the load, and anticipated cost savings. Subsequent communications, sent monthly, will update customers on their progress toward reducing always-on usage. In addition, the second treatment group will receive an incentive for reducing their always-on load compared to their baseline. This experimental approach will allow Avista to test for different behavioral responses to personalized information, private costs, and economic incentives, and determine the method most likely to generate the highest reduction in always-on usage.

Avista will track and report on observed energy savings as a result of the program. Based on initial estimates from the Bidgely Analytics Workbench, Avista's top third of always-on users is consuming approximately 300 kWh of always-on load. The program is targeting a reduction of 5 percent (15kWh) a month relative to each customer's baseline. Avista is planning to deliver this program to customers by the second quarter of 2022.

Program Eligibility

For the initial program, Avista plans to target the top third of residential always-on loads – around 24,200 customers. The Company estimates around a two percent opt-out rate of customers who choose to no longer receive communications related to the program.

Program Evaluation

Given the uniqueness of behavioral programs, Avista will work with its EM&V vendor to include within its EM&V plan effective methods for the evaluation of this pilot. It is assumed that the persistence of savings, the lasting impact around energy efficiency messaging, exists through the Always-On communication. However, Avista would defer to our evaluator on what industry best practices are for evaluating the incremental savings through these programs.

Low-Income Portfolio Overview

Low-Income Program

General Program Description

Low-income programs are offered in a cooperative effort with multiple agencies under annual contract to Avista. The funding allows for considerable flexibility for the agencies to deliver to each individual low-income client a mix of measures that are most applicable to their home.

Program Manager

Renee Coelho

TABLE 32 – LOW-INCOME PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		789,744
Incentives	$	1,520,092
Non-Incentive Utility Costs	$	565,313
Total Costs	$	2,085,404
Non-Energy Impacts	$	399,306
Cost-Effectiveness		
Total Resource Cost Test		2.41
Utility Cost Test		0.77

Avista partners with seven CAP agencies and one Tribal Housing Authority to deliver low-income energy efficiency programs (e.g. weatherization). The agencies income-qualify customers, generate referrals, and have access to a variety of funding sources used to best meet customers' home energy needs. The home must demonstrate a minimum level of electric usage for space heating to be eligible for Avista funds.

The agencies serving Avista's Washington service territory receive an aggregate annual funding amount of $3 million, which covers the cost of energy efficiency work performed as well as any health, safety, or repair improvements that are needed. Currently, Avista's Low-Income Program is budgeted at $3 million; however, with the increase in programs, cost-effectiveness, and requirements around CETA, the Company currently estimates an overall budget of nearly $4.5 million between electric and natural gas programs for low-income customers. While these funds are not allocated to specific agencies in this plan, Avista will remain flexible in order to meet incremental needs within communities.

Table 33 shows the budgeted funding allocation by agency and counties served.

TABLE 33 – LOW-INCOME PROGRAM FUNDING BY CAP AGENCY

CAP Agency	County	Funding	
Spokane Neighborhood Action Partners (SNAP)	Spokane	$	1,950,000
Rural Resources Community Action	Ferry, Lincoln, Pend Oreille, Stevens	$	250,000
Community Action Center	Whitman	$	210,000
Opportunities Industrialization Council	Adams, Grant	$	110,000
Spokane Indian Housing Authority	Stevens County	$	30,000
Community Action Council of Lewis, Mason & Thurston Counties	Klickitat, Skamania	$	40,000
Benton Franklin County Community Action	Franklin	$	30,000
Community Action Partnership	Asotin	$	360,000
Set aside/TBD		$	20,000
Total		**$**	**3,000,000**

The agencies are authorized to use 10 percent of these funds for administration cost reimbursement and 20 percent toward program support reimbursement. Avista also permits using up to 30 percent of the contract to fund health, safety, and repairs in qualified homes. Health, safety, and repair spend is at the agency's discretion, and offers flexibility in preparing a home so it might accommodate the improvement as well as the ability to preserve the longevity of the installed measures.

TABLE 34 – LOW-INCOME PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit kWh Savings	Incentive
Air Infiltration – Electric	200	Unit	803	$ 903.96
ENERGY STAR-Rated Doors	200	Unit	162	$ 605.97
ENERGY STAR-Rated Refrigerator	100	Unit	39	$ 640.55
Windows	20,000	sq. ft.	6.04	$ 20.45
Air Source Heat Pump	10	Unit	878	$ 1,270.25
Attic Insulation	30,000	sq. ft.	0.57	$ 1.76
Duct Insulation	20,000	sq. ft.	2.68	$ 3.05
Floor Insulation	20,000	sq. ft.	1.17	$ 3.03
Wall Insulation	6,000	sq. ft.	2.31	$ 2.17
Duct Sealing	20	Unit	710	$ 407.81
Ductless Heat Pump (single Head) (w FAF)	50	Unit	3,016	$ 4,794.76
Ductless Heat Pump (single head) (displace zonal)	50	Unit	3,016	$ 4,794.76
Tiers 2-3 HPWH	10	Unit	587	$ 697.39
Conversion to Air Source Heat Pump	2	Unit	7,234	$ 7,029.61
Outreach LEDs	10,000	Unit	1.00	$ 1.10
Ductless Heat Pump (multi head) (w FAF)	25	Unit	3,200	$ 5,300.00
Ductless Heat Pump (multi head) (displace zonal)	25	Unit	3,200	$ 5,300.00

The 2022 program year will continue to see the majority of electric measures to be fully funded through the Company's low-income weatherization offer. Health, safety, and repair projects are also fully funded, although no more than 30 percent of the annual contract may be used for this work and must accompany a qualifying efficiency improvement. Avista will continue in the same vein by reimbursing the agencies the full cost of the measures that appear on the state Deemed Measure Priority List (DMPL), as presented in the *Washington State Department of Commerce Weatherization Manual*, July 2021 edition. These measures apply to both electric- and natural gas-heated homes and include insulation for attic, floor, wall, air sealing, LED lamps, heat pump water heaters, and ductless heat pumps.

Measures reimbursed at 100 percent have a TRC of 1.0 or better. Per WAC 480-109-100(10)(a), measures identified through the deemed measure priority list in the *Weatherization Manual* are considered cost-effective. A list of 2022 approved measures can be found in Table 35.

TABLE 35 – LOW-INCOME PROGRAM 2022 APPROVED MEASURES

Electric Efficiency Measures
Air Infiltration – Electric
ENERGY STAR-Rated Doors
ENERGY STAR-Rated Refrigerator
Windows
Attic Insulation
Heat Pump Water Heater
Duct Insulation
Floor Insulation
Wall Insulation
Duct Sealing
Ductless Heat Pump (single Head) (w FAF)
Ductless Heat Pump (single head) (displace zonal)
Tiers 2-3 HPWH
Conversion to Air Source Heat Pump
HHS
Outreach LEDs
Ductless Heat Pump (multi head) (w FAF)
Ductless Heat Pump (multi head) (displace zonal)

For efficiency measures with a TRC less than 1.0 and not included on the priority list, a rebate that is equal to Avista's avoided cost of energy is provided to the agency. The agencies may also choose to use their health, safety, and repair allocation toward covering the full cost of the rebated measure if they do not have other funding sources to make up the difference. A list of 2022 fully funded and qualified rebate measures can be found in the Table 36.

TABLE 36 – LOW-INCOME PROGRAM 2022 – FULLY FUNDED AND REBATED

	Projected Participation		Funding	Measure Cost/Rebate
Air Infiltration – Electric	200	Unit	Fully Fund	$ 903.96
ENERGY STAR-Rated Doors	200	Unit	Fully Fund	$ 605.97
ENERGY STAR-Rated Refrigerator	100	Unit	Fully Fund	$ 640.55
Windows	20,000	sq. ft.	Fully Fund	$ 20.45
Air Source Heat Pump	10	Unit	Rebate	$ 1,270.25
Attic Insulation	30,000	sq. ft.	Fully Fund	$ 1.76
Duct Insulation	20,000	sq. ft.	Fully Fund	$ 3.05
Floor Insulation	20,000	sq. ft.	Fully Fund	$ 3.03
Wall Insulation	6,000	sq. ft.	Fully Fund	$ 2.17
Duct Sealing	20	Unit	Fully Fund	$ 407.81
Ductless Heat Pump (single head) (w FAF)	25	Unit	Fully Fund	$ 4,794.76
Ductless Heat Pump (single head) (displace zonal)	25	Unit	Fully Fund	$ 4,794.76
Tiers 2-3 HPWH	10	Unit	Fully Fund	$ 697.39
Conversion to Air Source Heat Pump	2	Unit	Fully Fund	$ 7,029.61
HHS	1	Unit	Fully Fund	$ 1.00
Outreach LEDs	10,000	Unit	Fully Fund	$ 1.10
Ductless Heat Pump (multi head) (w FAF)	25	Unit	Fully Fund	$ 5,300.00
Ductless Heat Pump (multi head) (displace zonal)	25	Unit	Fully Fund	$ 5,300.00

Agencies are encouraged to work with Avista when considering the installation of energy efficiency opportunities that are not found on either the approved or the rebate list.

Community Energy Efficiency Program

The Community Energy Efficiency Program (CEEP) was created by the Washington State Legislature in 2009 to tackle hard-to-reach markets in both the residential and commercial sectors by encouraging energy efficiency improvements. The CEEP pilot was funded by the DOE's State Energy Program and the American Recovery and Reinvestment Act. CEEP partners are selected by a competitive request for proposals and independent review committee. Avista has been a CEEP recipient since 2014.

The Company received a $750,000 CEEP allocation for the 2020-21 funding year that was set to complete in June 2021. However, due to the effects of COVID-19 on customers and, as a result, to program implementation, this contract will be extended to June 2022. Avista provides a $750,000 match, along with in-kind program administrative support, to the implementation of three distinct program opportunities. The Company has contracted with three community action agencies to implement the CEEP funds for energy efficiency improvements in multifamily housing, and converting income-qualified homes with an alternative heat source (e.g. wood and oil) to a heat pump system along with weatherization improvements. CEEP funds are also being used to match utility rebates for energy efficiency work done in small businesses in rural communities.

Commercial/Industrial Portfolio Overview

The commercial/industrial energy efficiency market is served through a combination of prescriptive and site-specific offerings. Any measure not offered through a prescriptive program is automatically eligible for treatment through the Site-Specific program, subject to the criteria for participation in that program. Prescriptive paths for the commercial/industrial market are preferred for measures that are relatively homogenous in scope and uniform in their energy efficiency characteristics.

Unlike the Site-Specific program, prescriptive paths do not require pre-project contracting, thus lending themselves to streamlined administrative and marketing efforts. Incentives are established for these prescriptive programs following Avista's guidelines and standard operating procedures. Actual costs and savings are tracked, reported, and available to the third-party impact evaluator. Many, but not all, of the prescriptive measures use RTF UES.

When the prescriptive path is not available, Avista offers commercial/industrial customers the opportunity to propose any energy efficiency project with documentable energy savings for technical review and potential incentive through the Site-Specific program. Multifamily residential developments may also employ the Site-Specific program when all or a large number of the residences and common areas are treated. The determination of incentive eligibility is based on projects' individual characteristics as they apply to the Company's guidelines and standard operating procedures.

For the 2022 program year, Avista anticipates 39,200,471 kWh to be achieved through commercial/industrial programs with an expected spend of $11,809,123. Table 37 summarizes the 2022 commercial/industrial program estimates.

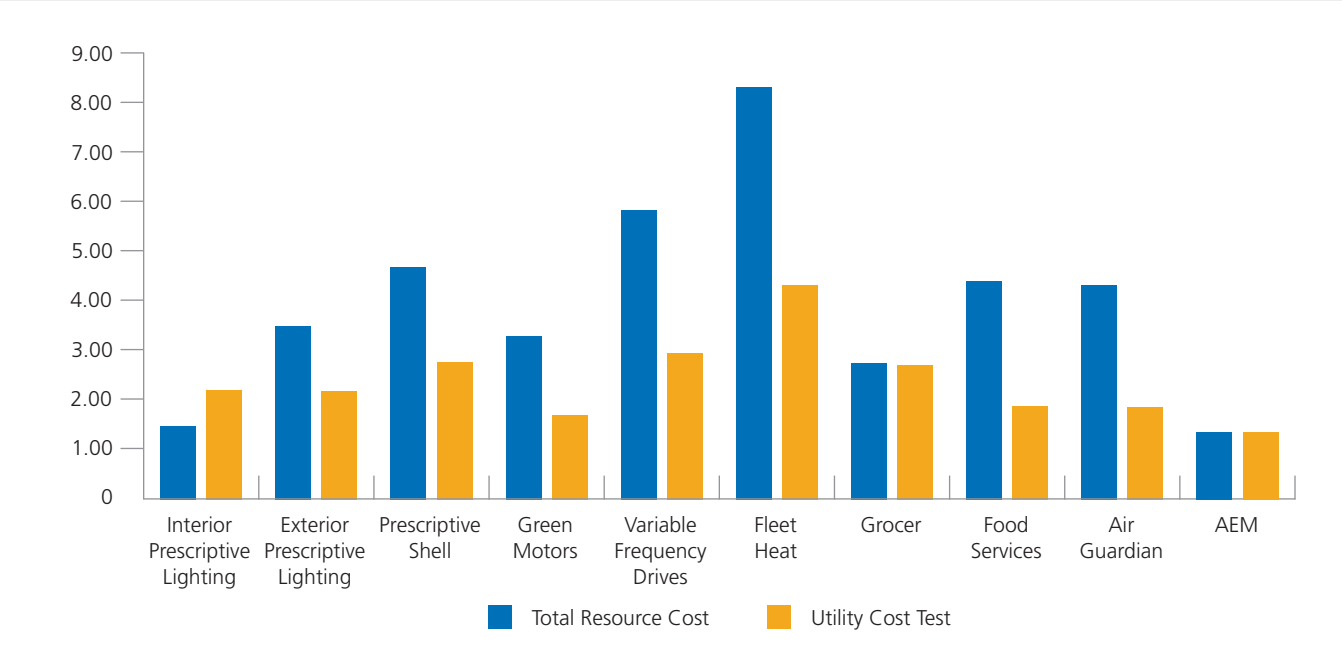
TABLE 37 – COMMERCIAL/INDUSTRIAL PROGRAM OVERVIEW

Commercial/Industrial Programs	Electric Program Savings (kWh)	Expected Spend
Lighting – interior	9,866,089	$ 2,805,259
Lighting – exterior	7,255,339	$ 2,154,842
Site-Specific	18,809,000	$ 5,965,923
Prescriptive Shell	160,500	$ 73,620
Variable Frequency Drives	773,800	$ 186,202
Active Energy Management	1,600,000	$ 495,803
Green Motors	40,685	$ 8,835
Fleet Heat	412,500	$ 53,700
Grocer	70,815	$ 11,923
Food Services	169,744	$ 42,247
Compressed Air	42,000	$ 10,769
Total Commercial/Industrial	**39,200,471**	**$ 11,809,123**

The Green Motors program is offered to customers through third-party implementation staff while the other programs are fielded by Avista energy efficiency staff.

Quantifiable NEBs are included in the TRC calculation, including but not limited to reductions in maintenance, water, sewer, and non-utility energy costs. All assigned and allocated non-incentive utility costs have been incorporated into the cost-effectiveness calculation. Figure 10 identifies the TRC and Utility Cost Test (UCT) cost effectiveness for the prescriptive commercial/industrial program.

FIGURE 10 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE PROGRAMS COST-EFFECTIVENESS



	Interior Pres. Lighting	Exterior Pres. Lighting	Pres. Shell	Green Motors	Variable Freq. Drives	Fleet Heat	Grocer	Food Services	Air Guardian	AEM
Total Resource Cost	1.42	3.42	4.73	3.17	5.86	8.29	2.78	4.41	4.25	1.35
Utility Cost Test	2.13	2.13	2.72	1.68	2.95	4.24	2.71	1.88	1.88	1.35

Avista's Site-Specific Program has historically been one of the largest – and frequently one of the more cost-effective. Any measure with documentable and verifiable energy savings that is not otherwise covered by a prescriptive program is eligible for the Site-Specific Program. The all-encompassing nature of the program has led to the participation of a number of projects that would not otherwise have been incorporated within the portfolio. Table 38 identifies the cost-effectiveness for the Site-Specific Program.

TABLE 38 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM COST-EFFECTIVENESS

	Site-Specific
Total Resource Cost	4.73
Utility Cost Test	4.35

Commercial/Industrial Programs

Commercial/Industrial Site-Specific Program

General Program Description

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 commercial/industrial offerings and has historically been one of the more cost-effective portions of the energy efficiency portfolio. Customers receive technical assistance and incentives in accordance with Avista's Schedule 90 in Washington. 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.

Program Manager

Lorri Kirstein

TABLE 39 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		18,809,000
Incentives	$	4,326,070
Non-Incentive Utility Costs	$	1,639,853
Total Costs	$	5,965,923
Non-Energy Impacts	$	474,933
Cost-Effectiveness		
Total Resource Cost Test		3.24
Utility Cost Test		4.02

Program Implementation

This program will offer an incentive for any qualifying electric energy-saving measure up to the incremental efficiency measure cost that has a simple payback which is less than the life of the measure being installed. Avista will make adjustments to the percentage of incremental cost paid in order to obtain the greatest energy savings at the lowest cost. A cap of 70 percent of the incremental cost and a 15-year measure simple payback based on energy cost savings is used unless a business need to increase either parameter is articulated.[2] Site-Specific program savings can be difficult to predict because of the large nature of the projects and long sales cycles. General economy shifts may also affect customer willingness to fund efficiency improvements. Increases in process and eligibility complexity and in customer costs to participate beyond the capital investment, as well as costs for post-measurement activities, are kept in mind and managed in order to continue to successfully engage customers.

Key components of the program include direct incentives to encourage customer interest, marketing efforts, account executives whose input and assistance can drive customers to the program, and ongoing work with trade allies to ensure that customer demand can be met. The Avista website and the trade ally network are used to communicate program requirements, incentives, and forms.

TABLE 40 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM MEASURES, INCENTIVES, AND BUDGET

	Annual Electric Savings (kWh)	Annual Incentive
Site-Specific Projects	18,809,000	$ 4,326,070

Commercial/Industrial Business Partner Program

The Business Partner Program (BPP) is a new outreach effort designed to target Avista's rural small business customers by bringing awareness of utility programs and services that can assist them in managing their energy bills. When it comes to actually participating in energy efficiency programs, small businesses are chiefly focused on ways to save money, and often don't have enough time or capital to make any improvements. The BPP provides advice and tools to educate and empower both business owners and employees to use less energy.

This initiative provides a free energy efficiency assessment, along with awareness about other services such as billing options and energy efficiency rebates. Once customers are educated about potential improvements, the challenge is to encourage them to act on these enhancements. To further support the BPP, Community Energy Efficiency Program (CEEP) funding was approved. The funding would be used toward assisting rural small business customers with financing the coordination and installation of identified Energy Efficiency Measures (e.g. a lighting retrofit) that may have been identified during the energy assessment. With hard-to-reach customers participating in the energy assessment, understanding their utility bills, and seeing the results of an energy efficiency improvement, this program will provide a comprehensive approach to serving them.

2) A 15-year simple payback is used as a proxy for cost-effectiveness for communication with customers. In some situations, a potential project may be tested against the TRC to determine whether it is cost-effective outside of the 15-year simple payback guideline.

Commercial/Industrial Prescriptive Lighting Program

General Program Description

This program is intended to prompt commercial electric customers to increase the energy efficiency of their lighting equipment through direct financial incentives. It indirectly supports the infrastructure and inventory necessary to ensure that the installation of high-efficiency equipment is a viable option for customers.

In an effort to streamline the process and make it easier for customers and vendors to participate in the program, Avista developed a prescriptive approach for commercial/industrial customers in 2004. This program provides for many common retrofits to receive a pre-determined incentive amount. Incentive amounts and energy savings are calculated using baseline existing wattages and average replacement wattages, as well as the average costs per unit and actual customer average run times – all from the previous year's project data. In mid 2021, Avista revised the per-unit lighting incentive calculation to approximately $0.23 per kWh, up from $0.20 per kWh.

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, MR16, and incandescent can fixtures to more energy-efficient LED light sources and controls.

Program Manager

Rachelle Humphrey

TABLE 41 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM METRICS

Projected Program Metrics	Interior	Exterior
Overall kWh Savings	9,866,089	7,255,339
Incentives	$ 2,119,850	$ 1,655,000
Non-Incentive Utility Costs	$ 685,409	$ 499,842
Total Costs	$ 2,805,259	$ 2,154,842
Non-Energy Impacts	$ 249,122	$ 183,199
Cost-Effectiveness		
Total Resource Cost Test	1.42	3.42
Utility Cost Test	3.14	3.39

Program Implementation

Key components of this program are direct incentives to encourage customer interest, marketing efforts to drive customers to the program, account executive outreach, and ongoing work with trade allies to ensure that customer demand can be met. In late 2021, Avista released new online functionality to its trade allies allowing them to submit prescriptive lighting incentive applications directly into the iEnergy tracking and payment system.

Critical to its success is clear communication to lighting supply houses, distributors, electricians, and customers on incentive requirements and forms. The Avista website also communicates program requirements and highlights opportunities for customers. Avista's regionally based account executives are an important part of delivering the Prescriptive Lighting program to commercial/industrial customers. Any changes to the program typically include an advance notice of 90 days to submit required documentation under the old requirements and/or incentive levels. This usually includes, at a minimum, direct mail communication to trade allies as well as internal forms and website updates.

Program Eligibility

This program is applicable to commercial/industrial facilities with electric service provided by Avista through rate schedules 11 or above.

TABLE 42 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit kWh Savings	Incentive
12-20 W LED Fixture Retrofit	1,500	Unit	227	$ 50
250-140 W Fixture/Lamp	500	Unit	1,022	$ 235
400-175 W Fixture/Lamp	1,500	Unit	1,243	$ 285
1000-400 W Fixture/Lamp	100	Unit	3,285	$ 450
2-9 W MR16	1,000	Unit	88	$ 9
Occupancy Sensors	200	Unit	499	$ 40
T5HO TLED	5,000	Unit	135	$ 25
T8 TLED 4'	60,000	Unit	54	$ 13
U-bend	1,000	Unit	59	$ 14
2x2 Fixtures	1,000	Unit	138	$ 30
2x4 Fixtures	4,500	Unit	254	$ 55
8' T8 TLED	5,000	Unit	103	$ 23
LLLC Fixture	500	Unit	724	$ 70
T8 TLED 2'	700	Unit	34	$ 8
T8 TLED 3'	200	Unit	43	$ 10
1x4 Fixture	200	Unit	157	$ 35
6LT5HO to 160 W Fixture	100	Unit	807	$ 185
TLED to TLED	200	Unit	18	$ 4
4LT5HO to 135 W Fixture	100	Unit	386	$ 85
T8 8' strip Fixture	1,000	Unit	218	$ 55
CFL to CFLED	1,500	Unit	69	$ 15
T5 TLED 4'	200	Unit	64	$ 14
89-25 W Fixture/Lamp	500	Unit	333	$ 75
100-30 W Fixture/Lamp	725	Unit	455	$ 100

	Projected Participation		Per-Unit kWh Savings	Incentive
150-50 W Fixture/Lamp	350	Unit	703	$ 160
175-100 W Fixture/Lamp	700	Unit	704	$ 160
100 W NC Fixture	100	Unit	664	$ 150
250-140 W Fixture/Lamp	300	Unit	879	$ 200
140 W NC Fixture	100	Unit	861	$ 195
320-160 W Fixture/Lamp	150	Unit	1,085	$ 250
160 W NC Fixture	100	Unit	964	$ 220
400-175 W Fixture/Lamp	1,900	Unit	1,444	$ 330
750-300 W Fixture/Lamp	250	Unit	2,891	$ 660
1000-400 W Fixture/Lamp	400	Unit	3,591	$ 825
Sign Lighting	6,000	Unit	48	$ 11
575-300 W Fixture/Lamp	100	Unit	1,540	$ 350

TABLE 43 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM REVISIONS

Measure Description	2021	2022
Interior Lighting		
T8 TLED 2'	$ 15.00	$ 7.50
T8 TLED 3'	$ 15.00	$ 10.00
T8 TLED 4'	$ 13.50	$ 12.50
T8 LED 8'	$ 12.00	$ 23.00
T8 LED U-bend	$ 16.00	$ 13.50
T5 LED 4'	$ -	$ 14.00
T5HO TLED	$ 22.00	$ 25.00
T8/T5 TLED	$ 4.00	$ 4.00
Four-pin plug-in LED	$ -	$ 15.00
9W MR16	$ 8.50	$ 8.50
2x4 LED Fixture	$ 45.00	$ 55.00
2x2 LED Fixture	$ 30.00	$ 30.00
1x4 LED Fixture	$ 30.00	$ 35.00
8' LED Fixture	$ -	$ 55.00
4T5HO to 135W LED Fixture	$ -	$ 85.00
6T5HO to 165W LED Fixture	$ 215.00	$ 185.00
140W Fixture/Lamp	$ 195.00	$ 235.00
175W Fixture/Lamp	$ 250.00	$ 285.00

Measure Description	2021	2022
400W Fixture/Lamp	$ 565.00	$ 450.00
12-20W LED Fixture Retrofit	$ 40.00	$ 50.00
Occupancy Sensors	$ 40.00	$ 40.00
LLLC Fixture	$ 150.00	$ 70.00
Exterior Lighting		
25W Fixture	$ 70.00	$ 75.00
30W Fixture	$ 100.00	$ 100.00
50W Fixture	$ 150.00	$ 160.00
100W Fixture	$ 155.00	$ 160.00
100W NC Fixture	$ 150.00	$ 150.00
140W Fixture	$ 200.00	$ 200.00
140W NC Fixture	$ 175.00	$ 195.00
160W Fixture	$ 270.00	$ 250.00
160W NC Fixture	$ 220.00	$ 220.00
175W Fixture	$ 325.00	$ 330.00
300W Fixture	$ -	$ 350.00
300W Fixture	$ 575.00	$ 660.00
400W Fixture	$ 820.00	$ 825.00
Sign Lighting	$ 10.00	$ 11.00

Commercial/Industrial Prescriptive HVAC Variable Frequency Drive Program

General Program Description

The Prescriptive HVAC Variable Frequency Drive Program is intended to prompt customers to increase the energy efficiency of their HVAC fan or pump applications with a Variable Frequency Drive (VFD) retrofit. Adding a VFD to HVAC systems is an effective tool for cutting operating costs, improving overall system performance, and reducing wear and tear on motors. The prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista electricity and apply the VFD to the eligible fan or pump measures are eligible for this program.

Program Manager

Greta Zink

TABLE 44 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE HVAC VFD PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		773,800
Incentives	$	120,000
Non-Incentive Utility Costs	$	66,202
Total Costs	$	186,202
Non-Energy Impacts	$	2,166
Cost-Effectiveness		
Total Resource Cost Test		5.86
Utility Cost Test		5.20

Program Implementation

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. Each rebate will be qualified and processed within iEnergy with the current-year calculator. Avista will send incentive checks to customers or their designees after each project is approved. Rebates will not exceed the total amount on the invoice. All VFD projects will have an installation verification inspection before the check is issued. 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 45 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE HVAC VFD PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit kWh Savings	Incentive
HVAC Cooling Pump	200 Unit	1,091	$ 200
HVAC Fan	200 Unit	1,022	$ 200
HVAC Heating Pump or Combo	200 Unit	1,756	$ 200

Commercial/Industrial Prescriptive Shell Program

General Program Description

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.

Program Manager

Greta Zink

TABLE 46 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE SHELL PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		160,500
Incentives	$	51,750
Non-Incentive Utility Costs	$	21,870
Total Costs	$	73,620
Non-Energy Impacts		TBD
Cost-Effectiveness		
Total Resource Cost Test		4.73
Utility Cost Test		4.35

Program Implementation

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. Rebates will not exceed the total amount on the invoice. Each rebate will be qualified and processed within iEnergy with the current-year calculator. 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 47 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE SHELL PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit kWh Savings	Incentive
Less than R11 Attic Insulation (E/E) to R30-R44 Attic Insulation	15,000 sq. ft.	1.02	$ 0.75
Less than R11 Attic Insulation (E/E) to R45+ Attic Insulation	15,000 sq. ft.	1.39	$ 0.85
Less than R11 Roof Insulation (E/E) to R30+ Roof Insulation	15,000 sq. ft.	1.36	$ 0.60
Less than R4 Wall Insulation (E/E) to R11-R18 Wall Insulation	15,000 sq. ft.	2.82	$ 0.60
Less than R4 Wall Insulation (E/E) to R19+ Wall Insulation	15,000 sq. ft.	4.11	$ 0.65

Incentive Revisions for 2022

None

Commercial/Industrial Food Services Program

General Program Description

The Commercial Food Service Equipment Program offers incentives for commercial customers who purchase or replace food service equipment with ENERGY STAR-qualified equipment. This prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista electricity to operate the equipment submitted for a rebate are eligible for this program.

Program Manager

Greta Zink

TABLE 48 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE FOOD SERVICES PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		169,744
Incentives	$	33,426
Non-Incentive Utility Costs	$	8,820
Total Costs	$	42,247
Non-Energy Impacts	$	11,307
Cost-Effectiveness		
Total Resource Cost Test		4.41
Utility Cost Test		3.05

Program Implementation

Customers must submit a completed rebate form and invoices within 90 days after the installation has been completed. Avista will send incentive checks to the customers or their designees after each project is approved. Rebates will not exceed the total amount on the invoice. Each rebate will be qualified and processed within iEnergy with the current-year calculator. 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 49 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE FOOD SERVICES PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit kWh Savings	Incentive
0.81 to 1.00 GPM Electric Pre-Rinse Sprayer	2 Unit	570	$ 50
3-4 Pan Electric Steamer	2 Unit	5,115	$ 1,300
5-6 Pan Electric Steamer	2 Unit	6,888	$ 2,200
7-12 Pan Electric Steamer	2 Unit	12,441	$ 2,488
On-Demand Commercial Overwrapper	10 Unit	1,588	$ 300
Efficient Electric Combination Oven (>= 16 pan and <= 20 pan)	1 Unit	5,528	$ 1,000
Efficient Electric Combination Oven (>= 6 pan and <= 15 pan)	1 Unit	5,107	$ 1,000
Efficient Electric Convection Oven, full size	2 Unit	977	$ 200
Efficient Hot Food Holding Cabinet, 1/2 size	1 Unit	398	$ 300
Efficient Hot Food Holding Cabinet, full size	1 Unit	1,016	$ 575
Efficient Hot Food Holding Cabinet, double size	1 Unit	660	$ 1,000
Electric Fryer (large vat size)	1 Unit	953	$ 175
Standard Efficiency Appliance to H.E. Electric Griddle, 70% effic. or better	2 Unit	1,636	$ 250
High Temp Electric Hot Water Dishwasher	2 Unit	4,110	$ 750
Low Temp Electric Hot Water Dishwasher	2 Unit	3,801	$ 750
Combination Oven Electric – 3-4 Pans	2 Unit	1,306	$ 1,000
Combination Oven Electric – 5-14 Pans	2 Unit	6,422	$ 1,000
Combination Oven Electric – 15-28 Pans	2 Unit	5,635	$ 1,000
Combination Oven Electric – 29-40 Pans	2 Unit	11,623	$ 1,000
Batch-IMH-1500	2 Unit	709	$ 200
Batch-IMH-4000	2 Unit	1,576	$ 200
Batch-RCU-4000	2 Unit	484	$ 200
Batch-SCU-4000	2 Unit	505	$ 200
Continuous-RCU-800	2 Unit	2,551	$ 200
Continuous-RCU-4000	2 Unit	3,752	$ 200

Incentive Revisions for 2022

As part of Avista's annual planning process, many measures within the Food Services program were updated to the latest RTF workbooks which provided updated measure categories. These updated definitions impacted the size of hot food holding carts and steamers. In addition, Avista has added several definitions for ice makers to be consistent with RTF measure listings. The incentive levels for these ice makers remained the same; however, Avista's TRM will now track several technology and batch quantity types. Efficient convection ovens were decreased for 2022 due to kWh savings values provided by the RTF.

TABLE 50 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE FOOD SERVICES PROGRAM REVISIONS

Measure Description	2021	2022
Efficient Electric convection oven full size	$ 225	$ 200

Commercial/Industrial Green Motors Program

General Program Description

The green motors initiative goals are to organize, identify, educate, and promote member motor service centers to commit to energy-saving shop rewind practices, continuous energy improvement, and motor-driven system efficiency.

Green Motors Practices Group (GMPG) launched the green motors initiative in 2008 to work with Northwest regional utilities and other sponsoring organizations to provide incentives, through GMPG's member motor centers, for qualifying motors meeting the organization's standards. Avista joined this effort in offering the program to electric customers who participate in the green rewind program for 15-5,000 HP industrial motors. This program provides an opportunity for Avista customers to participate in a regional effort. Without it, this market is difficult for the Company to reach as a local utility. Avista commercial electric customers are eligible for this program. Incentives are paid as a credit off the invoice at the time of the rewind. A $1 per horsepower incentive goes to the customer; $1 per horsepower to the service center.

Program Manager

Greta Zink

TABLE 51 – COMMERCIAL/INDUSTRIAL GREEN MOTORS PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		40,685
Incentives	$	4,960
Non-Incentive Utility Costs	$	3,875
Total Costs	$	8,835
Non-Energy Impacts	$	400
Cost-Effectiveness		
Total Resource Cost Test		3.17
Utility Cost Test		3.05

Program Implementation

This program is implemented and administered by the GMPG from inception to rebate payment. There is an administration fee based on the kWh savings for the organization. The incentive is split between the service center and the customer. Customers receive their incentive as an immediate discount off their bill. The Energy Efficiency Program management team oversees the contract, monitors the program, and qualifies and processes the monthly projects within iEnergy with the current-year calculator. The program is promoted by GMPG, participating service centers, Avista account executives, the Avista website, and Avista marketing efforts. The website is also used to communicate program requirements, incentives, and forms.

Measures and Incentives

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 52 – COMMERCIAL/INDUSTRIAL GREEN MOTORS PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit kWh Savings	Incentive	
15 HP Industrial	1	Unit	525	$	30
20 HP Industrial	0	Unit	703	$	40
25 HP Industrial	0	Unit	893	$	50
30 HP Industrial	0	Unit	962	$	60
40 HP Industrial	1	Unit	1,121	$	80
50 HP Industrial	1	Unit	1,206	$	100
60 HP Industrial	0	Unit	1,269	$	120
75 HP Industrial	2	Unit	1,305	$	150
100 HP Industrial	2	Unit	1,723	$	200
125 HP Industrial	1	Unit	1,990	$	250
150 HP Industrial	1	Unit	2,366	$	300
200 HP Industrial	0	Unit	3,138	$	400
250 HP Industrial	1	Unit	3,799	$	500
300 HP Industrial	0	Unit	4,535	$	600
350 HP Industrial	0	Unit	5,287	$	700
400 HP Industrial	1	Unit	5,994	$	800
450 HP Industrial	0	Unit	6,732	$	900
500 HP Industrial	1	Unit	7,491	$	1,000
600 HP Industrial	1	Unit	10,137	$	1,200
700 HP Industrial	0	Unit	11,777	$	1,400
800 HP Industrial	0	Unit	13,431	$	1,600
900 HP Industrial	0	Unit	15,077	$	1,800
1000 HP Industrial	0	Unit	16,682	$	2,000
1250 HP Industrial	0	Unit	17,812	$	2,500
1500 HP Industrial	0	Unit	21,329	$	3,000
1750 HP Industrial	0	Unit	24,779	$	3,500
2000 HP Industrial	0	Unit	28,201	$	4,000
2250 HP Industrial	0	Unit	31,527	$	4,500
2500 HP Industrial	0	Unit	34,957	$	5,000
3000 HP Industrial	0	Unit	41,686	$	6,000
3500 HP Industrial	0	Unit	48,532	$	7,000
4000 HP Industrial	0	Unit	55,466	$	8,000
4500 HP Industrial	0	Unit	62,269	$	9,000
5000 HP Industrial	0	Unit	69,044	$	10,000

*This incentive includes the $1 per HP fee paid to the service center for participating.

Incentive Changes for 2022

None

Commercial/Industrial Compressed Air Line Isolation Program

General Program Description

Targeting commercial compressed-air customers, this program is the direct installation of a programmable compressed-air leak-reduction device that generates energy savings by reducing the impact of compressed-air leaks during off-hour periods. The cost of the installation will be the customer rebate with no actual money going to the customer.

Program Manager

Greta Zink

TABLE 53 – COMMERCIAL/INDUSTRIAL COMPRESSED AIR LINE ISOLATION PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		42,000
Incentives	$	10,080
Non-Incentive Utility Costs	$	689
Total Costs	$	10,769
Non-Energy Impacts	$	4,057
Cost-Effectiveness		
Total Resource Cost Test		4.25
Utility Cost Test		0.94

Program Implementation

The Compressed Air Line Isolation program is a direct benefit offered to customers who have a qualified compressed-air contractor install a programmable line isolation device on their 15 HP or greater existing rotary screw compressor that is not already shut down daily. The line must have a minimum of two weeks of logging done before the line isolation device is installed and a minimum of two weeks of logging done after installation to show kWh savings. This program is available to all commercial electric customers with compressed-air systems that meet the HP requirement, have rotary screw compressors, and currently do not shut off their systems. Contractors who perform the logging can receive 20¢ per kWh saved, and must submit a completed rebate form, invoice, photos, and logging data with savings report within 90 days after the installation has been completed. Avista will send a check to the contractor after the project is approved. The incentive will not exceed the total amount on the invoice. Each rebate will be qualified and processed within iEnergy with the current-year calculator. 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 54 – COMMERCIAL/INDUSTRIAL COMPRESSED AIR LINE ISOLATION PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit kWh Savings	Incentive
Compressed Air	7 Unit	6,000	$1,440

The incentive amount for this measure covers the cost of the programmable line isolation device as well as installation by a qualified compressed-air contractor.

Incentive Changes for 2022

None

Commercial/Industrial Fleet Heat Program

General Program Description

Vehicle fleet operators use devices to heat vehicle engine blocks in cold weather to ease starting, reduce internal wear, and minimize fuel consumption due to idle warmup time. Block heaters typically use 110-volt single-phase resistive elements with no on-board controls. Heating operation is dependent solely on either the driver or fleet maintenance staff energizing the heaters as needed. In the Inland Northwest, many fleet operators energize vehicle heaters between October 31 and April 1 when the vehicle is off-shift. This 24-hour-a-day/7-days-a-week operation may incur extra energy consumption and costs in conditions when heating is not needed. There is currently a technology available that adds logic and sensor points to control heater operation. Called a thermocord, it adds the ability to sense and measure block coolant temperature and ambient Outside Air Temperature (OAT). With this information, the heater will only be energized when the OAT drops below a temperature set-point and the engine-mounted thermostat is calling for heat. Any commercial/industrial Avista electric customer installing qualified equipment is eligible for this program.

Program Manager

Greta Zink

TABLE 55 – COMMERCIAL/INDUSTRIAL FLEET HEAT PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		412,500
Incentives	$	26,025
Non-Incentive Utility Costs	$	27,675
Total Costs	$	53,700
Non-Energy Impacts	$	0
Cost-Effectiveness		
Total Resource Cost Test		8.29
Utility Cost Test		7.54

Program Implementation

Avista customers fill out a rebate form with the specifics of their fleet vehicles. When that form is submitted, the information is recorded and passed on to the vendor for processing. The customer pays the vendor for the cost of the thermocord and the vendor will deliver the product directly to the customer, who will be responsible for installation. The vendor will notify Avista when the product has been delivered and Avista will perform an installation verification within 30 days of installation. Upon inspection, Avista will reimburse the customer for the costs of the thermocords. This program is promoted by the vendor (Hotstart), Avista account executives, the Avista website, and Avista marketing efforts. The website is also used to communicate program requirements, incentives, and forms.

TABLE 56 – COMMERCIAL/INDUSTRIAL FLEET HEAT PROGRAM MEASURES & INCENTIVES

	Projected Participation	Per-Unit kWh Savings	Incentive
Washington Fleet Heat	50 Unit	8,250	$ 521

Incentive Changes for 2022

None

Commercial/Industrial Grocer Program

General Program Description

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.

Program Manager

Greta Zink

TABLE 57 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE GROCER PROGRAM METRICS

Projected Program Metrics		
Overall kWh Savings		70,815
Incentives	$	6,820
Non-Incentive Utility Costs	$	5,103
Total Costs	$	11,923
Non-Energy Impacts	$	0
Cost-Effectiveness		
Total Resource Cost Test		2.78
Utility Cost Test		6.26

Program Implementation

Customers must submit a completed rebate form and invoice within 90 days after the installation has been completed. Each rebate will be qualified and processed within iEnergy with the current-year calculator. Avista will send incentive checks to customers or their designees after each project is approved. Rebates will not exceed the total amount on the customer invoice. 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 58 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE GROCER PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit kWh Savings	Incentive	
LT Case: T12 to LP LED Inside Lamp	20	Unit	104	$	15
MT Case: T12 to LP LED Inside Lamp	20	Unit	85	$	15
MT Case: T8 to LED Inside Lamp	2	Unit	52	$	10
LT Case: T8 to LP LED Inside Lamp	2	Unit	63	$	10
T12 to LP LED Outside Lamp	5	Unit	73	$	15
T8 to LP LED Outside Lamp	5	Unit	44	$	15
MT Case: 2 T8 to 1 High Power LED Inside Lamp	5	Unit	116	$	20
MT Case: 2 T12 to 1 High Power LED Inside Lamp	5	Unit	183	$	20
LT Case: 2 T8 to 1 High Power LED Inside Lamp	5	Unit	142	$	20
LT Case: 2 T12 to 1 High Power LED Inside Lamp	5	Unit	223	$	20
MT Case: 2 T8 to 1 High Power LED Outside Lamp	5	Unit	99	$	15
MT Case: 2 T12 to 1 High Power LED Outside Lamp	5	Unit	156	$	15
Anti-Sweat Heater Controls – Low Temp	2	Unit	312	$	40
Anti-Sweat Heater Controls – Medium Temp	2	Unit	231	$	40
Gaskets for Low Temp Reach-In Glass Doors	2	Unit	211	$	40
Gaskets for Medium Temp Reach-In Glass Doors	2	Unit	118	$	40
Gaskets for Walk-In Freezer – Main Door	2	Unit	711	$	65
Gaskets for Walk-In Cooler – Main	2	Unit	394	$	25
Floating Head Pressure for Single Compressor Systems, LT Condensing Unit	2	Unit	1,971	$	100
Floating Head Pressure for Single Compressor systems, LT Remote Condenser	2	Unit	4,012	$	100
Floating Head Pressure for Single Compressor Systems, MT Condensing Unit	2	Unit	965	$1	00
Floating Head Pressure for Single Compressor Systems, MT Remote Condenser	2	Unit	3,194	$1	00
Strip Curtains for Convenience Store Walk-In Freezers	2	Unit	20	$	10
Strip Curtains for Restaurant Walk-In Freezers	2	Unit	100	$	10
Strip Curtains for Supermarket Walk-In Coolers	2	Unit	80	$	10

	Projected Participation		Per-Unit kWh Savings	Incentive	
Strip Curtains for Supermarket Walk-In Freezers	2	Unit	340	$	10
20W ECM Replacing 20W Shaded Pole	1	Unit	187	$	100
20W ECM Replacing 1/20HP Shaded Pole	1	Unit	503	$	100
20W ECM Replacing 1/15HP Shaded Pole	1	Unit	808	$	100
20W ECM Replacing 1/20HP Permanent Split Capacitor	1	Unit	255	$	100
20W ECM Replacing 1/15HP Permanent Split Capacitor	1	Unit	371	$	100
1/20HP ECM Replacing 1/20HP Shaded Pole	1	Unit	377	$	100
1/20HP ECM Replacing 1/15HP Shaded Pole	1	Unit	683	$	100
1/20HP ECM Replacing 1/15HP Permanent Split Capacitor	1	Unit	246	$	100
1/15HP ECM Replacing 1/20HP Shaded Pole	1	Unit	284	$	100
Medium Temp ECM Replacing Shaded Pole 9W Output Power	1	Unit	361	$	50
Medium Temp ECM Replacing Shaded Pole 10-15W Output Power	1	Unit	509	$	50
Medium Temp ECM Replacing Shaded Pole 16-20W Output Power	1	Unit	580	$	50
Medium Temp ECM Replacing Shaded Pole 20W+ Output Power	1	Unit	551	$	50
Medium Temp ECM Replacing Permanent Split capacitor 9W Output Power	1	Unit	200	$	50
Medium Temp ECM Replacing Permanent Split capacitor 10-15W Output Power	1	Unit	171	$	50
Medium Temp ECM Replacing Permanent Split capacitor 16-20W Output Power	1	Unit	232	$	50
Medium Temp ECM Replacing Permanent Split capacitor 20W+ Output Power	1	Unit	190	$	50
Medium Temp PMSM Replacing Shaded Pole 9W Output Power	1	Unit	376	$	50
Medium Temp PMSM Replacing shaded Pole 10-15W Output Power	1	Unit	530	$	50
Medium Temp PMSM Replacing Permanent Split Capacitor 9W Output Power	1	Unit	215	$	50
Medium Temp PMSM Replacing Permanent Split Capacitor 10-15W Output Power	1	Unit	192	$	50
Low Temp ECM Replacing Shaded Pole 9W Output Power	1	Unit	500	$	50
Low Temp ECM Replacing Shaded Pole 10-15W Output Power	1	Unit	705	$	50
Low Temp ECM Replacing Shaded Pole 16-20W Output Power	1	Unit	805	$	50
Low Temp ECM Replacing Shaded Pole 20W+ Output Power	1	Unit	764	$	50
Low Temp ECM Replacing Permanent Split Capacitor 9W Output Power	1	Unit	277	$	50

	Projected Participation	Per-Unit kWh Savings	Incentive
Low Temp ECM Replacing Permanent Split Capacitor 10-15W Output Power	1 Unit	237	$ 50
Low Temp ECM Replacing Permanent Split Capacitor 16-20W Output Power	1 Unit	322	$ 50
Low Temp ECM Replacing Permanent Split Capacitor 20W+ Output Power	1 Unit	263	$ 50
Low Temp PMSM Replacing Shaded Pole 9W Output Power	1 Unit	521	$ 50
Low Temp PMSM Replacing Shaded Pole 10-15W Output Power	1 Unit	735	$ 50
Low Temp PMSM Replacing Permanent Split Capacitor 9W Output Power	1 Unit	298	$ 50
Low Temp PMSM Replacing Permanent Split Capacitor 10-15W Output Power	1 Unit	267	$ 50
Walk-In Cooler Evaporator Fan Motor – 20W Shaded Pole to 20W ECM	1 Unit	522	$ 100
Walk-In Cooler Evaporator Fan Motor – 20W Shaded Pole to 1/20HP ECM	1 Unit	286	$ 100
Walk-In Cooler Evaporator Fan Motor – 1/20HP Shaded Pole to 20W ECM	1 Unit	1,256	$ 100
Walk-In Cooler Evaporator Fan Motor – 1/20HP Shaded Pole to 1/20HP ECM	1 Unit	1,019	$ 100
Walk-In Cooler Evaporator Fan Motor – 1/20HP Shaded Pole to 1/15HP ECM	1 Unit	732	$ 100
Walk-In Cooler Evaporator Fan Motor – 1/15HP Shaded Pole to 20W ECM	1 Unit	1,856	$ 100
Walk-In Cooler Evaporator Fan Motor – 1/15HP Shaded Pole to 1/20HP ECM	1 Unit	1,620	$ 100
Walk-In Cooler Evaporator Fan Motor – 1/15HP Shaded Pole to 1/15HP ECM	1 Unit	1,332	$ 100
Walk-In Freezer Evaporator Fan Motor – 20W Shaded Pole to 20W ECM	1 Unit	694	$ 100
Walk-In Freezer Evaporator Fan Motor – 20W Shaded Pole to 1/20HP ECM	1 Unit	380	$ 100
Walk-In Freezer Evaporator Fan Motor – 1/20HP Shaded Pole to 20W ECM	1 Unit	1,669	$ 100
Walk-In Freezer Evaporator Fan Motor – 1/20HP Shaded Pole to 1/20HP ECM	1 Unit	1,354	$ 100
Walk-In Freezer Evaporator Fan Motor – 1/20HP Shaded Pole to 1/15HP ECM	1 Unit	973	$ 100
Walk-In Freezer Evaporator Fan Motor – 1/15HP Shaded Pole to 20W ECM	1 Unit	2,466	$ 100
Walk-In Freezer Evaporator Fan Motor – 1/15HP Shaded Pole to 1/20HP ECM	1 Unit	2,152	$ 100
Walk-In Freezer Evaporator Fan Motor – 1/15HP Shaded Pole to 1/15HP ECM	1 Unit	1,770	$ 100

	Projected Participation	Per-Unit kWh Savings	Incentive
Evaporator Fan ECM Motor Controller – Walk-In – Medium Temp – >44W – 2 or more Motors/Controller	1 Unit	688	$ 50
Evaporator Fan ECM Motor Controller – Walk-In – Medium Temp – 24-43W – 2 or more Motors/Controller	1 Unit	254	$ 50
Evaporator Fan ECM Motor Controller – Walk-In – Low Temp – >44W – 3 or more Motors/Controller	1 Unit	304	$ 50
Evaporator Fan ECM Motor Controller – Walk-In – Low Temp – 24-43W – 3 or more Motors/Controller	1 Unit	203	$ 50
Evaporator Fan ECM Motor Controller – Walk-In – Medium Temp – ≤ 23W – 5 or more Motors/Controller	1 Unit	150	$ 50
Evaporator Fan ECM Motor Controller – Walk-In – Low Temp – ≤ 23W – 7 or more Motors/Controller	1 Unit	119	$ 50
Evaporator Fan ECM Motor Controller – Walk-In – Medium Temp – >44W – 1 or 2 Motors/Controller	1 Unit	688	$ 50
Evaporator Fan ECM Motor Controller – Walk-In – Low Temp – >44W – 1 or 2 Motors/Controller	1 Unit	304	$ 50

Incentive Revisions for 2022

In addition to several additions to the program, the following incentive amounts were increased in 2022.

TABLE 59 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE GROCER PROGRAM INCENTIVE CHANGES

	2021	2022
LT Case: T12 to LP LED Inside Lamp	$ 10	$ 15
MT Case: T12 to LP LED Inside Lamp	$ 10	$ 15
T12 to LP LED Outside Lamp	$ 10	$ 15
T8 to LP LED Outside Lamp	$ 10	$ 15
MT Case: 2 T8 to 1 High Power LED Inside Lamp	$ 15	$ 20
MT Case: 2 T12 to 1 High Power LED Inside Lamp	$ 15	$ 20
LT Case: 2 T8 to 1 High Power LED Inside Lamp	$ 15	$ 20
LT Case: 2 T12 to 1 High Power LED Inside Lamp	$ 15	$ 20
Strip Curtains for Convenience Store Walk-In Freezers	$ 5	$ 10
Strip Curtains for Restaurant Walk-In Freezers	$ 5	$ 10
Strip Curtains for Supermarket Walk-In Coolers	$ 5	$ 10
Strip Curtains for Supermarket Walk-In Freezers	$ 5	$ 10

Commercial/Industrial Pilot Programs and Potential New Programs

For 2022, Avista is exploring multiple pilot programs for commercial/industrial customers. The progress of these new and pilot programs is shared regularly with the Advisory Group. The pilot programs listed below are in addition to pilot programs Avista is developing related to CETA (page 8) as well as those the Company is developing for residential customers (page 32).

Washington State Clean Buildings Act Early Adopter Incentives

General Program Description

Washington State House Bill 1257 was codified into law late in 2019 with active rule-making underway throughout 2020. This law requires existing commercial buildings over 50,000 square feet to comply with established performance standards. Compliance requirements for commercial building owners will be phased in starting in 2026, with all commercial buildings over 50,000 square feet complying by 2028.

The law also includes provisions for incentives to early adopters whose building's baseline energy use exceeds the performance standard target by a certain amount. $75 million is designated to assist building owners in achieving compliance. Early adopter incentives will be administered by utilities.

Energy Use Intensity (EUI) metrics will be used to determine compliance with the performance standard. It has been determined that the Department of Energy's ENERGY STAR Portfolio Manager Tool will be used to calculate the EUI.

The Department of Commerce is responsible for assuring compliance and determining early adopter incentive fund allocations. They've published recommendations for affected building owners to prepare, including benchmarking their buildings through Portfolio Manager and developing and executing an energy efficiency plan. Utilities in Washington play a vital role in working cooperatively with the Department of Commerce to execute the new law and to support building owners as they navigate the compliance process. Avista has identified the three key areas of support shown in Table 60.

TABLE 60 – WASHINGTON STATE CLEAN BUILDINGS ACT EARLY ADOPTER INCENTIVES

Service	Start Date	Prior Service
Pay Early Adopter Incentive	in place	renewable incentives
Portfolio Manager	in place	current program offering since January 2009
Energy Efficiency Engineering Services	in place	current service offered since Avista began Energy Efficiency Programs

Avista preparations completed, identified, or underway:

1. Actively participate in Department of Commerce rule-making meetings
2. Actively participate in HB1257 utility working group meetings
3. Provide information and gain customer feedback at Spokane Building Owners & Managers Association (BOMA), Washington Association of Maintenance and Operation Administrators (WAMOA), and other industry meetings
4. Identified affected buildings in service area
    - Initial search with internal GIS tools
    - Work with Department of Commerce
5. Identified current Portfolio Manager customers affected by the law
6. Determine potential additional program offerings to help customers meet targets
7. Completed an outreach and communications materials
    - Target known affected customers through account executives
    - Provide broader awareness with reference materials on website
8. Payment process and procedures created that include the following:
    - Set up proper internal accounting
    - Develop reporting tools and process

The goal of this pilot is to further explore ways to encourage customers to comply with the law before it goes into effect. Through earlier participation in these programs, customers will experience fewer disruptions in their operations and avoid unwanted penalties for not complying with HB 1257.

Active Energy Management Pilot Program

General Program Description

CETA places aggressive targets on decarbonization of the electric grid and overall energy efficiency of the building sector. This legislation will increase the renewable mix on the grid, and could have significant operational impacts on utilities in managing more distributed and variable generation resources. To minimize impacts on customers' energy rates, Avista seeks innovative programs to cost-effectively reduce energy consumption. One potential way to further take advantage of efficiency programs is to implement continuous building monitoring to improve performance in real time, a concept referred to as Active Energy Management (AEM). The goal is a deeper understanding of how building energy demand may shift or flex based on potential tariffs, incentives, technologies, and building occupant behaviors.

The AEM pilot program will use the communication networks in Avista's eco-district,[3] as well as cloud services and data-mining algorithms, to capture, process, and disseminate information on ways to improve a building's energy usage to participants in the program. Potential building efficiency actions will be generated based on building data from the Scott Morris Center for Energy Innovation and the Catalyst building, both of which are located inside the eco-district, as well as data from up to 10 participating pilot program buildings located outside of the eco-district. Information to increase energy efficiency will be shared with participating pilot program buildings.

This pilot program will seek to achieve the following objectives:

- **Support customers in identifying and implementing operational energy efficiency opportunities and demonstrate the cost-effectiveness of those efficiency savings.** This pilot most closely resembles monitoring-based commissioning or strategic energy management programs currently deployed in other utilities, but with a slightly different approach, which aggregates data from multiple buildings.
- **Build capacity of Avista account management and energy efficiency resources.** This model is intended to support the Avista account management and energy efficiency teams in deepening their understanding of facility operations and energy efficiency opportunities through hands-on training. An outcome of this pilot will be a deeper understanding of the organizational capability of Avista to support this level of customer engagement.
- **Share facility data with relevant Avista teams for R&D purposes.** Facility operating information can be used to model new customer programs, such as time-of-use rates or Demand Response (DR) incentives. It can also replace assumed data in models and optimization tools.
- **Increase customer satisfaction and engagement.** The hands-on components of this program are designed to build trust between Avista energy efficiency team members and building operators. This relationship will increase satisfaction with Avista and engagement by building owners and operators in other Avista programs.

As a proof-of-concept pilot, Avista aims to evaluate the program by providing sufficient information to better understand the potential energy savings of implementing AEM, the associated cost per kWh saved compared to alternative approaches to acquiring savings, and the resources needed to adequately and effectively engage with customers. The AEM pilot program will also establish a set of metrics to baseline as well as a set of quarterly reports to illustrate the effectiveness of the program.

Energy Use Index Retrofit Pilot

The Energy Use Index (EUI) Retrofit pilot will encourage customers to use their energy more efficiently. The pilot uses a pay-for-performance approach with the goal of saving 50 percent of the customer's previous energy use. To participate, the facility must retrofit at least 25 percent of its useable square footage, and there must be a way to accurately measure the treatment area's performance. Limited to five customers, this pilot is modeled on the EUI pilot program for recently completed new construction, and can play a part in capturing savings from buildings not currently addressed by HB-1257's scope. Buildings of all sizes will be eligible for this pilot.

A primary goal of this pilot is to identify whether performance based incentives can encourage deep energy savings.

3) As an example of Avista's commitment to leadership in innovation and clean energy, the Company designed, owns, and operates an "eco-district development" in Spokane's University District. Funded by shareholder investment, it illustrates how net-zero and carbon-free technology can be economically sustainable.

Smart Buildings Center Tool Lending Pilot

The Tool Lending pilot will be a two-year program that enables Avista customers to borrow tools from a public space in the eco-district. In addition to the Company's current stock of energy efficiency-related equipment, the library of tools will include some newer technologies that provide more insight into energy use. Training on the tools – as well as shipping both tools and training materials to customers who are not in the immediate area – will also be included. Work is underway to make this an extension of the NEEC program, in order to take advantage of the work that has already been done in the Northwest and limit the cost to Avista while offering a more robust tool set. Avista is hoping to learn whether customers value this service as part of their energy management efforts. Throughout the pilot period, Avista will track the number of customers that participate in the program.

Midstream Program Design

Avista is in the process of determining its strategic approach to expanding customer engagement with energy efficiency programs by exploring midstream additions to its portfolio. Midstream programs move utility incentives up the supply chain to target the market actors that have the greatest influence on equipment sales. In a typical supply chain, distributors generally have the most power to influence equipment sales within the market.

The midstream approach captures savings more efficiently than other incentive channels, because conservation is counted at the point of sale rather than after the completion of the rebate process. Avista is considering this addition for select offerings within its portfolio, including residential and commercial/industrial HVAC, water heat and other prescriptive measures. Shell measures, such as home and business insulation, windows, doors and sealing, will remain within current prescriptive program paths.

The midstream program design has been a proven contributor to overall energy conservation achievements and has been successful within Avista's regional market, as well as on a national level.

At this time, Avista is awaiting estimated impacts of a midstream program to determine if this approach serves the best interests of customers. Avista will consult with its EEAG before makings its final determination.

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REGIONAL MARKET TRANSFORMATION

REGIONAL MARKET TRANSFORMATION

Avista's local energy efficiency portfolio seeks to influence customers to purchase cost-effective energy efficiency products and services through a combination of incentives, awareness, and addressing barriers to adoption. The local Energy Efficiency Portfolio is intended to be permanent in nature, with the understanding that the specific programs and eligibility criteria will be revised over time in recognition of the changing marketplace, technologies, and economics. Though these efforts can, and often do, create permanent changes in how customers make energy choices, it is generally not feasible for Avista to design local programs to influence markets that are often regional or national in scale.

Market transformation consists of defined interventions occurring for a finite period of time, utilizing strategically selected approaches to influence the energy market (customer, trade allies, manufacturers or combinations thereof) followed by an exit strategy. Successful market transformations permanently change the trajectory of markets in favor of more cost-effective energy efficiency choices, well beyond the termination of the active intervention.

Electric utilities within the Northwest came together in 1997 to establish and fund a cooperative effort toward sustaining market transformation on a regional basis, with sufficient scale and diversity to deliver a portfolio capable of providing a cost-effective electric-efficiency resource.

Northwest Energy Efficiency Alliance

That organization, NEEA, is currently in its sixth funding cycle for 2020-24. Avista has been an active participant and funder of this collaborative effort since its inception. NEEA's successful residential lighting efforts – and many other ventures – are difficult to replicate. Nevertheless, there is little doubt that there are cost-effective opportunities that can only be achieved, or that are best achieved, through a regionally cooperative effort. Avista has a high degree of confidence that the NEEA portfolio will succeed, and that the Company's Washington customers will continue to benefit from these efforts.

For 2022, Avista's Washington portion of the NEEA's electric budget is expected to be approximately $1,358,000. NEEA funding requirements are incorporated within the budget, but are considered to be supplementary expenditures outside of the scope of the current year's local portfolio. The NEEA portfolio has not been incorporated within either the acquisition projection or the cost-effectiveness of the 2022 local portfolio developed within this plan.

Eastside Market Transformation

Avista is investigating new market transformation efforts with a specific focus on energy efficiency measures and solutions that work well in eastern Washington and northern Idaho. This engagement will be complementary to the NEEA's efforts for the broader region. Avista will work with its advisory group as this engagement develops and will look forward to feedback from stakeholders.

Avista has partnered with Idaho Power to form a collaborative aimed at assessing market transformation opportunities that drive greater local impact and create deeper customer engagement. To do this, Avista and Idaho Power will pilot the application of a market transformation approach that focuses on mid- and upstream interventions to remove market barriers and create lasting change.

2022 is focused on pilot execution and initial assessment of an eastside market transformation approach. The collaborative will test the viability of this localized market transformation approach by conducting a short-term Ductless Heat Pump Pilot that is expected to launch in Q4 2021. In 2021 the team conducted a competitive bid process to identify market partners to support the pilot. The team negotiated partnerships with two major manufacturers and their distribution channels to invest additional resources and dollars aimed at removing market barriers associated with cost, awareness, and acceptance using an approach tailored to eastside markets and customers. The team has created a market transformation strategy, captured pilot logic, identified key market indicators of success, and negotiated relevant data exchanges to track pilot success and continue to explore ductless heat pump potential and specific barriers to adoption found in Avista's and Idaho Power's service territories.

A steering committee composed of Avista and Idaho Power staff has been charged with supporting pilot launch, exploring for long-term viability of a localized market transformation approach, ascertaining additional program concepts, and identifying tools to understand a pathway for cost-effective savings.

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

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COMPANY INITIATIVES, STUDIES, AND OTHER ITEMS

Connected Communities

This project is pending Department of Energy grant award determination. If funded, it will be centered in one of Avista's Named Communities, the East Central area in Spokane. The project creates customer-specific, packaged solutions for the optimization of space heating and cooling loads, energy efficiency measures, demand response, renewable energy resources, energy storage, and controllable customer assets that coordinate to optimize the supply and consumption of grid services. The goal of this project is to advance a new scalable business model that will demonstrate a mutually beneficial framework for the grid, the people it serves (the community), and the built environment. This project fulfills condition 9c of Avista's 2020-21 *BCP* Conditions.

Microgrid Design Project Partnership

Avista was recently awarded a Department of Commerce Clean Energy Fund grant to partner with the Spokane Tribe of Indians to design a grid resiliency program. The basis for the design is predicated on a micro-grid feasibility study completed in March 2021 by Sazan Environmental Services and sponsored by the Spokane Indian Housing Authority (SIHA). The project will start with the feasibility study and focus on energy resiliency, while maximizing the value of new and existing solar, energy storage, controllable customer loads, and backup generators to support Tribal goals of emergency preparedness, carbon footprint reduction, and self-sufficient strategies to maintain operations during an outage or natural disaster. Avista will consult with Spokane Tribe members and with the equity advisory group regarding design considerations and outreach strategies for the duration of this design project. While the grant does not fund construction, it creates shovel-ready packages of work that, once completed, will provide energy resilience during wildfires, energy independence for critical facilities, and energy billing benefits for customers. This project also fulfills condition 9c of Avista's 2020-21 *BCP* Conditions.

Non-Energy Impacts Study and Gap Analysis

Avista engaged with DNV (formerly DNV-GL) to develop and quantify a list of NEIs for Avista's electric and natural gas programs, along with a gap analysis of areas where future NEI development might exist. Avista has included the full report from DNV in Appendix D of the *ACP.* The result of these efforts were the identification of several NEIs for low-income, residential, and commercial/industrial customers, including those affecting participants, society, and the utility. Please see Appendix D for the report itself.

While basic conservation efforts consider the effect energy efficiency measures have on the utility's system by way of deferring capital investments, NEIs provide an opportunity to assign value that is received by the customer. As such, NEI values are included in the TRC cost-effectiveness test as a benefit to the customer. A uniform approach to valuing NEIs has historically proven to be challenging. As new benefits are identified, the quantification of those benefits is not always possible. Moreover, acceptance of specific NEIs varies between regions where there are differing levels of the prevalence of issues mitigated by the measures installed.

While this has been the situation for Avista customers, new efforts have identified the desire to have a well-defined set of NEIs. In Avista's 2020-21 *BCP* conditions, sections 10a-10c address NEIs with the following statements:

a. During this biennium, Avista must demonstrate progress toward identifying, researching, and developing a plan to properly value non-energy impacts that have not previously been quantified. The non-energy impacts considered must include the costs and risks of both long- and short-term public health benefits, environmental benefits, energy security, and other applicable non-energy impacts. These impacts and risks must be included in the 2022-23 *BCP*.

b. Avista must identify the discrete NEIs and the monetized value used in cost-effectiveness testing for each electric conservation program. This must be provided in a detailed format with a summary page and subsequent supporting spreadsheets, in native format with formulas intact, providing further detail for each program and line item shown in the summary sheet in annual plans and reports.

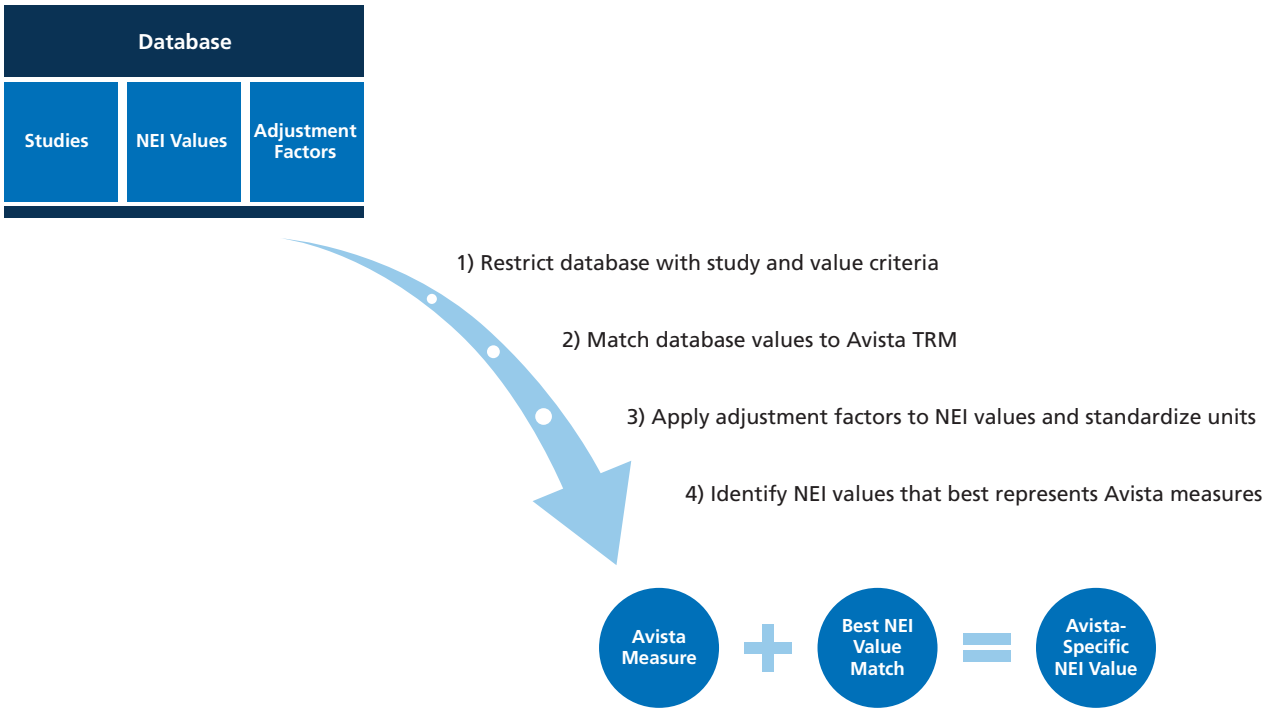
c. To the extent practicable, Avista must begin to identify the distribution of energy and non-energy benefits in annual plans and reports. This reporting must use currently quantified NEIs, as well as values and estimates of additional impacts as they become available.

The following sections explain these efforts and present the findings as a result of the study.

Non-Energy Impact Study and Approach

DNV's approach to establishing NEI values involved several steps including the known research available on NEI values, assuring fit for the Avista market, adjusting known values to Avista's library of measures, and identifying gaps in Avista's offerings. Figure 11 illustrates the process pursued by DNV in the development of the NEI values.

FIGURE 11 – NON-ENERGY IMPACTS STUDY PROCESS



DNV identified six studies that were applicable to Avista's program. These studies focused on a wide array of impacts including those applicable to residential, low-income, and commercial/industrial segments. The categories of NEIs fall into three main impact areas including participant, societal, and utility. Within these categories are a range of impacts including health and safety, economic development, bad debt write-offs savings, O&M savings, and supplies and materials savings. To ensure the applicability of these studies to Avista's market, DNV applied several adjustment factors to the studies to indicate the overall fit. These adjustments include a confidence factor, a plausibility factor, and an economic adjustment.

The confidence factor addresses the overall fit of the studies to ensure that the available data is disaggregated adequately and appropriately for matching with Avista level measures. It answers the following questions

1. Is the study measure specific?
2. Is the study segmented by sector?
3. Was the sample drawn using a statistical method?
4. Does the study incorporate identifiable economic factors?
5. Does the study consider any of the following when appropriate: open-ended questions, additivity, or double counting?

The results of the confidence factor indicate a score which is then applied to each study.

The plausibility factor accounts for any nuances that exist with in a study that may impact its ability to provide meaningful results for the NEI analysis. First, the age of the study is considered and is given a score. Reports that are more recent receive a higher score than those that are older with scores ranging between (4) for five years or less and (1) for reports that are older than 15 years. The plausibility factor also accounts for how well the studies identify individual technologies. A "match level" score is provided, based on the level of detail provided about each measure or technology. A higher score is given based on the specificity of the measure such as "air source heat pump." A lower score is given if the description does not identify the specific technology but rather indicates its part of a program such as "retrofit."

The economic adjustment looks to Avista's specific jurisdictional costs and adjusts the NEI value based on the source of the study and levels the values to Avista's market. Adjustments are made for property values, income and health impacts, age of homes, utility costs, labor costs, and other factors.

After the adjustment factors are complete, DNV matches the NEI values to Avista's current Technical Reference Manual (TRM). The TRM houses the Unit Energy Savings (UES) values for each measure in Avista's program including the kWh values for each measure. DNV them matches the NEI values to the TRM resulting in an index of NEI values per measure.

Categories of Non-Energy Impacts

NEIs are sourced from several studies and provide impacts to three primary categories: societal, participant, and utility. Table 61 illustrates the categories of NEI values identified in the study that fall into these primary areas, along with a definition to further explain each category's meaning.

TABLE 61 – NON-ENERGY IMPACTS CATEGORIES

NEI Reporting Name	Definition
Avoided Illness from Air Pollution	Modeled value of avoided particulate matter 2.5 microns or less (PM2.5) associated with electricity generation at power plant. Does not include carbon dioxide.
Bad Debt Write-Offs	Reduction in cases of bad debt write-offs.
Calls to Utility	Reduction in number of calls to utility from customers.
Carrying Cost on Arrearages	Reduced carrying cost on arrearages.
Ease of Selling or Leasing	Participant reported improved ability to sell or lease property due to increased performance and desirability.
Fires/Insurance Damage	Avoided cost of fires based on insurance estimates.
Health and Safety	Participant reported costs from time off and lost pay due to fewer missed days of work/school, heat/cold stress, etc., resulting from measures installed in the home.
Thermal Comfort	Increased comfort due to fewer drafts and even temperatures throughout the building.
Noise	Participant reported value associated with reduced amount of outside noise that can be heard inside the home.
O&M	Avoided time and costs associated with reduced maintenance, parts/repairs, service visits, and system monitoring.
Other Impacts – Participant	Includes participant benefits such as price hedging, rate discounts, and reduced tenant complaints.
Other Impacts – Utility	Includes insurance savings and transmission and distribution activities (when they are not covered in the study under "fires/insurance damage").
Productivity	Participant reported value resulting from improved rest, sleep, and living conditions associated with energy efficiency improvements.

For some NEIs, such as "calls to the utility," both a utility benefit and a customer benefit exists. When customers have a manageable energy burden, they may be less likely to contact the utility for energy assistance. Likewise, "bad debt write-off" is also a utility benefit; however, the benefit is influenced by programs that provide positive impacts to customers, enabling them to stay current on their accounts.

Table 61 groups each non-energy impact identified through Avista's NEI study into CBI groups. As noted before, of all the methods for reducing energy burden, Energy Efficiency Measures are most impactful. It is important to note that the "energy burden" NEI excludes energy efficiency but includes other less impactful ways to lower energy burden. The overall impact of each NEI has been given a general impact rating of none, low, medium, and high to indicate the magnitude of each NEI associated with a bundle of Energy Efficiency Measures.

The Impact of Low Income as It Relates to Named Communities

While "highly impacted community" and "vulnerable populations" both have specific definitions and defining characteristics, it is assumed that a percentage of customers within each group experience excess energy burdens. For the purposes of ensuring that these customer groups receive a distribution of energy and non-energy benefits, it is assumed that the NEI values identified within low-income communities also apply to highly impacted communities and vulnerable populations.

As part of our efforts going forward, Avista's will continue to identify the barriers faced by customers in Named Communities and employ thoughtful design principles to overcome these barriers. Access to transportation, health challenges, language barriers, disabilities, and lack of capital are all barriers that impact our customer base, often limiting their ability to participate in Company offerings.

Non-Energy Impact Classification to Customer Benefit Indicators

In Avista's efforts to associate or create a relationship between the non-energy impacts found in DNV's study with the CBIs established through the Company's equity advisory group, NEI values have been mapped to individual indicators. The purpose of this classification is to support the energy efficiency team's actions in addressing requirements of WAC 480-100-640 and to ensure the distribution of non-energy benefits, addressing energy burden reductions and prioritizing energy efficiency that is most effective for Named Communities.

Avista requested that DNV identify NEI values on a per-kWh basis. The result of this is that several NEI values were quantified with varying degrees of overall impact. Table 62 provides a description of the CBI, the NEI type, and a general indication of how influential or effective the NEI value is for low-income and residential programs.

TABLE 62 – CUSTOMER BENEFIT INDICATOR CLASSIFICATION

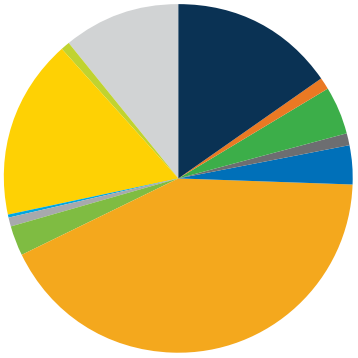
Customer Benefit Indicator	Non-Energy Impact	Low-Income	Residential
Indoor Air Quality/Public Health	Avoided Illness from Pollution	Low	None
	Health and Safety	High	None
Energy Burden	Bad Debt Write-Offs	Medium	None
	Calls to Utility	Low	None
	Carrying Cost on Arrearages	Low	None
	O&M – Participant	Low	Low
	Thermal Comfort	Medium	Low
Named Community Investment	Ease of Selling or Leasing	Low	Medium
	Fires/Insurance Damage	Low	High
	Noise – Participant	Low	Medium
	Other Impacts – Participant	None	Low
	Other Impacts – Utility	Medium	High
	Productivity	Low	None

Non-Energy Impact Study Results

Low-Income – Non-Energy Impacts

NEI values for low-income measures are primarily associated with health and safety which, on an average basis, make up approximately 42.1 percent of the overall NEI value. While all HVAC and Shell measures have an NEI value of health and safety, the largest values are associated with building envelope items (insulation, windows, and doors). Figure 12 shows the share of each NEI on average across Avista's low-income offerings. Note that each individual measure may have different percentages since they contribute uniquely to several NEI values.

FIGURE 12 – PERCENTAGE CONTRIBUTION OF LOW-INCOME NEI CATEGORY TO OVERALL NEI VALUE

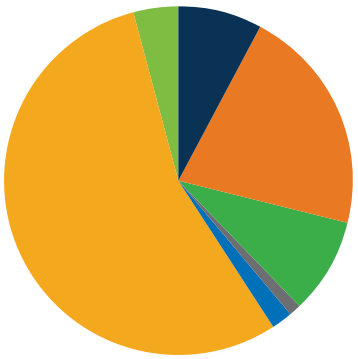


15.4% Bad Debt
1.0% Calls to Utility
4.5% Arrearages
1.2% Ease of Selling or Leasing
3.7% Fire/Insurance Damage
42.1% Health & Safety
2.7% Noise – Participant
0.8% O&M – Participant
0.5% Other Impacts – Participant
16.6% Other Impacts – Utility
0.7% Productivity
10.9% Thermal Comfort
0.0% Avoided Illness

Residential Non-Energy Impacts

While Figure 13 shows how each NEI affected residential customers, the level of NEI per kWh was lower overall for residential customers than for low-income customers. For residential, the largest NEI values originate from utility-related non-energy impacts. From a participation perspective, ease of selling or leasing and reductions in fires or insurance damages were also primary NEI values. The overall distribution of NEIs for residential programs is seen below.

FIGURE 13 – RESIDENTIAL NON-ENERGY IMPACTS



8% Ease of Selling or Leasing
21% Fire/Insurance Damage
9% Noise – Participant
1% O&M – Participant
2% Other Impacts – Participant
55% Other Impacts – Utility
4% Thermal Comfort

Commercial and Industrial Non-Energy Impacts

Non-energy impact values were established for the majority of Avista's commercial/industrial programs including lighting, green motors, grocer, VFDs, and fleet heat programs. While the study considered NEI values of several areas, the vast majority of those benefits are derived from O&M savings. Table 63 summarizes NEI values identified for Avista programs.

TABLE 63 – COMMERCIAL/INDUSTRIAL NON-ENERGY IMPACTS

Program/Measure	NEI – O&M	All Other NEI Values
LED Lighting	$ 0.01740	$ 0.00785
Green Motors	$ 0.00971	$ 0.00012
Grocer	$ 0.00278	$ 0.00002
Prescriptive VFDs	$ 0.00971	$ 0.00012
Fleet Heat	$ 0.00971	$ 0.00003

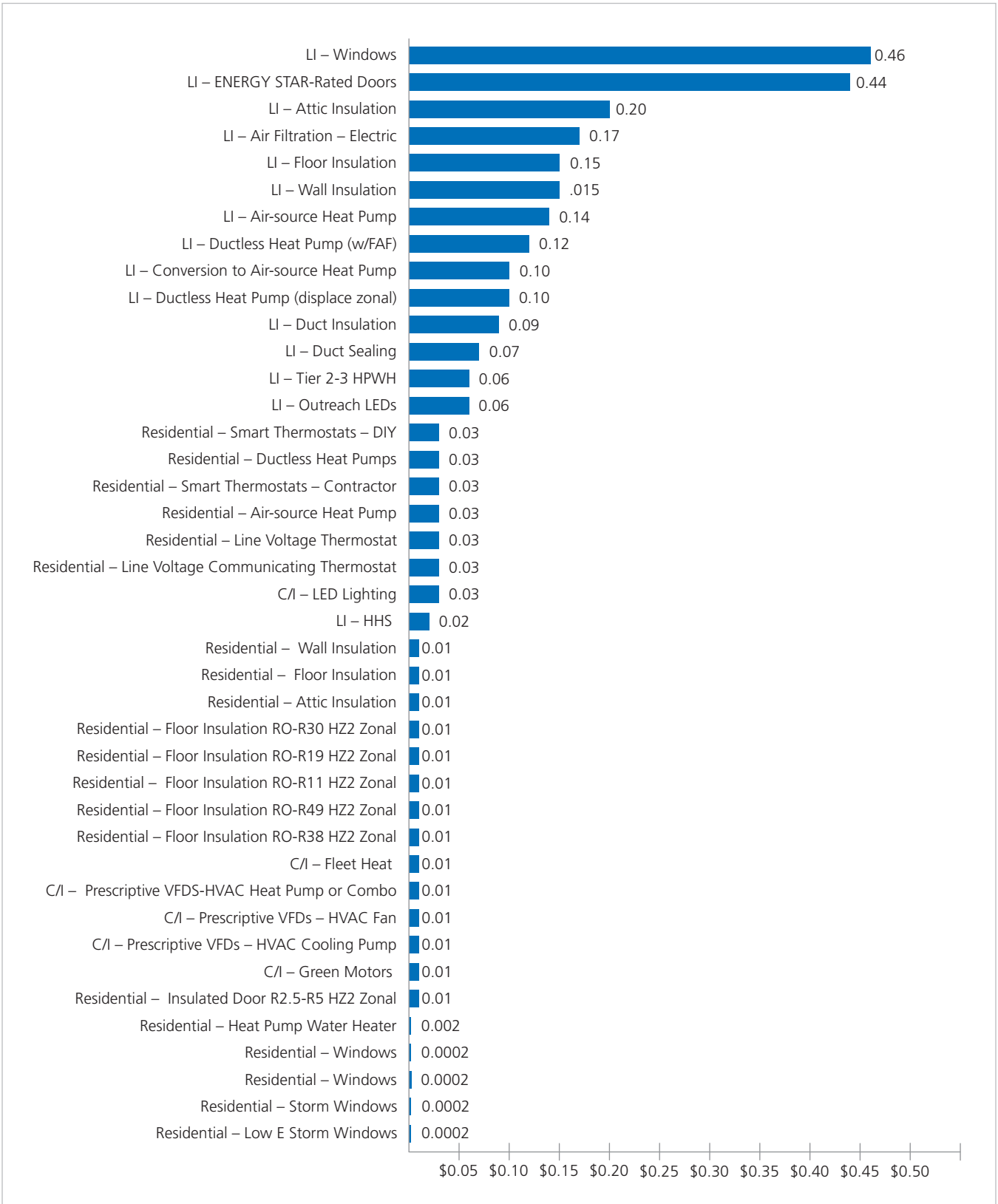
Note that for the purpose of prioritizing measures for Named Communities, commercial and industrial measures are not a contributing factor to that selection. While it is recognized that commercial/industrial business exist within these communities, the vast majority of NEI benefits applicable to this effort are sourced from low-income programs.

Non-Energy Impact per kWh

Providing the non-energy impacts on a per-kWh basis provides a level playing field for prioritizing measures. For several items, such as insulation and windows, Avista unitizes measures on a square-foot-installed basis. In comparison, many HVAC and water heating units are unitized as a single unit. A comparison between the two would show that more NEI values exist for an HVAC unit than from a single square foot of insulation.

Figure 14 shows the NEI values for each measure on a NEI/kWh basis. Due to the high health and safety NEI value, Shell measures, along with HVAC, received the highest overall NEIs.

FIGURE 14 – NON-ENERGY IMPACTS PER KILOWATT HOURS – AVISTA MEASURES



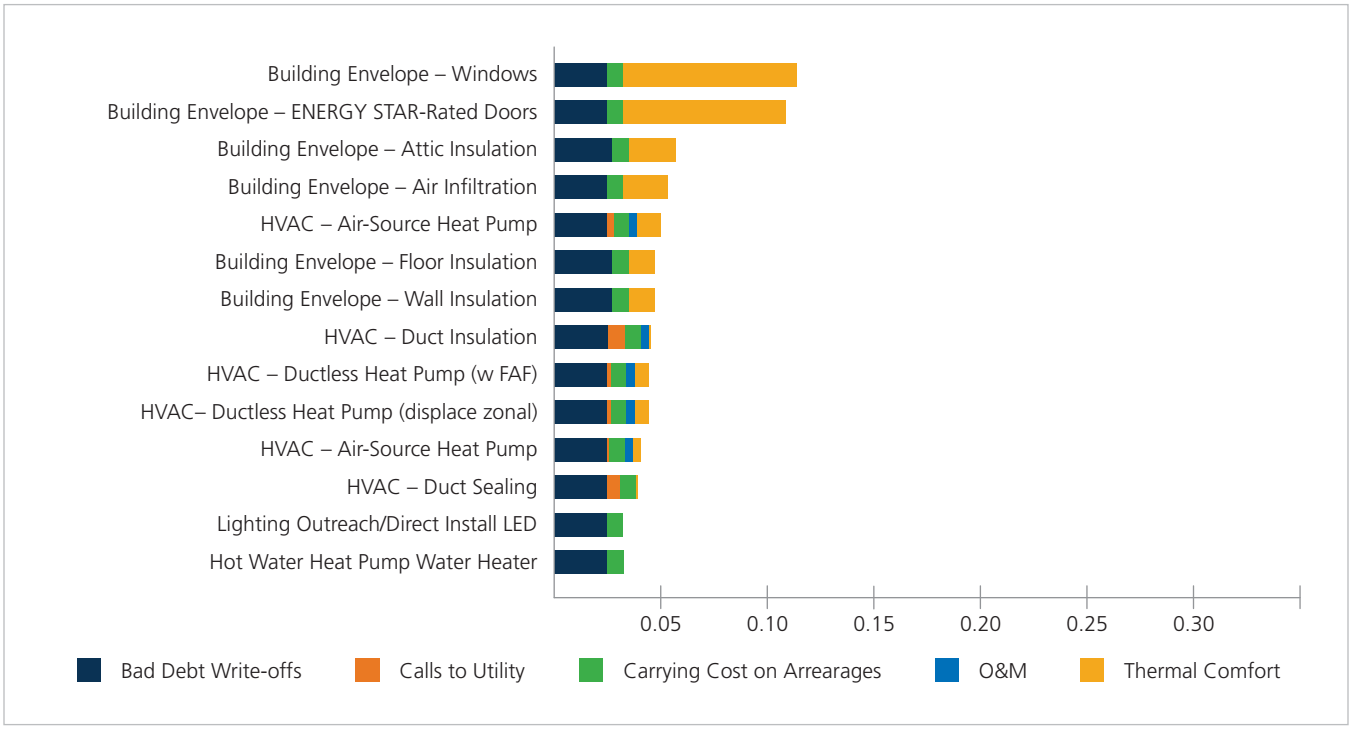
It should be noted that for some measures not included above, a zero value has been assigned since no NEI value was identified. It will be part of an ongoing effort to continue to identify NEI values and potentially even develop new NEI values that are applicable to Avista's measures.

The following sections further describe the NEI values for each of our CBI categories.

Energy Burden

While the study identified NEI values that are associated with energy burden, the primary component of energy burden reductions is the technology's ability to attain kWh savings. Because of this, all measures included in the Energy Efficiency Program are instrumental in attaining energy burden reductions. For the purposes of identifying the NEI contribution to energy burden reductions, the following chart illustrates the non-energy components for each measures in the NEI study.

FIGURE 15 – ENERGY BURDEN RELATED NON-ENERGY IMPACTS

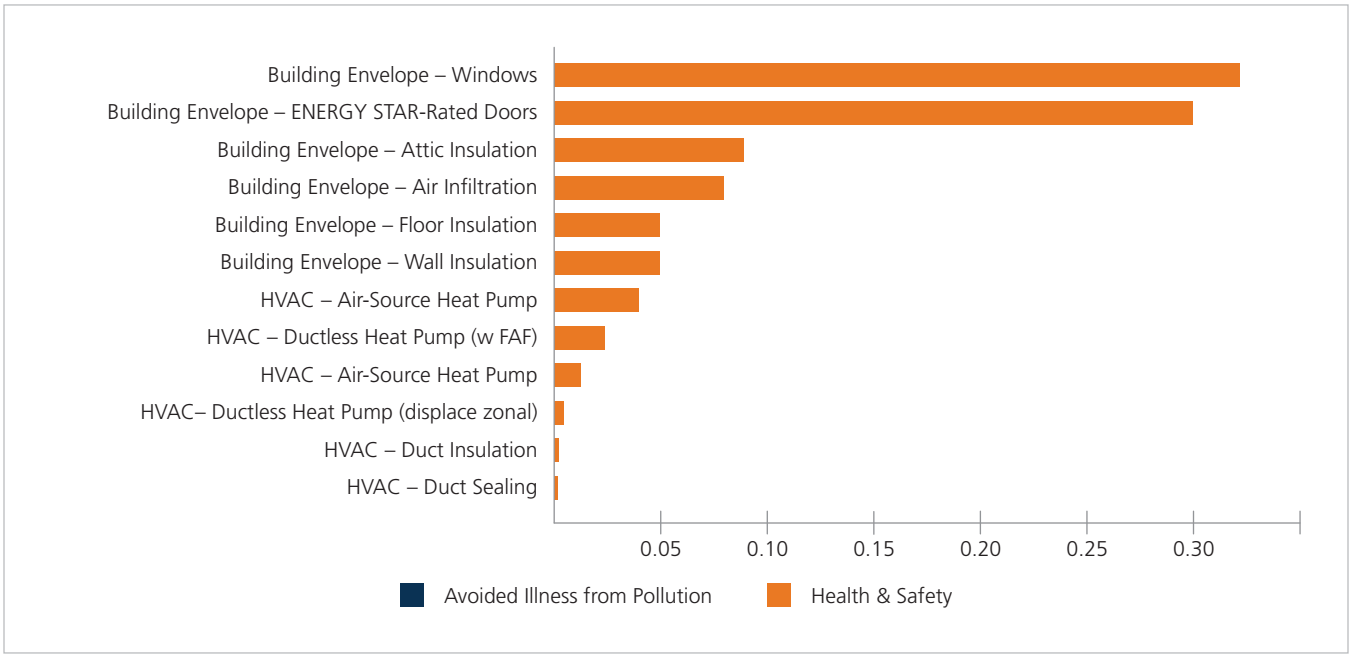


Although NEI categories do not perfectly align with energy burden reductions, they are indicators that participants in energy efficiency are benefiting from a lower energy burden. Fewer bad debt write-offs, calls to utility, and lower carrying costs on arrearages would indicate that customers are in a better position to afford their energy use, which is a primary goal of these programs.

Indoor Air Quality/Public Health

To the extent that air quality is improved through the installation of improvements in homes, the building envelope is a key contributor to improvements for public health and indoor air quality. The health and safety NEI value includes associated costs from time off and lost pay due to fewer missed days of work/school, heat/cold stress, and other impacts. While lowering pollutants did not have a significant NEI value, the health and safety NEI was by far the highest contributor to individual measures.

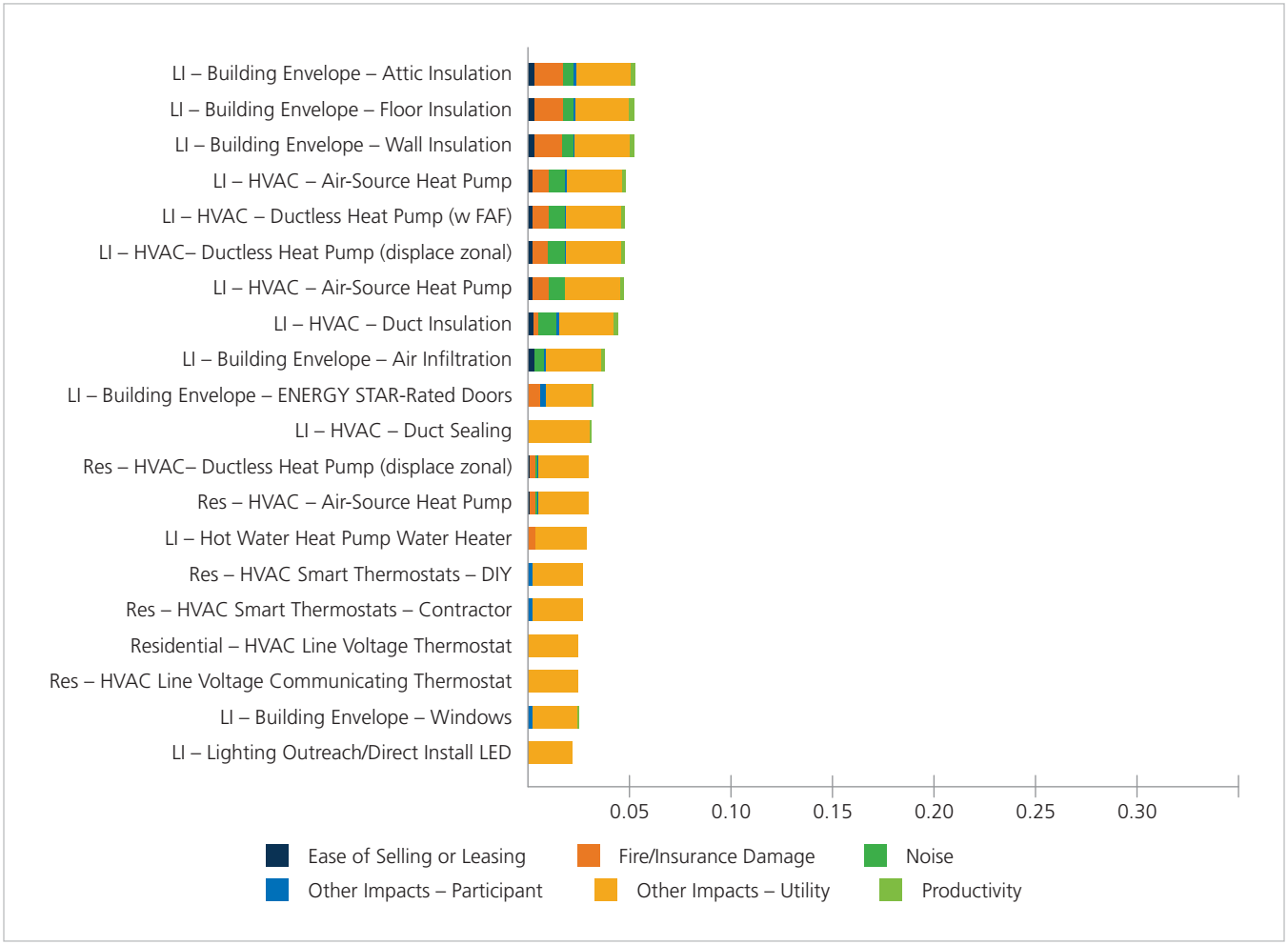
FIGURE 16 – AIR QUALITY AND PUBLIC HEALTH RELATED NON-ENERGY IMPACTS



Named Community Investment

The vast majority of NEI values were derived from the "Other Impacts – Utility" category which include insurance savings and transmission and distribution activities. While these NEIs do not directly benefit the customer, more reliability on the system and lower costs impact customer rates and the avoidance of issues contribute to those improvements.

FIGURE 17 – NAMED COMMUNITY INVESTMENT RELATED NON-ENERGY IMPACTS



NEI Values Informing Program and Measure Prioritization for Named Communities

In an effort to be actionable with DNV's study on non-energy impacts, Avista's goal is to create a prioritization of measures that serve customers in Named Communities. For this effort, Avista focused on two main aspects: whether (1) the measure provides a known level of conservation, and (2) the measure has a high level of NEIs that support customer benefit indicators.

Table 64 identifies the prioritized measures along with their cost effectiveness, kWh savings, and NEI per kWh for each measure considered within Avista's low-income portfolio. While residential measures will still receive an impact to their overall cost-effectiveness calculation due to the identification of NEI values, the NEI values were lower than for low-income. Because of this, and also since the assumption is that low-income NEIs are also applicable to Named Communities, the prioritization is based on low-income measures only.

TABLE 64 – PRIORITY MEASURES FOR NAMED COMMUNITIES

Measure	Cost-Effective	Energy Burden	Air Quality	Named Community Investment	Total NEI
LI – Building Envelope – Windows	Yes	$ 0.11	$ 0.32	$ 0.03	$ 0.46
LI – Building Envelope – ENERGY STAR-Rated Doors	Yes	$ 0.11	$ 0.30	$ 0.03	$ 0.44
LI – Building Envelope – Attic Insulation	Yes	$ 0.06	$ 0.09	$ 0.05	$ 0.20
LI – Building Envelope – Air Infiltration	Yes	$ 0.05	$ 0.08	$ 0.04	$ 0.17
LI – Building Envelope – Floor Insulation	Yes	$ 0.05	$ 0.05	$ 0.05	$ 0.15
LI – Building Envelope – Wall Insulation	Yes	$ 0.05	$ 0.05	$ 0.05	$ 0.15
LI – HVAC – Air Source Heat Pump	No	$ 0.04	$ 0.04	$ 0.05	$ 0.13
LI – HVAC – Ductless Heat Pump (w FAF)	Yes	$ 0.04	$ 0.02	$ 0.05	$ 0.12
LI – HVAC – Ductless Heat Pump (displace zonal)	Yes	$ 0.04	$ 0.01	$ 0.05	$ 0.10
LI – HVAC – Duct Insulation	Yes	$ 0.05	$ 0.00	$ 0.04	$ 0.09
LI – HVAC – Duct Sealing	Yes	$ 0.04	$ 0.00	$ 0.03	$ 0.07
LI – Hot Water – Heat Pump Water Heater	Yes	$ 0.03	$ 0.00	$ 0.03	$ 0.06
LI – Lighting – Outreach/Direct Install LED	Yes	$ 0.03	$ 0.00	$ 0.02	$ 0.06

To monetize the overall energy burden, the energy benefit derived from the installation of these measures must be included. This is done by determining the estimated annual bill reductions from the installation of Energy-Efficient Measures.

Table 65 illustrates the overall benefit in dollars. Bill savings has been included at a customer rate of $0.10 per kWh, which approximates Avista's residential rates for Schedule 01 in Washington. While many measures could affect savings at different rate tiers, it is assumed that $0.10 per kWh provides adequate estimates and simplicity for illustrative purposes.

The CBI areas have been calculated by multiplying the NEI per kWh values against the kWh savings in the prior table. The result is a NEI per unit installed in a customer's home.

TABLE 65 – TOTAL CUSTOMER BENEFIT OF ENERGY AND NON-ENERGY IMPACTS

Measure	Bill Savings	Energy Burden (NEI Only)	Air Quality	Named Community Investment*	Total Benefit	NEI Contribution to Total Benefit
LI – Building Envelope – Windows†	$ 0.60	$ 0.69	$ 1.95	$ 0.15	$ 3.39	82%
LI – Building Envelope – ENERGY STAR-Rated Doors	$ 16.19	$ 17.61	$ 48.63	$ 5.09	$ 87.52	81%
LI – Building Envelope – Attic Insulation†	$ 0.06	$ 0.03	$ 0.05	$ 0.03	$ 0.17	67%
LI – Building Envelope – Air Infiltration	$ 63.10	$ 33.79	$ 50.55	$ 23.92	$ 171.36	63%
LI – Building Envelope – Floor Insulation†	$ 0.12	$ 0.06	$ 0.06	$ 0.06	$ 0.29	60%
LI – Building Envelope – Wall Insulation†	$ 0.14	$ 0.07	$ 0.07	$ 0.07	$ 0.35	60%
LI – HVAC – Air Source Heat Pump	$ 87.84	$ 35.64	$ 35.59	$ 41.79	$ 200.86	56%
LI – HVAC – Ductless Heat Pump (w FAF)	$ 301.62	$ 133.65	$ 72.54	$ 142.76	$ 650.58	54%
LI – HVAC – Ductless Heat Pump (displace zonal)	$ 301.62	$ 133.65	$ 16.02	$ 142.76	$ 594.05	49%
LI – HVAC – Duct Insulation†	$ 0.27	$ 0.12	$ 0.01	$ 0.12	$ 0.52	48%
LI – HVAC – Duct Sealing	$ 70.99	$ 27.73	$ 1.53	$ 21.86	$ 122.12	42%
LI – Hot Water – Heat Pump Water Heater	$ 58.73	$ 19.08	$ 0.00	$ 17.23	$ 95.04	38%
LI – Lighting – Outreach/Direct Install LED	$ 0.10	$ 0.03	$ 0.00	$ 0.02	$ 0.16	35%

* This classification of CBI is still under review. The NEI values contained within it may be reallocated to other CBI categories as those conversations occur. Avista does not anticipate a change to the overall NEI value to customers.

† Sq Ft

AVISTA-SPECIFIC METHODOLOGIES AND ANALYTICAL PRACTICES

Over time, Avista has evolved approaches to calculating the various metrics applied within the planning effort to meet the needs of its portfolio and regulation. Care has been taken to ensure that these approaches are consistent with the intent of the NWPCC's methodologies for the analysis of energy efficiency. Avista completes an *Annual Conservation Report* (*ACR*) in the spring of each year, based on a retrospective review of actual results from the prior year. This process includes the calculation of each of the four basic standard practice tests (summarized in Appendix B – Summarization of Cost Effectiveness Methodology). Since the TRC and UCT tests are the basis for optimizing the portfolio (for reasons previously explained), the explanation of Avista's methodologies, for planning purposes, focus on these two tests.

The calculation of portfolio cost-effectiveness excludes costs that are unrelated to the local energy efficiency portfolio in that particular year. Those excluded costs, termed "supplemental" in Avista's calculations, include:

- The funding associated with regional programs (NEEA)
- The cost to perform CPA studies
- Costs related to EM&V

Individual measures are aggregated into programs composed of similar measures. At the program level, non-incentive portfolio costs are allocated based on direct assignment to the extent possible, and costs are allocated based on a program's share of portfolio-avoided cost-value acquisition when direct assignment is not possible. The result is a program-level TRC and UCT cost-effectiveness analysis that incorporates all of these allocated costs.

Since the costs and benefits associated with the adoption of a measure may accrue over time, it is necessary to establish a discount rate.[1] Future costs and benefits are discounted to the present value and compared for cost effectiveness purposes. Generally, energy and non-energy benefits accrue over the measure life and costs are incurred up-front.

The calculation of the TRC test benefits, to be consistent with NWPCC methodologies, includes an assessment of non-energy impacts (both benefits and costs) accruing to the customer. These impacts most frequently include maintenance cost, water, and sewer savings, and – in the case of the low-income program – inclusion of the cost of providing base-case end-use equipment as part of a fully funded measure as well as the value of health and human safety funding (on a dollar-for-dollar basis).

For the purposes of calculating TRC cost-effectiveness, any funding obtained from outside of Avista's customer population (generally through tax credits or state- or federally administered programs) is not considered to be a TRC cost. These are regarded as imported funds and, from the perspective of Avista's customer population appropriate to the TRC test, are not costs borne by Avista customers. Co-funding of efficiency measures from state and federal programs for low-income programs applicable to a home that is also being treated with Avista funding is not incorporated within the program cost. This is consistent with permitting tax credits to offset customer incremental cost as described within the *California Standard Practice Manual* description of the TRC test.

1) Avista used a discount rate of 4.85% for commercial/industrial programs and 4.56% for residential programs.

Avista's energy efficiency portfolios are built from the bottom up, starting with the identification of prospective efficiency measures based on the most recent CPA and augmented with other specific opportunities as necessary. Since potential assessments are only performed every two years and the inputs are locked many months in advance of filing the *IRP* itself, there is considerable time for movement in these inputs and the development of other opportunities.

Evaluation, Measurement, and Verification

Within its Energy Efficiency Portfolio, Avista incorporates EM&V activities to validate and report verified energy savings related to its Energy Efficiency Measures and Programs. EM&V protocols serve to represent the comprehensive analyses and assessments necessary to supply useful information to management and stakeholders that adequately identify the acquisition of energy efficiency attributable to Avista's conservation programs, as well as potential process improvements necessary to improve operations both internally and for customers. EM&V includes impact evaluation and process evaluation. Taken as a whole, EM&V is analogous with other industry standard terms such as *portfolio evaluation* and *program evaluation*.

To support planning and reporting requirements, several guiding EM&V documents are maintained and published. This includes the *EM&V Framework*, an annual *EM&V Plan*, and EM&V contributions within other energy efficiency and Avista corporate publications. Program-specific EM&V plans are created, as necessary, to inform and benefit the energy efficiency activities. These documents are reviewed and updated regularly, reflecting improvements to processes and protocols.

EM&V efforts will also be applied to evaluating emerging technologies and applications being considered for inclusion in the Company's energy efficiency portfolio. In the electric portfolio, Avista may spend up to 10 percent of its conservation budget on programs whose savings impact have not yet been measured if the overall portfolio of conservation passes the applicable cost-effectiveness test. These programs may include educational, behavior change, and other types of investigatory or pilot projects. Specific activities can include product and application document reviews, development of formal evaluation plans, field studies, data collection, statistical analysis, and solicitation of user feedback.

Because of the benefits to customers and to the utility, Avista actively participates in regional energy efficiency activities. Avista has a voting role on the RTF, a critical advisory committee to the NWPCC. The RTF oversees standardization of energy savings and measurement processes for electric applications in the Pacific Northwest. This knowledge base provides energy efficiency data, metrics, non-energy benefits, and references suitable for inclusion in Avista's *Technical Reference Manual* (*TRM*) relating to acquisition planning and reporting. In addition, the Company engages with other Northwest utilities and NEEA in various pilot projects or subcommittee evaluations. Portions of the energy efficiency savings acquired through NEEA's programs within the region are attributable to Avista's portfolio.

Avista's commitment to the critical role of EM&V is supported by the Company's continued focus on the development of best practices for its processes and reporting. The *International Performance Measurement and Verification Protocol* serves as the basis of measurement and verification plans developed and applied to Avista programs. In addition, the compilation of EM&V protocols released under the U.S. Department of Energy's Uniform Methods Project will be considered and applied where applicable to support the consistency and credibility of reported results. Verification of a statistically significant number of projects is often extrapolated to perform impact analysis on complete programs, within reasonable standards of rigor and degree of conservatism. This process serves to ensure that Avista will manage its energy efficiency portfolio in a manner consistent with both utility and public interests.

For 2022, Avista will engage with a single EM&V vendor for both its residential and commercial/industrial program segments. Avista issued a Request for Proposals (RFP) in late 2021 and is awaiting responses to determine the EM&V vendor for the 2022-23 biennium.

In order to align the performance of Avista's low-income conservation programs with other energy burden reduction goals set out in CETA and in this *BCP*, Avista intends to start measuring and reporting metrics related to energy burden reduction. The primary goal is to measure the true energy burden reduction resulting from Avista's programs, specifically for high-burden households. A secondary goal is to diagnose issues with program operations, design, marketing, or access for high-burden households. The exact mechanism for including energy burden metrics in the EM&V process is yet to be determined but would include integrated equity-aware program evaluations, as well as separate energy burden assessments and potential studies.

Cost-Effectiveness Metrics, Methodology, and Objectives

Avista's planning approach aims to maximize cost-effective conservation acquired by analyzing the cost-effectiveness of each segment (residential, low-income, and commercial/industrial), as well as the ways in which measures within programs contribute to the cost-effectiveness of that segment and eventually the individual portfolios. NEIs are a common topic of discussion in many energy-evaluation circles and Avista has made effective changes to the inclusion of NEIs (see the section on Non-Energy Impacts). The Company is appreciative of the valuable work the RTF has done to quantify NEIs for the region and where values have not been identified, Avista will look to the RTF to supplement values. The Company views these efforts as an iterative process and expects that more discovery will take place in the future.

As with other utilities in the region, Avista actively participates in RTF meetings and provides measure-level data back to the RTF to further refine its estimates. The Company acknowledges that it has the responsibly to use the best available data no matter the source; at times, that comes from internal estimates. Avista will continue to work with members from the RTF to identify measures or technologies that may have gaps in data and provide information where needed. These efforts further refine the RTF measures and form UES values that are more specific to Avista's service territory.

The Company maintains an active involvement in the regional energy efficiency community and is committed to acknowledging and addressing new energy efficiency developments as they are presented. Avista will continue to work with stakeholders as conversations around cost-effectiveness arise.

Energy Efficiency at Power Production Facilities

As required by the Company's *BCP* Conditions, Avista continues to review the feasibility of pursuing cost-effective conservation in the form of reductions in electric power consumption, resulting from increases in the efficiency of energy use at electric power production facilities it owns in whole or in part.[2] Avista meets with its generation engineering team on an annual basis to discuss potential projects that may lead to energy efficiency at facilities it manages or owns. While the generation team is primarily focused on providing safe and reliable power, they understand the benefit of efficiency and how those levels contribute to the regional clean energy goal. Avista will continue to work with its generation team to identify potential projects in the next biennium.

Schedule 90 – Energy Efficiency Programs

Avista's electric energy efficiency operations are governed by Schedule 90 tariff requirements. These tariffs (attached to Appendix C) detail the eligibility and allowable funding that the Company provides for energy efficiency measures. Though the tariff allows for considerable flexibility in how programs are designed and delivered – and accommodates a degree of flexibility around incentives for prescriptive programs subject to reasonable justification – there remains the occasional need to modify the tariff to meet current and future market conditions and opportunities. For 2022-23, Avista is not proposing changes to the tariff rider's language. Recently verbiage was added to allow for future program design elements for highly impacted communities and vulnerable populations. This additional language allows design flexibility in order for Avista to serve its Named Communities.

Schedule 91 – Demand Side Management Rate Adjustment

WAC 480-100-130(2) requires the utility to file on or before June 1 every year to true up the rider balance with an August 1 effective date. On May 26, 2021, Avista filed, in Docket UE-210375, a request for exemption from the annual requirement to file revisions to its schedule indicating that its current tariff rider balance was aligned with its expectations. The WUTC allowed the request to become effective as requested, per the no action agenda on 7/29/21. Avista will revisit its need to revise its Schedule 90 rates on or before June 1, 2022 as per WAC 480-100-130(2).

2) UE-19092 Attachment A – Condition 12a

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CONCLUSION AND CONTACT INFORMATION

This 2022 *ACP* represents program efforts by Avista to achieve its expected eligible acquisition savings for the first year of the 2022-23 biennium. In addition, the plan is designed to identify various activities that promote and support energy efficiency for the transition to clean energy, reducing energy costs for customers, and deferring investments in Avista's energy system. For additional supporting information please see the following appendices:

- Appendix A: 2022 Energy Efficiency Evaluation, Measurement, and Verification Annual Plan
- Appendix B: Cost Effectiveness Methodology
- Appendix C: Washington DSM Tariff Schedules
- Appendix D: Non-Energy Impact Study
- Appendix E: RFP Framework
- Appendix F: Low-Income Gap Analysis Study

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GLOSSARY OF TERMS

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

Active Energy Management (AEM): The implementation of continuous building monitoring to improve building performance in real time.

adjusted market baseline: 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 adjusted market baseline, no net-to-gross factor would be applied since the resultant unit energy savings 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 and/or water meters through various communication media on request or on a predetermined schedule.

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

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 National Standards Institute (ANSI): A source for information on national, regional, and international standards and conformity assessment issues.

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 Avista's conservation offerings, its approach to energy efficiency, and 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 on how efficient an appliance is in converting the energy in its fuel to heat over the course of a typical year.

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, which would have occurred without implementation of the subject energy efficiency activity. Baseline conditions are sometimes referred to as "business-as-usual" conditions.

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

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

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

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

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

British Thermal Unit (BTU): The amount of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit (3,413 BTUs 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 is capable of carrying under specified conditions.

Clean Energy Implementation Plan (CEIP): Introduced within a subsection of the Clean Energy Transformation Act, a CEIP must describe the utility's plan for making progress toward meeting the clean energy transformation standards while it continues to pursue all cost-effective, reliable, and feasible conservation and efficiency resources.

Clean Energy Transformation Act (CETA): Signed into law in 2019, the Clean Energy Transformation Act requires electric utilities to supply their Washington customers with 100 percent renewable or non-emitting electricity with no provision for offsets.

Community Action Partnership (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 agencies and other funding sources (e.g. utility constitutions).

Community Energy Efficiency Program (CEEP): Created by the Washington State Legislature in 2009, CEEP encourages homeowners and small businesses across the state to make energy efficiency retrofits and upgrades.

conservation: According to the Northwest Power Act, any reduction in electric power consumption as a result 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 Integrated Resource Planning (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.

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.

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 based largely on an estimation of costs of providing service over a certain set time period, with an allowed profit margin, divided by a forecasted amount of unit sales over the same time period. If the actual sales turn out to be as forecasted, the utility will recover all of its 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 unit energy savings, 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, expressed in cubic feet, therms, BTUs or multiples thereof, for a designated period of time such as during a 24-hour day.

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

Demand Side Management (DSM): The process of helping customers use energy more efficiently. Used interchangeably with Energy Efficiency and Conservation although conservation technically means using less while DSM and energy efficiency means using less while still having the same useful output of function.

Direct Load Control (DLC): The means by which a utility can signal a customer's appliance to stop operations in order 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.

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

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

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

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 (and/or portfolio) and understanding or documenting program performance, program or program-related markets and market operations, program-induced changes in energy efficiency markets, levels of demand or energy savings, or program cost-effectiveness. Market assessment, monitoring and evaluation, and verification are aspects of evaluation.

Evaluation, Measurement, and Verification (EM&V): Catch-all term for evaluation activities at the measure, project, program and/or portfolio level; can include impact, process, market and/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 (AKA third party evaluators): Independent professional efficiency person or entity retained to conduct EM&V activities. Consideration will be made for those who are Certified Measurement and Verification 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 advisors whose goal is the continual improvement of the electric motor repair industry.

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

heating degree days: A measure of the amount of heat needed in a building over a fixed period of time, 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 degrees Fahrenheit, the outdoor temperature below which heat was typically needed. As an example, a day with an average temperature of 45 degrees Fahrenheit would have 20 heating degree days, assuming a base of 65 degrees Fahrenheit.

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 ductless heat pump equipment.

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

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

implementer: Avista employees 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.

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

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

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

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

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

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

Kilo British Thermal Unit (kBTU): BTU, which stands for British thermal units, measures heat energy. Each BTU equals the amount of heat needed to raise one pound of water one degree Fahrenheit; the prefix kilo- stands for 1,000, which means that a kBTU equals 1,000 BTU.

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

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

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

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

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

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

measure life: See Effective Useful Life (EUL).

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

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

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

net savings: The change in energy consumption and/or demand that is attributable to an energy efficiency program. This change in energy use and/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 and/or in adjustments to gross savings values.

Non-Energy Benefit/Non-Energy Impact (NEB/NEI): The quantifiable non-energy impacts 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 environment 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.

portfolio: Collection of all programs conducted by an organization. In the case of Avista, 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 for 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.

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

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

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

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

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

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

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

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

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

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

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

Site-Specific (SS): 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, nor other investment opportunities.

spillover: Reductions in energy consumption and/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 and/or nonparticipant spillover (sometimes referred to as "free drivers"). Participant spillover is the additional energy savings that occur as a result 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 as a result of a program's influence.

Technical Reference Manual (TRM): An Avista-prepared resource document that contains Avista's (ex-ante) savings estimates, assumptions, sources for those assumptions, guidelines, and relevant supporting documentation for its natural gas and electricity energy efficiency prescriptive measures. This 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 a majority of the high-voltage, long-distance transmission lines.

Uniform Energy Factor (UEF): A measurement of how efficiently a water heater utilizes its fuel.

Unit Energy Savings (UES): Defines the 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 R-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 benefit is the avoided cost of energy in comparison to the incentive and non-incentive utility costs.

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

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

Washington Utilities and Transportation Commission (WUTC): A three-member Commission appointed by the governor and confirmed by the state senate, whose mission is to protect the people of Washington by ensuring that investor-owned utility and transportation services are safe, available, reliable, and fairly priced.

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

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

8760: Total number of hours in a year.


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APPENDIX A

2022 Energy Efficiency Evaluation, Measurement, and Verification Annual Plan

Background

Avista's 2022 *energy efficiency Evaluation, Measurement, and Verification* (*EM&V*) *Annual Plan*, in combination with the Avista *EM&V Framework*, is intended to identify the evaluation, measurement, and verification activities planned to be performed in 2022 in order to adequately inform and assess energy efficiency programs provided by Avista for its customers in Washington and Idaho. This evaluation effort is made not only to verify savings estimates of the program, but also to enhance program design and improve the marketing and delivery of future programs. This document also provides the projected 2022 EM&V budget.

Overview

Avista's 2022 *EM&V Annual Plan* identifies evaluation activities intended to be performed on the 2022 energy efficiency portfolio. The scope of this plan is consistent with prior evaluation plans as presented to Avista's Energy Efficiency Advisory Group (EEAG). A comprehensive EM&V overview and definitions are included in Avista's *EM&V Framework*, a companion document to this plan.

A key consideration integrated into this plan is the role of the independent third-party evaluator that will perform the majority of evaluation planning, tasks, analysis, and external reporting as coordinated by Avista energy efficiency staff.

For the 2022-23 period, Avista will select an independent third-party evaluator for its residential, low-income, and commercial/industrial programs. Whereas in the prior biennium Avista chose to select separate evaluators for its residential and commercial/industrial programs, for the 2022-23 biennium, the Company will seek to select a single vendor for all program segments. Currently, Avista has an active Request for Proposal (RFP) and is soliciting proposals for this work. The Company plans to work with its EEAG to finalize its selection before the beginning of the biennial period.

The following details the key aspects of this plan:

- Avista continues to pursue a portfolio approach for impact analysis, ensuring a comprehensive annual review of all programs – to the degree necessary – based on the magnitude both of savings and uncertainty of the related unit energy savings (UES) values, and of claimed energy efficiency acquisition relative to the portfolio.
- Inherent in the impact analysis, a locked UES list identifying a significant number of UES values is available to use through verification rather than fundamental impact analysis; however, this list of UES is reevaluated as part of the Company's normal and recurring savings value analysis. Measures will also be updated to reflect the best science from other sources as well, primarily the Regional Technical Forum (RTF).
- Portfolio impact evaluations will be conducted for all electric and natural gas programs in Washington and Idaho. For programs with a majority of savings or particular aspects of interest, such as a high level of uncertainty, detailed impact evaluations using protocols from the Uniform Methods Project, International Performance Measurement and Verification Protocol (IPMVP), and other industry-standard techniques for determining program-level impacts will be used. Billing analyses will be incorporated as appropriate.

- Electric energy efficiency acquisition achieved during 2022 will contribute to the biennial savings acquisition for EIA compliance, which will complete its seventh biennium at the end of 2023.[1]
- A final evaluation of the electric programs deployed during 2022 and 2023 will be initiated prior to the end of 2023 in order to meet the June 1, 2024, filing deadline in Washington.
- The evaluation will provide energy efficiency acquisition results with 90 percent precision with a 10 percent confidence interval. Discrete measures may be represented by reduced precision and wider confidence – such as 80 percent with a 20 percent confidence interval – but must support the required portfolio criteria of 90 percent/10 percent.
- This planning document will not be construed as pre-approval by the Washington or Idaho Commissions.
- Evaluation resources will be identified through the development of the 2022 evaluation work plan in conjunction with the independent, third-party evaluator. Primary segments will include:
    - ***Residential*** – The impact analysis will consider the portfolio of measures provided to residential customers during the program year. Evaluation effort will be focused on measures that contribute significant portfolio savings and allow consolidation and grouping of similar measures to facilitate the evaluation.
    - ***Low-Income and Named Communities*** – For the impact analysis, billing analysis on the census of measures, including conversions, will be conducted. In addition, a comparison group, possibly consisting of Low-Income Home Energy Assistance Program (LIHEAP) or Low-Income Rate Assistance Program (LIRAP) participants, may be incorporated into the analysis if possible.
    - ***Commercial/Industrial*** – Interviews of Avista staff and third-party implementers will be conducted, along with customer surveys, tracking databases, marketing materials, and quality assurance documents.
- A process evaluation report will be delivered as part of the 2022 Energy Efficiency *Annual Conservation Report*, which addresses program considerations for that program year.

External EM&V Budget for Evaluations

For 2022-23, the total budget for external evaluation is estimated to be $1,019,464 on a total system basis. The following table identifies evaluation activities and allocations that are anticipated for 2022-23. The Washington and Idaho expenses include evaluation activities for both electric and natural gas fuel types.

TABLE 1 – EVALUATION ACTIVITIES AND ALLOCATIONS

Individual Evaluations	Evaluation Type	Contractor	Budget (System)	WA Expense	ID Expense
2022-2023 Electric and Natural Gas Portfolio	Impact	TBD	$ 899,464	$ 629,625	$ 269,839
Electric and Natural Gas DSM Operations (or components of)	Process	TBD	$ 120,000	$ 84,000	$ 36,000
Total Budget for Individual Evaluations			**$ 1,019,464**	**$ 713,625**	**$ 305,839**

1) Washington Initiative 937 was approved by voters on November 7, 2006. Codified as RCW 19.285 and WAC 480-109, the energy efficiency aspects of this law became effective on January 1, 2010.

Overall 2022 EM&V Budget

The table below captures the individual evaluations specifically identified in the previous table in aggregate, and augments them with the associated expenses related to participate in and fund the activities of the Regional Technical Forum (RTF).

TABLE 2 – AGGREGATE OF INDIVIDUAL EVALUATIONS

Activity	Budget (WA/ID System)	Total Budget	WA Expense	ID Expense
Individual Evaluations Previously Specified	$ 509,732	$ 509,732	$ 356,812	$ 152,920
Regional Technical Forum Dues	$ 105,000	$ 105,000	$ 73,500	$ 31,500
Total	**$ 614,732**	**$ 614,732**	**$ 430,312**	**$ 184,420**
Expected Total DSM Budget (WA/ID)	$ 32,910,542		$ 24,983,523	$ 7,927,019
EM&V as a % of Total DSM Budget	2%		2%	2%

Summary of Individual Evaluations

Provided below is a summary of each of the external evaluation activities anticipated to occur in 2022. All savings estimates, calculations, assumptions, and recommendations will be the work product of the independent evaluator in conjunction with the respective portfolio impact, process, or market evaluation component. The final evaluation plans will also be included in this plan as an appendix as they become available.

2022-23 Electric and Natural Gas Portfolio Impact Evaluation

Based on the evaluator's work plan, performance data and supporting information may be derived from primary consumption data collected in the field, site audits, phone surveys, billing analysis, and other methods identified to effectively quantify the energy performance of the energy efficiency measure.

Similar to prior evaluations, billing analyses are to be conducted to identify the electric and natural gas impacts of the Low-Income program based on a census of program participants to estimate savings by state, fuel type, and overall program levels. For this evaluation cycle, savings estimates will be evaluated through a combined approach of billing and engineering analysis, as well as developing net savings estimates by measuring the effects of a comparison group.

If possible, a low-income comparison group study may be used to evaluate this specific program activity. There are two feasible approaches for selecting this comparison group. One method would be to identify nonparticipants from data on Avista customers that receive energy assistance payments such as LIHEAP or LIRAP who have not participated in the Low-Income program. A second method would be to consider using future program participants. The best approach will be identified as the timeline and available data are considered.

Additional participant phone surveys may be conducted to provide a better understanding of certain topics, such as primary and secondary heating sources, equipment functionality prior to replacement, customer behaviors and take-back effects, participant non-energy benefits, and other building or equipment characteristics.

For commercial/industrial, site and metering visits on prescriptive and site-specific projects will support project verification and gather necessary data to validate energy savings and engineering calculations. Sample sizes for each type of fuel will be based on the combined two-year (2020-21) anticipated project count. Prior evaluations may inform sampling rates to effectively reduce the sample size in measure categories with less uncertainty, and increase the sampling for those measures with greater variation.

2022 Portfolio Process Evaluation

To identify program changes and areas of interest, brief interviews will be employed to gather relevant information. Key participants in the interview process will include Avista staff and, as appropriate, third-party implementation staff and trade allies.

The independent third-party evaluator will review communication and participant materials for critical program documents that have new or updated materials, including program tracking databases and marketing and trade ally materials. The program materials will be evaluated against industry best practices for their adequacy, clarity, and effectiveness. Where appropriate, feedback will be provided to support the development of new or the enhancement of existing program materials.

Participant and nonparticipant surveys will be conducted in 2022 and 2023 for both residential and commercial/industrial segments and be used to assess differences in customer experiences, effectiveness of programs, and materials available for customers and trade allies. Participant and nonparticipant surveys will focus on the decisions, attitudes, barriers, and behaviors regarding Avista's programs and efficient equipment/measure installations as well as supplement past spillover research.

Third-Party Vendor Evaluation Plan

As part of contractual requirements, the vendor will provide an overall detailed evaluation plan for 2022-23 that includes details on methodology, approach, and deliverables. That plan will be provided when made available and is anticipated to be received in the fourth quarter of 2021 before the beginning of the 2022-23 biennium.

APPENDIX B

Cost-Effectiveness Methodology

The cost-effectiveness evaluation of Avista's energy efficiency programs has been standardized to a significant degree in order to provide for greater transparency and understanding of the metrics. Avista has brought these standardized[2] approaches into the evaluation of the cost-effectiveness of its portfolio through a series of specific interpretations, approaches, and policies. The summarization of these key guidelines provides a greater insight into the evaluation and how to interpret the results.

The cost-effectiveness of energy efficiency programs can be viewed from a variety of perspectives, each of which leads to a specific standardized cost-effectiveness test. The below outlines and describes the various perspectives.

1. ***Total Resource Cost:*** The perspective of the entire customer class of a particular utility. This includes not only what they individually and directly pay for efficiency (through the incremental cost associated with higher efficiency options) but also the utility costs that they will indirectly bear through their utility bill. When looking at the full customer population, incentives are considered to be a transfer between ratepayers and not a cost for the overall ratepayer class. This perspective is represented in the total resource cost (TRC) test. Avista has included a 10 percent conservation credit to the TRC calculation adding a benefit to the overall cost effectiveness.
2. ***Utility Cost Test:*** If the objective is to minimize the utility bill – without regard to costs borne by the customer outside of that which is paid through the utility bill – then cost-effectiveness simply comes down to a comparison of reduced utility avoided cost and the full cost (incentive and non-incentive cost) of delivering the utility program. This is the utility cost test (UCT), also known as the program administrator cost test (PAC).
3. ***Participant Cost Test:*** A participating customer's view of cost-effectiveness is focused upon reduced energy cost (at the customer's retail rate). Avista also includes the value of any non-energy benefits that they may receive. Incentives received by the customer offset the incremental cost associated with the efficiency measure. This is the participant cost test (PCT). Since participation within utility programs is voluntary, it could be asserted that well-informed participating customers are performing their own cost-effectiveness test based on their own circumstances and voluntarily participate only to the extent that it is beneficial for them to do so.
4. ***Ratepayer Impact Measure:*** Non-participating customers are affected by a utility program solely through the impact on their retail rate. Their usage, since they are non-participants, is unaffected by the program. The impact of energy efficiency programs on the utility rate imposed upon these non-participating customers is the result of the reduced utility energy costs, diminished utility revenues, and the cost associated with the utility program. Since utility retail energy rates exceed the avoided cost under almost all scenarios (peak end-use load and a few other exceptions apply), the non-participant rarely benefits. This is the rate impact measure (RIM), also known as the non-participant test. The following table summarizes Avista's approach to calculating the four basic cost-effectiveness tests. The categorization and nomenclature have been worded so as to provide clarity regarding each cost and benefit component. Please note that some of the values within the table below represent negative values.

2) California Standard Practice Manual: Economic Analysis of Demand Side Program and Projects

TABLE 1 – SUMMARIZATION OF STANDARD PRACTICE TEST BENEFITS AND COSTS

	TRC	UCT	PCT	RIM
Benefit Components				
Avoided Cost of Utility Energy	$	$		$
Value of Non-Utility Energy Savings	$		$	
Non-Energy Impacts	$		$	
Reduced Retail Cost of Energy			$	
Cost Components				
Customer Incremental Cost	$		$	
Utility Incentive Cost		$	($)	$
Utility Non-Incentive Cost	$	$		$
Imported Funds (tax credits, federal funding etc)	($)		($)	
Reduced Retail Revenues				$

A summary of some of the approaches by which Avista measures these values and how they are applied within Avista's evaluation of cost-effectiveness is contained below.

Avoided cost of utility energy: The avoided cost of electricity and natural gas is based on the results of the most recent *Integrated Resource Plan* (*IRP*) to include the valuation of several avoided costs that are somewhat unique to energy efficiency (e.g. distribution losses, the monetary cost of carbon, etc.). The cost of electric transmission and distribution (T&D) capacity benefits was adjusted to align with the seventh power plan, and a $26.90 per kW-yr for 20-year levelized cost was used to bring electricity into the Avista balancing area from the mid-C market.

The electric *IRP* provides 20 years of mid-C prices for every hour of the year (8,760 hours) and system capacity benefits for generation and T&D. Different measures have different distribution of their savings of the year, so to properly value the commodity portion for individual measures the 175,200 market prices (8,760 x 20) are multiplied by the individual load shapes yielding 23 different end-use commodity-avoided costs.

To calculate the capacity value an average of the percentage of savings on January weekdays between 7:00–12:00 and 18:00–23:00 was used to estimate the peak coincidence to be multiplied by that year's generation, transmission and distribution capacity benefits.

The commodity and capacity benefits are summed for each year and the combined avoided costs are increased to account for avoided line loss rates.

The avoided cost of the natural gas *IRP* produces an annual and winter avoided therm value which an avoided delivery charge is added (represented by the demand portion of Schedule 150) to each.

The application of the avoided cost of energy to energy efficiency measures includes all interactive impacts upon the fuel specific to the measure (e.g. interactive impacts upon electric consumption by electric programs) as well as cross-fuel (e.g. interactive impacts upon natural gas usage as a result of an electric program).

Value of non-utility energy: For forms of energy not provided by the utility – such as propane or wood fuel – and for which there is no *IRP* valuation of the avoided cost, all savings are valued based on the customer's retail cost of energy.

Non-energy impacts: Impacts of efficiency measures unrelated to energy usage are incorporated into the appropriate standard practice tests to the extent that they can be reasonably quantified and externally represented to a rational but critical audience. Avista sources its NEIs from regional and natural studies, and NEI values are applied with adjustment factors for the Company's service territory. NEI values currently range from $0.08-$0.00002/kWh.

When Avista pays the full cost of a measure within the low-income portfolio, and includes that full cost as a customer incremental cost, the value of the baseline measure is included as a non-energy benefit as a representation of the end-use service beyond the energy efficiency impact. Those impacts that have been determined to be unquantifiable within reasonable standards of rigor consist of both benefits and costs. For example, Avista has not been able to quantify the value of comfort, preventing the Company from valuing the benefit of draft reduction from efficient windows, or the increased productivity due to lighting upgrades.

Reduced retail cost of energy: For the participant test, it is the participating customer's reduced retail cost of energy, and not the utility avoided cost of energy, that is relevant to that perspective.

Customer incremental cost: This represents the additional cost of an efficient measure or behavior above the baseline alternative. To the maximum extent possible the determination of customer incremental cost is based on alternatives that are identical in all aspects other than efficiency. When a clear comparison isn't feasible, an individualized adjustment is made to the extent possible.

Utility incentive cost: Direct financial incentives, or the utility cost of physical products or services distributed to individual customers, are transfer payments between participating and non-participating customers. The provision of program delivery services is not a transfer cost and is not incorporated into the definition of the utility incentive cost.

Utility non-incentive cost: These costs consist of all utility costs that are outside of the previously defined incentive costs. It typically consists of costs associated with the administration of the program such as labor, EM&V, training, outreach, marketing, pilot programs, conservation potential assessments, organizational memberships, and so on.

Imported funds: Avista includes the value of imported funds (generally tax credits or governmental co-funding of programs) to be a reduction in the customer incremental cost of the measure for purposes of calculating the TRC test and the participant test. These funds are acquired from entities outside the ratepayer population or the individual participant.

The alternative approach to treating imported funds as an offset to the customer incremental cost is to consider these funds to be a benefit. For the purposes of Avista's cost-effectiveness objective (maximize residual net TRC benefit), there would be no mathematical difference between these two approaches.

Reduced retail revenues: For the purposes of the RIM test, the loss of retail revenue is a cost to the non-participating customer.

The means by which Avista's energy efficiency portfolio is defined for the purposes of evaluation and cost allocation is also an important part of the Company's methodology. The various definitions used for the different levels of aggregation are explained below, followed by an explanation of how these are applied in the allocation of costs.

Sub-Measure: A sub-measure is a component of a measure that cannot be coherently offered without aggregating it with other sub-measures. For example, an efficient three-pan fryer couldn't be offered as part of a sensible customer-facing program if the program did not also include two-pan and four-pan fryers. Avista may offer sub-measures that fail cost-effectiveness criteria if the overall measure is cost-effective. This is the only area where Avista permits the bundling of technologies for the purposes of testing offerings against the cost-effectiveness screen. There are relatively few sub-measures meeting the criteria specified above within the portfolio.

Measure: Measures are standalone energy efficiency options. Consequently, measures are generally expected to pass cost-effectiveness requirements barring justifiable exceptions. Exceptions include, but are not necessarily limited to, measures with market transformation value not incorporated into the assessment of the individual measure, significant non-energy benefits that cannot be quantified with reasonable rigor, and cooperative participation in larger regional programs.

Programs: Programs consist of one or more related measures. The relation among the measures may be based on technology (e.g. an aggregation of efficient lighting technologies) or market segment (e.g. aggregation of efficient food service measures). The aggregation is generally performed to improve the marketability and/or management of the component measures.

Portfolio: Portfolios are composed of aggregations of programs. The aggregating factor will vary based on the definition of the portfolio. The following portfolios are frequently defined in the course of Avista's energy efficiency reporting and management:

- *Customer segment portfolio* – An aggregation of programs within a customer segment (e.g. low-income, residential, nonresidential).
- *Fuel portfolio* – Aggregating electric or natural gas energy efficiency programs.
- *Regular vs. low-income portfolios* – Separating income-qualified measures delivered through CAP agencies from the remainder of the portfolio.
- *Jurisdictional portfolio* – Aggregating programs within either the Washington or Idaho jurisdiction.
- *Local or Regional portfolio* – Aggregating all elements of the local energy efficiency portfolio vs. the regional market transformation portfolio.
- *Fuel/Jurisdictional portfolio* – Aggregating all programs within a given fuel and jurisdiction (Washington electric, Washington natural gas, Idaho electric, or the currently suspended Idaho natural gas portfolio).

Overall portfolio: Aggregating all aspects of the Washington and Idaho, electric and natural gas energy efficiency portfolio.

Methodology for Allocation of Energy Efficiency Costs

The Avista methodology for cost allocation builds from the measure or sub-measure analysis to the program and ultimately portfolio analysis. At each level of aggregation, those costs that are incremental at that stage are incorporated into the cost-effectiveness analysis. Incremental customer cost and benefits are fully incorporated into measure-level analysis. Utility costs (both labor and non-labor) are currently fully incorporated within the program level of aggregation based on previous advisory group discussions regarding the Company's ability to expand or contract the portfolio to meet acquisition target. Cost allocations are made based on the expected adjusted BTU acquisition of the program, with adjustments by the relative avoided cost of electricity and natural gas (e.g. a kWh is a highly processed btu compared with an equivalent natural gas).

Generally little of the non-incentive utility cost (labor and non-labor) is allocated at the measure level, with the exception of programs delivered through a third-party contractor where those costs are truly incremental. Other non-incentive utility costs are allocated at the program level in the belief that the addition or elimination of programs would lead to a change in the scale of the overall portfolio, and that, therefore, these costs are incremental at the program level.

It should be noted that costs not associated with the delivery of local energy efficiency programs within the planned year are excluded from the cost-effectiveness calculations. These are termed "supplemental costs," and consist of:

- The funding associated with regional programs (NEEA)
- Cost to perform conservation potential assessment studies (CPA)
- Evaluation, Measurement, and Verification engagements (EM&V)
- Funding of low-income educational outreach programs (ID)
- Idaho research funding and similar expenses unrelated to the planned local portfolio

Unit Energy Savings

The quantification of energy savings applicable toward achieving Washington EIA acquisition targets has been an ongoing topic of discussion since the effective date of the requirement. The Company plan will create an annual locked Unit Energy Savings (UES) associated with the Technical Reference Manual (TRM) that will be updated on an annual basis. The savings will primarily be derived from the Regional Technical Forum (RTF) or previous impact evaluations.

For planning purposes the business plan has applied the same assumptions regarding UES to the Idaho portfolio as the best current estimate of savings. However, the retrospective Annual Conservation Report may displace these assumptions with the results of actual impact evaluations when available and appropriate.

Analytical Methodology Applicable to the Low-Income Programs

Avista has developed several analytical methodologies specific to the evaluation needs of the low-income portfolio. These include the (1) accommodation of incentive levels equal to the entire cost of the measure, including the cost of the baseline measure, and (2) the treatment and quantification of the considerable non-energy benefits incorporated within the low-income portfolio. Beyond these two rather significant analytical issues, the treatment of the low-income portfolio is similar to that applied to the other portfolios.

Except for the low-income program, Avista does not typically fully fund the customer incremental cost, and even less frequently the full installed cost of an end-use. For low-income programs delivered with Avista funding in partnership with Community Action Program (CAP) agencies, the participating customer may receive full funding of the end-use. There is a need to appropriately represent this expenditure within the overall energy efficiency expenditure budget, but at the same time it is necessary to recognize that only a portion of this expenditure is dedicated toward energy efficiency. The Company does so by recognizing the full expenditure as a cost, but also recognizing that there is a non-energy benefit associated with the provision of base-case end-use services. The full cost less this non-energy benefit is equal to the amount invested in energy efficiency. Thus the assessment of the cost-effectiveness of the energy efficiency investment is appropriately based upon the value of the energy savings of the efficient measure in comparison to this incremental cost. In situations where a measure might be found cost-effective under one fuel, it will be reimbursed at the full cost for both fuels.

Avista has also defined the expenditure of non-energy health and safety funds as a non-energy benefit (on a dollar-for-dollar basis). This quantification is based on the individual assessment of each of these expenditures by the CAP agency prior to the improvements being made. This approval process provides reasonable evidence that the improvements are worth, at a minimum, the amount that has been expended upon them through CAP agency funds.

As a consequence of these two assumptions, the low-income portfolio accrues considerable non-energy benefits.

The administrative reimbursement permitted to the CAP agency is considered to be a component of the measure cost. This amount reimburses the CAP for back-office costs that would, in a typical trade ally bid, be incorporated into the project invoice. For 2022, the admin reimbursement is 30 percent for Washington and 15 percent for Idaho.

APPENDIX C

Washington DSM Tariff Schedules

Fourth Revision Sheet 90
Canceling
WN U-28 Third Revision Sheet 90 90

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 90
ELECTRIC ENERGY EFFICIENCY PROGRAMS
WASHINGTON

1. AVAILABILITY

The services described herein are available to specified residential, commercial, and industrial, retail electric distribution customers of Avista for the purpose of promoting the efficient use of electricity. Customers receiving electric distribution service provided under special contract and/or customers receiving electric services not specified under Tariff Schedule 91 (Energy Efficiency Rider Adjustment) are not eligible for services contained in this schedule unless specifically stated in such contract or other service agreement. The Company may provide partial funding for the installation of electric efficiency measures and may provide other services to customers for the purpose of identification and implementation of cost-effective electric efficiency measures as described in this schedule. These services are available to owners of facilities, and also may be provided to tenants who have obtained appropriate owner consent.

Assistance provided under this schedule is limited to end uses where electricity is the primary energy source. Assistance may take the form of monetary incentives or non-monetary support, as further defined within this tariff. The Company shall strive to develop a portfolio of programs that is cost-effective on an aggregate basis. Customer participation under this schedule shall be based on eligibility requirements contained herein.

2. ELIGIBLE CUSTOMER SEGMENTS

All customers in all customer segments to whom this tariff is available are eligible for participation in electric efficiency programs developed in compliance with this tariff. The broad availability of this tariff does not preclude the Company from targeting measures, markets and customer segments as part of an overall effort to increase the cost-effectiveness and access to the benefits of electric efficiency.

3. MEASURES

Only electric efficiency measures with verifiable energy savings and demand response measures intended to achieve capacity reductions are eligible for assistance. Measure eligibility may not necessarily apply to all customer segments. Final determination of applicable measures will be made by the Company. Eligible technologies may include, but are not limited to, energy-efficient appliances, assistive technologies, controls, distributed renewable energy, motors, heating, ventilation and air-conditioning (HVAC) systems, lighting, maintenance, monitoring, new technologies, and shell.

Incentives for distributed renewable energy measures will be limited to net-metering facilities operating under Avista Utilities Idaho/Washington Rate Schedule 63 Net Metering rules. Incentives will be limited to energy production not to exceed 100% of the average annual energy use of the facility for the preceding three years or if new, a similar facility's annual use as calculated by the Company. Any project design that is fully complete and submitted before December 31, 2021 will be considered for eligibility. Submitted project must meet cost-effectiveness requirements to be determined eligible, and project must be completed by December 31, 2022. (D) (N) (N) (N) (N)

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By Patrick Ehrbar, Director of Regulatory Affairs

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 90 (continued)

Market transformation ventures will be considered eligible for funding to the extent that they improve the adoption of electric efficiency measures that are not fully accepted in the marketplace. These market transformation efforts may include efforts funded through regional alliances or other similar opportunities. (D) (D)

4. FUNDING AND NONMONETARY ASSISTANCE

4.1 Funding

The Company shall offer incentives for projects based upon the incremental capital cost associated with the energy efficiency of the project. Energy savings are calculated using the current retail energy rates.

The Company shall pay an incentive up to a maximum of the incremental measure cost. The Company shall make adjustments to the percent of incremental cost paid to attempt to obtain the greatest energy savings at the lowest cost

Low-income measures that have a TRC of 1.0 or higher are incentivized at 100% of the project cost. For measures that have a TRC of less than 1, the project is incentivized at an amount equal to the present value of avoided cost.

Incentives for efficiency measures within the following categories shall not exceed 100% of the project cost:

4.1.1 Energy efficiency programs delivered by community action agencies contracted by the Company to serve low-income or vulnerable customer segments, including agency administrative fees and health and human safety measures. (M)

4.1.2 Low-cost electric efficiency measures with demonstrable energy savings (e.g. compact fluorescent lamps).

4.1.3 Programs or services supporting or enhancing local, regional or national electric efficiency market transformation efforts.

4.1.4 Prescriptive programs are guided by the typical application of that measure in accordance with the previously defined incentive structure. Incentive levels for these programs are based on market conditions at the time of program design and are not dependent on actual project cost relative to incentive caps. Incentives shall not exceed project costs.

4.1.5 Incentives for demand response programs shall not exceed 75% of the calculated capacity present value of the measure if and when an interruption event is triggered. (M)

4.1.6 Effective October 1, 2021, pending Commission approval, On-Bill Repayment (OBR) Program interest rate buydowns for qualifying electric energy efficiency measure financing as provided through the Company's partner lender. (N) (N) (N) (N)

(M) material transferred from Sixth Revision Sheet 90B

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AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 90 (continued)

(K) (N)

4.1.7 Incentives for customers designated as part of a vulnerable population or highly impacted community pursuant to RCW 19.405.020. Funding is limited to 100% of the project costs for installation and use of energy efficiency equipment. Equipment or repairs related to the health and safety of the customer or community is also allowed under this section. (N)

The Company will actively pursue electric efficiency opportunities that may not fit within the prescribed services and described in this tariff. In these circumstances the customer and the Company will enter into a site-specific services agreement.

4.2 Non-Monetary Assistance

Assistance without the granting of direct monetary incentives to the customer is available across all applicable segments and may be provided in various ways, that include, but are not limited to, the following:

4.2.1. Educational, training, or informational activities that enhance electric efficiency. This may include technology or customer-segment specific seminars, literature, tradeshow or community events, advertising, or other approaches to increasing the awareness and adoption of resource efficient measures and behaviors. (K)

4.2.2. Financial activities intended to reduce or eliminate the financial barriers to the adoption of electric efficiency measures. This may include programs intended to reduce the payment rate for resource efficiency measures, direct provision of leased or loaned funds or other approaches to financial issues with better than existing market terms and conditions.

(K) material transferred to Ninth Revision Sheet 90A

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By Patrick Ehrbar, Director of Regulatory Affairs

SCHEDULE 90 continued

4.2.3. Product samples may be provided directly to the customer when energy efficiency products may be available to the utility at significantly reduced cost as a result of cooperative buying or similar opportunities. (M)

4.2.4. Technical Assistance may consist of engineering, financial or other analysis provided to the customer by or under the direction of, Company staff. This may take the form of design reviews, product demonstrations, third-party bid evaluations, facility audits, measurement and evaluation analysis or other forms of technical assistance that addresses the cost- effectiveness, technical applicability or end-use characteristics of customer alternatives.

5. BUDGET & REPORTING

The electric efficiency programs defined within this tariff will be funded by surcharges levied within Schedule 91. The Company will manage these programs to obtain resources that are cost-effective from a Total Resource Cost (TRC) perspective and achievable through utility intervention. Schedule 91 will be reviewed annually and revised as necessary to provide adequate funding for electric efficiency efforts.

6. GENERAL RULES AND PROVISIONS

Service under this schedule is subject to the General Rules and Provisions contained in this tariff and is limited to facilities receiving electric service from the Company. All installations and equipment must comply with all local code and permit requirements applicable and be properly inspected, if required, by appropriate agencies.

The Company may establish specifications regarding any electric efficiency measures and modifications to be affected under this schedule and may conduct inspections to ensure that such specifications are met.

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 91

DEMAND SIDE MANAGEMENT RATE ADJUSTMENT- WASHINGTON

APPLICABLE:

To Customers in the State of Washington where the Company has electric service available. This Demand Side Management Rider Adjustment or Rate Adjustment shall be applicable to all retail customers for charges for electric energy sold and to the flat rate charges for Company-owned or Customer-owned Street Lighting and Area Lighting Service. This Rate Adjustment is designed to recover costs incurred by the Company associated with providing Demand Side Management services and programs to customers.

CONSERVATION COST RECOVERY PROCEDURES:

Each year, the Company; (K)(N)

a. Obtains the most recent DSM balance, which trues-up prior period differences for;
   i. Budget versus actual expenditures, and
   ii. Revenues set in rates versus actual revenue recovered.

b. Estimates current year DSM expenditures,

c. Adds together the present DSM balance and the estimate of current year expenditures (a + b) to develop the revenue requirement for the rate period. The Company then uses base revenue from the most recently approved general rate case to allocate the DSM revenue requirement to each rate schedule. The per kWh rates are then calculated by dividing the DSM revenue requirement for each rate schedule by the forecasted kWh usage for the rate period. For rate schedules 41-48 (Street & Area Lighting) the Company divides the allocated revenue requirement by the base revenue from the most recently approved rate case to determine the percentage applied to the fixed monthly charges for those rate schedules.

The total demand side management revenue requirement amount, applicable adjustments by rate schedule (if any), and all substantiating calculations, are then submitted to the Commission for approval at least 60 days prior to the requested effective date.

(K) Material has been transferred to Original Sheet 91A. (K)(N)

Issued July 28, 2015 Effective April 8, 2016

Issued by Avista Corporation
By Kelly Norwood Kelly O. Norwood, Vice President, State & Federal Regulation

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 91A

DEMAND SIDE MANAGEMENT RATE ADJUSTMENT- WASHINGTON cont.

MONTHLY RATE:

The energy charges of the individual rate schedules are to be surcharged by the following amounts:

Schedule 1 & 2	$0.00255 per kWh	(R)
Schedule 11, 12 & 13	$0.00321 per kWh	(R)(N)
Schedule 21, 22 & 23	$0.00273 per kWh	(R)(N)
Schedule 25	$0.00182 per kWh	(R)
Schedule 31 & 32	$0.00236 per kWh	(R)
Schedules 41-48	$0.01118 per kWh	(R)

SPECIAL TERMS AND CONDITIONS:

Service under this schedule is subject to the Rules and Regulations contained in this tariff.

The above Rate is subject to increases as set forth in Tax Adjustment Schedule 58.

Issued May 26, 2021 Effective August 1, 2021

Issued by Avista Corporation
By Patrick Ehrbar, Director of Regulatory Affairs

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 190
NATURAL GAS EFFICIENCY PROGRAMS
WASHINGTON

1. AVAILABILITY

The services described herein are available to qualifying residential, commercial, and industrial, retail natural gas distribution customers of Avista Corporation for the purpose of promoting the efficient use of natural gas. Customers receiving natural gas distribution service provided under special contract and/or customers receiving natural gas services not specified under Tariff Schedule 191 (Natural Gas Efficiency Rider Adjustment) are not eligible for services contained in this schedule unless specifically stated in such contract or other service agreement. The Company may provide partial funding for the installation of natural gas efficiency measures and may provide other services to customers for the purpose of identification and implementation of cost-effective natural gas efficiency measures as described in this schedule. Facilities-based services are available to owners of facilities, and also may be provided to tenants who have obtained appropriate owner consent.

Assistance provided under this schedule is limited to end uses where natural gas is or would be the energy source and to measures which increase the efficient use of natural gas. Assistance may take the form of monetary incentives or non-monetary incentives, as further defined within this tariff. The acquisition of resources is cost-effective as defined by a Utility Cost Test (UCT) as a portfolio. Customer participation under this schedule shall be based on eligibility requirements contained herein. (C)

2. ELIGIBLE CUSTOMER SEGMENTS

All customers in all customer segments to whom this tariff is available are eligible for participation in natural gas efficiency programs developed in compliance with this tariff. The broad availability of this tariff does not preclude the Company from targeting measures, markets and customer segments as part of an overall effort to increase the cost-effectiveness and access to the benefits of natural gas efficiency.

3. MEASURES

Only natural gas efficiency measures with verifiable energy savings are eligible for assistance. Measure eligibility may not necessarily apply to all customer segments. Final determination of applicable measures will be made by the Company.

Market transformation ventures will be considered eligible for funding to the extent that they improve the adoption of natural gas efficiency measures that are not fully accepted in the marketplace. These market transformation efforts may include efforts funded through regional alliances or other similar opportunities.

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Issued by Avista Corporation
By Kelly Norwood, Vice President, State and Federal Regulation

Kelly Norwood

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 190 - continued

4. FUNDING AND NONMONETARY ASSISTANCE

4.1 Funding

The Company shall offer incentives for projects based upon the incremental capital cost associated with the energy efficiency of the project. Energy savings are calculated using the current energy rates.

The Company shall pay an incentive up to a maximum of the incremental measure cost. The Company shall make adjustments to the percent of incremental cost paid to attempt to obtain the greatest energy savings at the lowest cost.

Low income measures that have a Total Resource Cost (TRC) of 1.0 or higher are incentivized at 100% of the project cost. For measures that have a TRC of less than 1, the project is incentivized at an amount equal to the present value of avoided cost.

Incentives for efficiency measures within the following categories shall not exceed 100% of the project cost:

4.1.1 Energy efficiency programs delivered by community action agencies contracted by the Company to serve Low Income or vulnerable customer segments including agency administrative fees and health and human safety measures;

4.1.2 Low-cost natural gas efficiency measures with demonstrable energy savings (e.g. rooftop unit service);

4.1.3 Programs or services supporting or enhancing local, regional or national natural gas efficiency market transformation efforts.

4.1.4 Prescriptive programs are guided by the typical application of that measure in accordance with the previously defined incentive structure. Incentive levels for these programs are based on market conditions at the time of the program design and are not dependent on actual project cost relative to incentive caps. Incentives shall not exceed project costs.

4.1.5 Effective October 1, 2021, pending Commission approval, On-Bill Repayment (OBR) Program interest rate buydowns for qualifying natural gas efficiency measure financing as provided through the Company's partner lender. (N)

4.1.6 Incentives for customers designated as part of a vulnerable population or highly impacted community pursuant to RCW 19.405.020. Funding is limited to 100% of the project costs for installation and use of energy efficiency equipment. Equipment or repairs related to the health and safety of the customer or community is also allowed under this section. (N)

Issued June 1, 2021 Effective August 1, 2021

Issued by Avista Corporation
By Patrick Ehrbar, Director of Regulatory Affairs

SCHEDULE 190 - continued

Avista Corporation will actively pursue natural gas efficiency opportunities that may not fit within the prescribed services described in this tariff. In these circumstances the customer and Avista Corporation will enter into a site specific services agreement. (D)

4.2 Non-Monetary Assistance

Non-monetary assistance is service that does not involve the granting of direct monetary incentives to the customer. This type of assistance is available across all applicable segments. This assistance may be provided in various ways that include, but are not limited to, the following:

4.2.1. Educational, training or informational activities that enhance resource efficiency. This may include technology or customer-segment specific seminars, literature, trade-show booths, advertising or other approaches to increasing the awareness and adoption of resource efficient measures and behaviors.

4.2.2. Financial activities intended to reduce or eliminate the financial barriers to the adoption of resource efficiency measures. This may include programs intended to reduce the payment rate for resource efficiency measures, direct provision of leased or loaned funds or other approaches to financial issues by better than existing market terms and conditions.

4.2.3. Product samples may be provided directly to the customer when resource efficient products may be available to the utility at significantly reduced cost as a result of cooperative buying or similar opportunities.

4.2.4. Technical Assistance may consist of engineering, financial or other analysis provided to the customer by or under the direction of, Avista Corporation staff. This may take the form of design reviews, product demonstrations, third-party bid evaluations, facility audits, measurement and evaluation analysis or other forms of technical assistance that addresses the cost-effectiveness, technical applicability or end-use characteristics of customer alternatives.

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 190 - continued

5. BUDGET & REPORTING (M)

The natural gas efficiency programs defined within this tariff will be funded by surcharges levied within Schedule 191. The Company will manage these programs to obtain resources that are cost-effective from a Total Resource Cost perspective and achievable through utility intervention. Schedule 191 will be reviewed periodically and revised as necessary to provide adequate funding for natural gas efficiency efforts.

6. GENERAL RULES AND PROVISIONS (D)

Service under this schedule is subject to the General Rules and Provisions contained in this tariff and is limited to facilities receiving natural gas service from the Company.

All installations and equipment must comply with all local code and permit requirements applicable and be properly inspected, if required, by appropriate agencies. The Company may establish specifications regarding any natural gas efficiency measures and modifications to be effected under this schedule and may conduct inspections to insure that such specifications are met.

Issued June 26, 2013 Effective August 15, 2013

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By By Kelly Norwood, Vice President, State and Federal Regulation

Twenty-first Revision Sheet 191
Canceling
WN U-29 Twentieth Revision Sheet 191

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 191

DEMAND SIDE MANAGEMENT RATE ADJUSTMENT - WASHINGTON

APPLICABLE:
To Customers in the State of Washington where the Company has natural gas service available. This Demand Side Management Rate Adjustment or Rate Adjustment shall be applicable to all retail customers taking service under Schedules 101, 102, 111, 112, 121, 122, 131, and 132. This Rate Adjustment is designed to recover costs incurred by the Company associated with providing Demand Side Management services and programs to customers. (N)

MONTHLY RATE:
The energy charges of the individual rate schedules are to be increased by the following amounts:

Schedule 101 & 102	$0.02229 per Therm	(R)(N)
Schedule 111 & 112	$0.01581 per Therm	(R)
Schedule 121 & 122	$0.01614 per Therm	(R)
Schedule 131 & 132	$0.01521 per Therm	(R)

SPECIAL TERMS AND CONDITIONS:
Service under this schedule is subject to the Rules and Regulations contained in this tariff.

The above Rate is subject to increases as set forth in Tax Adjustment Schedule 158.

Issued March 14, 2017 Effective June 1, 2017

Issued by Avista Corporation
By Kelly O. Norwood, Vice-President, State and Federal Regulation
Kelly Norwood

APPENDIX D

Non-Energy Impact Study

FINAL REPORT

Non-energy Impacts

Avista

Date: September 08, 2021

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1 INTRODUCTION

DNV's Non-energy Impact (NEI) Database (the "Database") allows DNV to map published NEI values to Avista's Technical Reference Manual (TRM). The values produced are adjusted to account for differences in economic and programmatic conditions. The overall goal of this NEI research is to develop the most comprehensive set of NEI values possible based on published research and to identify gaps where additional research is necessary to quantify the value of occurring NEIs. The results can be used to report, evaluate, and market energy efficiency programs across Avista's Residential and Commercial and Industrial (C&I) sectors.

The overall process for estimating the NEIs is broken down into seven tasks:

Task 1: Map Avista measures to DNV's NEI Database

Task 2: Assign confidence factors

Task 3: Assign plausibility factors

Task 4: Estimate economic adjustment factors

Task 5: Adjust Database values to calculate utility specific NEIs

Task 6: Choose the best value for each NEI/measure combination

Task 7: Gap analysis

This report is constructed from the individual memos provided throughout the duration of this project and provides the necessary documentation to establish the final NEI values as viable impacts results from the installation of energy efficiency measures.

2 OVERVIEW OF APPROACH

The Database approach identifies NEIs from the existing literature and assigns those NEIs to relevant Avista programs and measures. DNV's NEI Database contains 50 separate residential and C&I NEIs from 46 publicly available studies. After assigning the NEI to Avista programs and measures, we adjust the estimates based on plausibility, confidence, and economic adjustment factors. The adjustments improve transferability of the research to Avista territory. They also adjust the NEI values to account for uncertainty stemming from extremely high or low values, the quality of the methods used in the original study, the age of the original study, and differences in economic conditions between the area covered by the original study and Avista service territory.

The NEI Database approach consists of the following 7 tasks:

Task 1. Map Avista measures to DNV's NEI Database - NEI studies can vary considerably in how they aggregate information when reporting a quantified NEI value. The goal in this step is to standardize the Avista measure descriptions into the same taxonomy as we have assigned to the measures from all of the studies in the Database. We then use those standardized descriptions to match the Avista measures to those in the Database.

Task 2. Assign confidence factors - DNV assigns a Confidence Factor (CF) to each study to reflect how well the study follows research best practices. The CF is used to discount the NEI values matched to Avista's measures to provide a conservative estimate of NEI values in our Database. Furthermore, the studies and measures in the Database are sorted from highest confidence to low confidence, so that the matching look-up value select the higher confidence values first.

Task 3. Assign plausibility factors - DNV developed a Plausibility Factor (PF) for each study to further account for nuances in NEI research outside of the actual study methodology. The PF is also used in conjunction with the CF for discounting NEI values and for identifying best-fit values in the event of multiple measure-by-NEI matches.

Task 4. Estimate economic adjustment factors - DNV uses publicly available data to develop factors that adjust NEI's based on the economic activity of the original jurisdictions to Avista's service territory.

Task 5. Adjust Database values to calculate utility-specific NEIs – All NEIs from the Database that match Avista measures are scored according to the combined Confidence and Plausibility scores, creating the "combined score." This combined score, along with the economic adjustment factor, are applied to the study NEI value to make it utility-specific (or more specific, where possible) as well as to discount the value based on how applicable it is. This process is reflected in the following equation:

Equation 1: Discount and geographically adjust NEI value

$$Utility-specific\ NEI = Study\ NEI\ Value * Combined\ Score * Economic\ Adjustment\ Factor$$

Task 6. Choose the best value for each NEI/measure combination – The automated Database process can produce multiple matches between the published NEI values and the Avista TRM. A multi-level ranking approach identifies the best fit for each NEI-by-measure combination. When there are multiple options for a top value, the most conservative estimate is flagged and the DNV NEI team reviews all potential matches to identify the best fit. The results produce a single matched value as the final recommended NEI for each measure-by-NEI combination.

Task 7. Gap analysis – DNV identifies areas in which follow-up research is necessary to confirm or quantify NEIs occurring within Avista territory. This process involves:

a. Conducting a gap analysis to identify Avista measures lacking NEIs; and,

b. Developing and applying a framework to prioritize future research.

3 DETAILED MEASURE MAPPING METHODOLOGY

This section describes how DNV mapped each measure in Avista's data to DNV's Database.

3.1 Conduct Jurisdictional Scan of Existing NEI Studies

The Database contains 46 different NEI studies as part of the NEI database, including studies from literature reviews from Ohio and Ontario and those referenced by the Massachusetts NEI Framework project. We start the process with a jurisdictional scan (JS) to determine the following information from each available NEI study:

- Categories of NEIs
- Quantified NEI values and their units
- Level of aggregation, specifically whether the NEI was identified by sector, program, end-uses, or detailed measures
- Rigor and methodology used to calculate NEIs
- Plausibility of applying the study to other programs
- Economic factors related to the original jurisdiction for each study

Thus, the JS provides the foundation for gathering inputs not only for identifying NEI values, but also the inputs needed to adjust those values based on our various adjustment factors.

3.2 Mapping NEI measures in the Database

DNV standardizes the names of NEIs reported by each of the 46 JS studies. For example, many NEIs are similar in nature but were described differently (e.g., "Avoided Operation and Maintenance" vs "O&M avoided"). DNV also created a list of standard NEI names that we assigned to the observed NEIs identified across all the studies in the JS. We create a "crosswalk" that maps the unique NEI names from the original studies to our standardized names.

NEI studies can vary considerably in how they aggregate information when reporting a quantified NEI value. Some studies may report NEI results for specific segment-program-measure level descriptions, such as "C&I-small business retrofit-4-ft linear LED lamp. Other studies may only report NEIs for C&I lighting retrofits, while some may simply report the NEIs that are associated with a prescriptive C&I program.

NEIs can also vary by the fuel-type that was examined as part of the study, such as electricity, natural gas, or kerosene. For example, an NEI study conducted for an electric-only utility might provide different values for insulation measures than one conducted for a gas and electric utility. In addition, the units in which the NEI are reported can be fuel-specific, such as $/kWh or $/therm.

DNV refers to the combination of the following classes of fuel saved, program participant populations, programs, and measure descriptions as the "level of aggregation" (LoA). Below is a list of the seven LoAs we classified for use in this study:

1. **Fuel (Level 0):** Identifies the fuel studied in the JS report (electricity, gas, or both).
2. **Sector (Level 1)**: Identifies the population being served by the program (C&I or Residential).
3. **Program Level (Level 2)**: Designates the class of program within the sector (Low Income, New Construction, Retrofit).
4. **Prescriptive/Custom (Level 3)**: Separates programs into Prescriptive or Custom.
5. **End-use Level (Level 4)**: High-level description of end-use systems modified through a program type.
6. **Broad Measure Level (Level 5)**: High-level description of measure within an end-use (e.g., LED Lighting)
7. **Detailed Measure Level (Level 6)**: Detailed-level description of measure within an end-use (e.g., Linear LED)

We standardized and assign the LoAs to each measure in the 46 studies contained in the Database.

3.3 Mapping Avista measures to the Database

DNV then standardizes and assigns the same LoAs listed above to each of Avista's measures. All the studies in the JS had an original (observed) LoA, but they varied in terminology from study to study. As such, DNV reviewed the Avista TRM to identify the observed LoA in Avista's programs and measures. The result was a list of fuels, sectors, programs, sub-programs, end-uses and measures in TRM, which we refer to as the **Avista TRM.**

DNV reviewed all original LoA across the JS and the Avista TRM to assign a standard set of naming conventions. During the LoA assignment process, DNV analyzed Avista's tracking data to identify the programs in which each measure was installed. In cases where a certain measure in Avista's TRM was installed across different program types (e.g., Custom HVAC measure being installed in a New Construction and Retrofit program), DNV created duplicate rows in the TRM and delineated between the two by adding a program type to column H of the 'NEI Breakout' worksheet in the attached results workbook.

3.3.1 Match JS to Avista TRM

In the subsequent stages of this project, DNV will map the JS measures to the Avista TRM using the standard set of Level 0 through Level 6 match codes. The match codes are assigned to the Avista TRM using the same match code dictionary used in the JS. Table 1 below illustrates how a Linear LED measure in the JS is broken out into the LoA.

Table 1. Example of Standard Level of Aggregation details for one measure in the Avista TRM

Standard Levels of Aggregation	Example of Standard Levels of Aggregation Details
Detailed Measure Level (Level 6)	Linear LED
Broad Measure Level (Level 5)	LED
End-Use Level (Level 4)	Lighting
Prescriptive/Custom (Level 3)	Prescriptive
Program Level (Level 2)	Retrofit
Sector (Level 1)	C&I
Fuel (Level 0)	Electricity
Standard NEI Category Example	O&M-Participant-C&I

Table 2 illustrates how these Standard LoA and the Standard NEI Categories come together to form the matching IDs.

Table 2. Example of Concatenated Matching IDs

Match Level ID	Concatenated Matching ID
6	Electricity_C&I_Retrofit_Prescriptive_Lighting _LED _Linear LED
5	Electricity_C&I_Retrofit_Prescriptive_Lighting _LED
4	Electricity_C&I_Retrofit_Prescriptive_Lighting
3	Electricity_C&I_Retrofit_Prescriptive
2	Electricity_C&I_Retrofit

A match occurs when the concatenated match codes exist in both the Avista TRM and in one or more studies in the JS. All potential matches are created using mutual exclusivity.

First, all matches are identified that happen at a Level 6. Next, all matches are identified that happen at a Level 5, but which did not happen at a Level 6. This process is done all the way through Level 2, and then a match level is assigned, and all potential matches are preserved. Lastly, the top values are chosen by ranking the potential matches from most specific (i.e., Level 6) to least specific (i.e., Level 2).

The following is an outline of how the six levels of matching are used to generate a list of results utilizing the above Avista lighting measure in Tables 1 and 2 as an example. Initially, a lookup of the Level 6 ID in Table 2 is performed in the JS to check for any exact matches. A current look in the JS shows that there are no exact matches at a Level 6, so the code then checks for any matches using the Level 5 ID. The JS does not contain any matches at a Level 5 either, so the next step is to check for any matches using the Level 4 ID. This time the output shows 7 matches spanning 4 different studies at a Level 4. This process continues using the Level 3 and 2 IDs until a list of all potential matches are generated.

4 DETAILED CONFIDENCE FACTOR METHDOLOGY

This section describes how DNV assigns the Confidence Factor to each study in the Database.

4.1 Develop the Confidence Factor

At times, the Avista TRM matched to more than one study in the Database. DNV's Confidence Factor (CF) informs the selection of one study's NEI over another. DNV considers six different questions that relate to best practices in NEI research to develop each CF. Each question has a set of fixed responses, outlined in Table 3.

Each question is also assigned a weight based on significance. These weights can be adjusted and used to reflect whether one or more questions are determined to be more important than others in determining which study to use.

4.1.1 Confidence Factor Scoring Inputs

To assign a CF to each of the studies in the Database, DNV examined each report in the context of the following questions. Table 3 presents the possible responses to each of the confidence factor criteria, and their associated scores in parentheses.

Table 3. Questions used to Calculate Confidence Factor Score, and the Reasons for Each Question

Question	Possible Responses (scores)	Intention of question
1. Is the study measure specific?	a. Measures have specific NEIs associated with them (3) b. Measures are identified by the study, but in aggregate (2) c. Measures are not reported at all (1)	Studies providing values tied to specific measure groups are more robust than those that provide combined NEIs across multiple measures or do not distinguish which measures are included in the sample.
2. Is the study segmented by sector?	a. Study identified NEIs related to sample segments (3) b. Study identifies sample segments used to design sample frame, but NEIs are not specific to segments (2) c. Sample not segmented at all (1)	The impact of measures on participants varies by participant characteristics such as income level and industry. Studies that account for these differences are regarded as providing greater precision in results than those that do not.
3. Was the sample drawn using a statistical method?	a. Study reports statistically significant sample results with precision levels (3) b. Study uses statistical sampling, but results are not always statistically significant (2) c. Does not use statistical sampling (1)	Statistical sampling accounts for key differences in respondents and/or measures that create variance in NEI estimates. NEI studies that use stratified sampling and provide statistically significant results are regarded as superior to those that do not.
4. Does the study incorporate identifiable economic factors?	a. Approach clearly isolates/identifies relevant economic factors (3)	NEIs result from changes to either consumer or producer surplus. As such, they should relate to some aspect of the household or firm decision-making

	b. They used some economic factors based on theory, although not clearly identified in study (e.g., property values) (2) c. Economic factors are not identified, and cannot be inferred (1)	process such as improved costs, revenues, living conditions, etc. Studies that isolate NEIs that tie to identifiable economic factors provide greater confidence than those that are less specific about the factors that justify NEIs.
5. Does the study consider any of the following when appropriate: Open-ended questions, Additivity, Double Counting	a. Accounts for Open-ended questions, Additivity, and Double Counting (3) b. Accounts for two out of the three factors (2) c. Accounts for only one of the factors (1) d. No evidence to suggest any of the factors were accounted for (0)	Best practices in NEI research document the need for studies to tie NEI estimates to known factors (such as utility bills) or derive estimates from factors that are known, such as hours to do a task and wages. Research also clearly documents the need to account for non-additivity of multiple NEIs. Finally, more rigorous studies take steps to ensure that NEIs are distinct across NEI categories.

4.1.2 Confidence Factor Scoring

DNV applied the rating system presented in Table 3 to construct the confidence factor for each study as follows:

- DNV recorded the numeric score (0-3) for each of the five questions for each study.
- A weighted score was calculated by multiplying the numeric score for each question by the question's weight. In the calculation, each of the five questions was given an equal weight; however, the weights can be adjusted in the final Database.

Equation 2: Confidence Factor Score Calculation Using Weights

$$Confidence\ Factor\ Score = \frac{(Q1\ Score * Q1\ Weight) + (Q2\ Score * Q2\ Weight) + (Q3\ Score * Q3\ Weight) + (Q4\ Score * Q4\ Weight) + (Q5\ Score * Q5\ Weight)}{Max\ Total\ Score}$$

- An example of how the weights are applied for two of the studies is shown in Table 4. If the question weights ("Q Weight") are adjusted, then the max score will also adjust:

Table 4. Example Confidence Factor Calculation

Study_ID	Q1 Score	Q2 Score	Q3 Score	Q4 Score	Q5 Score	Weighted Total Score	CF (Percent of Max)
Q Weight (0-1)	**1**	**1**	**1**	**1**	**1**	**Max = 15 Min = 5**	**CF Max = 100% CF Min = 50%***
Study0001	3	3	3	3	3	15	100%
Study0002	2	3	3	3	3	14	93%

*DNV sets of CF floor of 50%

- The weighted scores were summed to create an aggregate score for each study. The maximum possible weighted score was 15, while the lowest score was five.
- The weighted CF was calculated by dividing the aggregate score by the maximum possible score of 15. Studies with higher CFs typically contain more granular measure details and have more identifiable economic factors.

- The DNV method includes a CF “floor” of 50%, meaning no CF will drop below 50%, regardless of the answers to the five scoring questions. The DNV NEI team believes that NEIs should not be discounted to zero, but some discounting is appropriate. DNV reasoned that reducing NEIs from studies with a low confidence factor by 50% allows some value of NEI to be recognized, while still reducing the value to reflect our lack of confidence in the estimate.

Table 25 and Appendix B: Confidence Factor Scoring contain a table that shows the CF scores and adjusted CF for each study in the Database.

5 DETAILED PLAUSIBILITY FACTOR METHODOLOGY

DNV developed a Plausibility Factor (PF) to further account for nuances in NEI research outside of the actual study methodology. The Plausibility Factor (PF) considers three variables:

1. Level of matching (Level 6, Level 5, etc.) represents how specifically the measures in the study match to Avista's measures
2. Age of the study
3. Changes in energy consumption within an end-use category over time

These inputs account for factors that impact NEI values that are not included in the CF, since the factors depend on data outside of the study. Similar to the CF inputs, each of these three inputs can receive a different weight to reflect greater or lesser relative importance. By default, DNV set all weights to 1 to represent equal importance for each factor. DNV calculated a PF score from 0% to 100%, with the higher the score representing a higher level of plausibility.

5.1.1 Plausibility Factor Scoring Inputs

5.1.1.1 Level of Matching

We used the level of matching discussed in Section 3.2 to provide the first input to the PF. Higher level matches indicated that the study from the Database closely represented the measure in the Avista TRM, and therefore received a higher score. Table 5 shows how the matching level translated into a PF input for matching. DNV's calculation does not typically result in the use of a prior studies with a level of match of 3 or lower. The level of match is typically 4 or greater for all NEI estimates used in the final calculations.

Table 5. Level of Matching Scoring Table

Match Level	Match Level Description	Example	Score
Level 6 Match	Detailed Measure	Air Source Heat Pump	6
Level 5 Match	Broad Measure	Heat Pump	5
Level 4 Match	End-Use	HVAC	4
Level 3 Match	Prescriptive/Custom	Prescriptive	3
Level 2 Match	Program	Retrofit	2

5.1.1.2 Age of the Study

Existing studies are affected by the economic, programmatic, demographic, and other factors relevant at the time those studies took place. As the studies age, these factors can shift, which decrease the relevance of the study to current programs and measures. For example, the Great Recession affected programs running in the 2009-2015 time period. Also, NEI research has evolved substantially over the last several years (Skumatz, 2016). This adjustment factor is designed to represent this potential decrease in relevance and discount NEI values based on it. DNV grouped the studies into the categories shown in Table 6, assigning higher scores for more recently published studies.

Table 6. Age of Study Scoring Table

Age of Study	Score
Five years or less	4

Six to ten years	3
11-15 years	2
Greater than 15	1

5.1.2 Change in End-Use Unit Energy Consumption

The third aspect of the PF calculation accounts for technological change in measure energy consumption over time. DNV assumed that if a study from the Database analyzed an end-use that has had a large change in energy consumption over the last several years, then the age of the study, in combination with the end-use category, provides important insight into whether the study's NEI results should be further discounted. For example, a study published prior to 2013 (with energy efficiency data from 2012 or older) that analyzed lighting NEIs would almost certainly have little coverage of LEDs in the measure-mix of the study. Therefore, the NEIs in that study related to lighting measures should be discounted to account for the large change in lighting energy consumption.

To calculate this value, DNV reviewed historical end-use energy consumption from the 2003 and 2012 Commercial Building End-Use Survey (CBECS) and the 2009 and 2015 Residential End-Use Consumption Survey (RECS) published by the Energy Information Administration.[1] CBECS and RECS provide tables reporting the unit energy consumption (UEC) of end-use technologies over time. DNV used the UEC/sq ft and UEC/household reported in CBECs and RECS, respectively, to measure change in energy consumption in each end use category over time. By calculating the Compound Annual Growth Rate (CAGR) between the earlier study and later study, DNV assumed that constant energy consumption over time for a specific end-use (indicated by a low CAGR %) showed that a study of that end-use would still be reliable today.

Appendix C: Plausibility Scoring Metrics contains tables that show the scoring inputs by the different CAGR categories and UEC numbers by end-use categories in CBECS and RECS.

5.1.3 Plausibility Factor Scoring

DNV constructed the plausibility factor for each study, end-use, and matching level combination as follows:

- DNV recorded the numeric score for each of the three factors.
- DNV assigned a weight to each score. By default, the weights are all set to 1.
- The weighted scores were summed to create an aggregate score for each study, end-use, and matching level combination.

Equation 3: Plausibility Factor Score Calculation Using Weights

$$Plausibility\ Factor\ Score = \frac{\begin{array}{c}(Age\ of\ Study\ Score * Age\ of\ Study\ Weight)\\ +(UEC\ Change\ Score * UEC\ Change\ Weight)\\ +(Match\ Level\ Score * Match\ Level\ Weight)\end{array}}{Max\ Total\ Score}$$

- A PF was calculated by dividing the aggregate score by the maximum possible score of 13. Studies with higher PFs are typically more recent.

[1] For further details on RECS, see: https://www.eia.gov/consumption/residential/data/2009/index.php?view=consumption
https://www.eia.gov/consumption/residential/data/2015/index.php?view=consumption

For further details on CBECS, see: https://www.eia.gov/consumption/commercial/archive/cbecs/cbecs2003/detailed_tables_2003/2003set19/2003html/e06a.html
https://www.eia.gov/consumption/commercial/data/2012/c&e/cfm/e6.cfm

- The DNV method includes an PF “floor” of 50%, meaning no PF will drop below 50%, regardless of the scores attached to the three factors.

The PF scores apply to a measure within a study. Table 7 shows examples of PF scores for different combinations of study age, UEC change score, and match level. Table 29 in Appendix D: Plausibility Combinations show all possible combinations of PF factors and the resulting adjusted PF score.

Table 7. Example of Plausibility Factor Scoring

Age of Study Score (A)	Unit Energy Consumption Change Score (B)	Matching Level Score (C)	Total Score (A+B+C)	% of Max Score (A+B+C)/13	Adjusted Plausibility Factor (No PF below Min PF)
4	3	6	13	100%	100%
3	3	6	12	92%	92%
4	3	4	11	85%	85%

6 DETAILED EXAMPLE OF COMBINED SCORE CALCULATION

Equation 4 below shows an example calculation of the CF score for NEI Framework Study Report (Study 04). This example uses Equation 2 referenced above and utilizes the CF question scoring for that Study 04 further detailed in Table 8. The calculation also assumes an equal weight of 1 for Q1-Q5.

Equation 4: Confidence Factor Calculation Example

$$Confidence\ Factor\ Score\ (Study0004) = \frac{(3*1)+(3*1)+(2*1)+(2*1)+(1*1)}{15} = \frac{11}{15} = 0.73$$

Table 8. Confidence Factor Scoring Examples – Study0004

Confidence Factor Question	Score	Rational
Q1 - Is the study measure specific?	3	The study reports NEI values for specific measures such as boilers, thermostats, and heat pumps.
Q2 - Is the study segmented by sector?	3	The sample design is segmented by sector (Residential, Low-income, and C&I) and initiatives (e.g. multifamily retrofit, home energy services, lighting, new construction). NEI results were linked to all sector initiatives.
Q3 - Was the sample drawn using statistical method?	2	The study used statistical sampling, but some results regarding electric hot water measures were not statistically significant.
Q4 - Does the study incorporate identifiable economic factors?	2	The study identified several property value NEIs based on the Hedonic Price theory.
Q5 - Does the study not consider any of the following when appropriate: Open-ended questions, Additivity, Double Counting	1	This study cites coordination across its approach in order to avoid double counting across both residential and C&I sectors. This study aimed to eliminate possible double counting by recommending that Program Administrators do not count existing property value NEIs for measures with property value and other NEIs. The report did a review of TecMarket Works (2007) study which included open-ended questions, but there was no evidence in the report to suggest they accounted for this or additivity.

Equation 5 below shows an example calculation of the PF score for Study0004. It is based on Equation 3 referenced above. The study was published in 2018 and therefore gets an Age of Study Score of 4. The UEC and Match level scores depend on the measure being matches to the measures in the original study. For the purposes of this example, the calculation will assume a Level 5 match to an HVAC measure. Because the measure falls under HVAC end-use, the UEC score is 3. The Match Level score is 5 due to it being a level 5 match. An equal weight of 1 is used for each factor. The Max Total Score possible for the PF is 13.

Equation 5: Plausibility Factor Calculation Example

$$Plausibility\ Factor\ Score\ (Study0004) = \frac{(4*1)+(3*1)+(5*1)}{13} = \frac{12}{13} = 0.92$$

If either the CF or the PF were less than 0.5, we would adjust them to 0.5 at this point before multiplying them together. As both are above 0.5, no minimum adjustment is needed.

The Combined Score is the product of the CF and PF and is the factor by which the Study NEI value is discounted prior to any economic adjustments.

Equation 6: Combined Score Calculation Example

$$Combined\ Score\ (Study0004) = CF * PF = 0.73 * 0.92 = 0.67$$

Therefore, the Study NEI value retains 67% of its original value prior to economic adjustments.

If both the CF and PF were set to the 0.5 individual value minimum, then the combined score would be 25%. Therefore, the maximum adjustment taken in the study is to discount an NEI to 25% of its original value.

7 ECONOMIC ADJUSTMENT METHDOLOGY

This section describes how DNV developed economic factors that adjust the Database NEIs to account for differences in economic activity between a study's original jurisdiction and Avista's service territory. DNV's Database already contains economic adjustment factors at the state level (e.g., Massachusetts versus Washington), so for Avista's analysis the focus was on developing intrastate economic adjustment factors that can be applied at the service-territory level.

7.1 Construct the Economic Adjustment Factors

During the NEI jurisdictional scan (JS) to develop the Database, DNV identified various economic factors on which NEIs from each study are based, either explicitly (stated in the study) or implicitly (assumed based on economic theory). DNV used publicly available data to develop factors that adjust the NEI based on the economic activity in the original jurisdiction to the intended jurisdiction.

DNV identified eight economic factors that can be used to adjust the NEIs. The factors are broken into Residential and C&I categories and include the following.

Residential economic adjustment factors:

- **Property Value –** Noise, visual, and air/temperature NEIs that are reflected in the differences in home values.
- **Income & Health Impacts (loss of income) –** Economic development NEIs related to income, as well as health NEIs related to longer life or missed days at work can be adjusted using differences in income.
- **Health Impacts (avoided costs) –** Health and safety NEIs related to avoided medical costs in hospitals. These NEIs are adjusted using the differential in medical costs between jurisdictions.
- **Age of Home –** Fire related NEIs using the differential in the age of homes between jurisdictions.
- **Utility Cost - Residential –** NEIs that result from changes to utility costs such as bad debt, arrearages, and hedging. These NEIs can be adjusted using the ratio of the average utility cost per MMBtu by sector (commercial, industrial, residential).

Commercial and Industrial economic adjustment factors:

- **Labor Costs (wage-based) –** Operations and maintenance (O&M) NEIs are largely a function of the time spent to maintain, repair, or replace equipment. These NEIs are adjusted using wage differentials in C&I settings.
- **Revenue & Productivity –** NEIs that change the profitability or operating costs for C&I customers other than what can directly be attributed to O&M. Comfort changes in C&I applications result in productivity NEIs. Changes may also affect the durability of a product or the amount of sales revenue. These NEIs can be adjusted using differentials in output or GDP.
- **Utility Cost - C&I –** NEIs that result from changes to utility costs such as bad debt, arrearages, and hedging. These NEIs can be adjusted using the ratio of the average utility cost per MMBtu by sector (commercial, industrial, residential).

The following sections discuss the economic adjustment factors:

- Section 7.1.2 discusses the values already contained in the Database and how to use them with newly developed, Avista values
- Section 7.1.3 presents the economic variables used for the adjustment factors
- Section 7.1.4 discusses economic adjustment factors for NEIs applicable to residential programs
- Section 7.1.5 discusses economic adjustment factors for NEIs applicable to C&I programs
- Section 7.1.6 discusses how these economic adjustments are applied to create NEI values representative of Avista's service territory
- Section 7.1.7 provides an example of economic adjustment for a residential NEI

7.1.2 Between State and Within State Adjustments

DNV developed adjustments to account for economic differences within the state of Washington. The JS already contains factors used for state-to-state comparison, so the updated factors address how Avista's service territory differs from that of Washington as a whole. The study uses the state-level adjustments to modify NEI values from their original jurisdiction, but it will now also include these service territory-level adjustments.

Most data used for the Avista adjustments are identified by county or area and not by specific utility service territory. Avista provided a geographic distribution of customers that DNV used to weight county-level economic data to a utility-level adjustment that could be compared with the state as a whole. These customer distributions were identified for each sector (Residential and C&I). With both the state and Avista adjustment factor representing relational qualities, the two can be multiplied together to form a single ratio for comparing Avista's service territory to that of the original study jurisdiction (See example in Section 7.1.7).

Equation 7: Relating Avista service territory to original state

$$\frac{Economic\ Adjustment_{WA}}{Economic\ Adjustment_{study\ state}} * \frac{Economic\ Adjustment_{Avista}}{Economic\ Adjustment_{WA}} = \frac{Economic\ Adjustment_{Avista}}{Economic\ Adjustment_{study\ state}}$$

7.1.3 Variables Used for Adjustment

Table 9 shows the variables, along with their description, year, and source, used to create the economic adjustment factors. These variables will be used in the formulas described in the subsequent sections. A more extensive bibliography can be found in Section 12.

Table 9. Variables with descriptions, years, and sources use to calibrate NEIs to a different state or region

Variable Name	Description	Year	Source
Median Home Value/Rent per Square Foot	The variable is equal to the median home value ($) divided by the square footage of the home. The value is the sum of the value per square foot of single-family attached houses, single-family detached houses, and mobile homes.	2018	Zillow, 2018
Square Foot	Total square footage of residency. These values are only available by the census regions[2] of (1) New England, (2) Middle Atlantic, (3) East North Central, (4) West North Central, (5) South Atlantic, (6) East South Central, (7) West South Central, (8) Mountain North, (9) Mountain South, and (10) Pacific. Individual states are imputed with the values from their region. Home types included in data: single-family attached houses, single-family detached houses, apartments in a building with 2 to 4 units, apartments in a building with 5 or more units, and mobile homes.	2015	EIA, 2018

[2] For more information about how states are divided into census regions, please visit https://www.eia.gov/consumption/residential/terminology.php

County Median Rental Price per Square Foot	This variable is equal to the median Zillow Rent Index over the course of a 12-month period. It includes all homes (own/rent/multifamily).	2017	Data World, 2020
Median Age of Structure	This variable is the median age of the structure from the ACS data. It is available at the state level and county level. State level adjustments use 2017 data, county level adjustments use the 2020 5-year detailed table.	2017/2019	US Census Bureau, 2018
Average Health Care Spending – State	Health care spending ($) in a state divided by the population of the state. This amount includes both public and private health care spending for goods and services. The health care spending does not include operation and maintenance costs, construction, or research and development.	2014	KFF, 2014
Average Health Care Spending - County	Standardized per capita medical costs using the Medicare fee-for-service population.	2018	Centers for Medicare & Medicaid Services, 2020
Median (household) Income by Age Group of Head of household	Median (household) income ($) from ACS data. These data are broken out by the householder age group or by education and are used to make the state adjustment.	2017	US Census Bureau, 2018
Median household income estimates	Income estimates for the counties of Washington based on census data.	2017	Washington Office of Financial Management, 2017
Age Bracket	Householder age groups: under 25 years old, 25 to 44 years, 45 to 64 years, and 65 years and over.	2017	US Census Bureau, 2018
Total Energy Price per Million Btu	The cost of total energy per million Btu in (USD). This accounts for primary energy (coal, natural gas, petroleum, biomass) and retail electricity.	2017	EIA, 2018
Retail Sales of Electricity to Ultimate Customers	Total revenue from sales of electricity broken out by sector (residential, commercial, industrial, transportation).	2019	EIA, 2020
Median Wage Dollar	Median hourly wage ($) by state.	2017	BLS, 2018
Add updated wage	Median hourly wage ($) by statistical area.	2019	BLS, 2020

GDP	Gross domestic product (GDP) is an economic measure for the value of output in a given area. The data are measured by 2-digit NAICS and by state.	2016	BEA, 2018
GDP - County	Updated GDP values for Washington counties segmented by 2-digit NAICS.	2019	BEA, 2020
Home Type	The classification of residential location: single-family attached house, single-family detached house, apartment in a building with 2 to 4 units, apartment in a building with 5 or more units, or mobile home.	2015	EIA, 2018

7.1.4 Residential Economic Adjustment Factor

This section covers the state and Avista economic factors used to adjust NEIs for residential programs. Residential adjustment factors are based on the economic principle of household utility maximization. These factors consider how the new technologies associated with energy programs affect a participant's economic wellbeing aside from the direct changes in energy consumption. Further detail explaining the economic theory behind residential economic factors can be found in Appendix E: Non-energy Impact Theory. Each factor discussed in Section 7.1.4.1 generates a single value for a geographic region. Section 7.1.6 describes how these geographic values are used in relation to one another.

7.1.4.1 Types of Residential Economic Adjustment Factors

Each adjustment factor will result in a single monomial represented by X_{Avista}, where "X" represents the specific economic adjustment being discussed. This holds for both the residential adjustment factors and the C&I adjustment factors in Section 7.1.5. Use of these monomials and interpretation will follow in Section 7.1.6 with an example in Section 7.1.7.

DNV created five general adjustment factors for NEIs associated with residential programs:

- Property value related adjustments
- Income and health impacts (loss of income) related adjustments
- Health impacts (avoided costs) related adjustments
- Age of home related adjustments
- Utility costs related adjustments

Property Value

State-to-State Adjustment

Most Residential NEIs impact a home's value; therefore, differences in property value serve as the key variable for adjusting most residential NEIs. These NEIs will include, but are not limited to: comfort, aesthetics, noise, and home durability and improvements.

DNV created a property value adjustment factor based on single family attached houses, detached houses, and mobile homes. The general formula consists of a factor that relates the home value to the building stock in the state, calculated for each state in the U.S.[3]

[3] Note to the reader: This equation takes a similar form for many of these NEI category calibrations. The values within the summation will end up as the sum of monomials by home type (and later by NAICS code or industry). The final output for X_{State} will be a single monomial specific to that state.

$$Property\ Value_{State} = \left[\sum \begin{pmatrix} Median\ Home \\ Value\ per \\ Square\ Foot \end{pmatrix} \times \begin{matrix} \%\ of\ Square\ Footage \\ within\ Each\ Home\ Type \end{matrix}\right]_{\substack{Non-Apartment \\ Home\ Type}}{}_{State}$$

Intrastate Adjustment

DNV then used median county rental price per square foot (Zillow Rent Index (ZRI) Summary, 2017) to develop the Avista property value adjustment. DNV used count of residential customers to weight the county level rental prices. Note that while the state-level adjustment used only non-apartment home types, the Avista adjustment used all home types, due to the data available.

$$Property\ Value_{Avista} = \left[\sum (Median\ Rental\ Price\ per\ ft^2 \times \%\ Customers)_{WA\ County}\right]_{Avista}$$

Income and Health Impacts (loss of income)

State-to-State Adjustment

This adjustment factor considers two different categories of NEIs, both adjustable by income: 1) NEIs associated with the income adjustment relate to economic development benefits, both direct and indirect, and 2) monetization of health impacts, or lost income experienced by participants due to the illness or death. Consequently, the economic adjustment factor for both categories is determined using a formula that relates the income in Avista to the income in the corresponding state from the JS. The general formula consists of a factor that accounts for the distribution of median household income by age of the head of household, calculated for each state in the U.S.

$$Income\ and\ Health\ Impacts_{State} = \left[\sum \begin{pmatrix} Median\ HH\ Income \\ by\ Age\ Group\ of \\ Head\ of\ HH \end{pmatrix} \begin{matrix} \%\ of\ Head\ of \\ \times HH\ Within\ Each \\ Age\ Bracket \end{matrix}\right]_{\substack{Age \\ Bracket}}{}_{State}$$

Intrastate Adjustment

The 2017 county household median income (Washington Office of Financial Management, 2017) was used for developing the Avista income and health impacts factor. DNV used count of residential customers to weight the county level income to a single Avista median income.

$$Income\ and\ Health\ Impacts_{Avista} = \left[\sum (Median\ Household\ Income \times \%\ Customers)_{\substack{WA \\ County}}\right]_{Avista}$$

Health Impacts (avoided costs)

State-to-State Adjustment

Other healthcare impacts are derived from the value associated with avoided healthcare costs. The monetization of these impacts is measured by the avoided costs associated with medical treatment. The formula consists of one factor that represents the average health care spending per resident. This factor is determined for both WA and the state from which the respective study in the JS was completed.

$$Health\ Impacts\ (avoided\ costs)_{State} = [Average\ Health\ Care\ Spending]_{State}$$

Intrastate Adjustment

Data used for state adjustments did not have information at the county level, so new data was identified for developing county-level factors for Washington health impacts (Medicare Geographic Variation, Public Use Files, 2018). DNV then used count of residential customers to weight the county level health costs to a single Avista health cost.

$$Health\ Impacts\ (avoided\ costs)_{Avista} = \left[\sum (Per\ Capita\ Health\ Spending \times \%\ Customers)_{WA\ County}\right]_{Avista}$$

Age of Home

State-to-State Adjustment

For NEIs related to fire damage, DNV investigated factors that are considered indicative of home fires. Of the available economic data, age of home (ACS 1 Year Detailed Tables State, 2017) was identified as the best variable corresponding with incidence of fires. Therefore, this economic adjustment factor will be used to relate the distribution of the age of a home in WA to the corresponding state from the JS. The formula consists of one factor that represents the median age of residential homes.

$$Age\ of\ Home_{State} = [Median\ Age\ of\ Home]_{State}$$

Intrastate Adjustment

To get Washington county median age of home, DNV used an updated census dataset segmented by county (ACS 5 Year Detailed Tables County, 2020). DNV then used count of residential customers to weight the county level health costs to a single Avista health cost.

$$Age\ of\ Home_{Avista} = \left[\sum (Median\ Age\ of\ Home \times \%\ Customers)_{WA\ County}\right]_{Avista}$$

Utility Cost – Residential

State-to-State Adjustment

The final residential NEI adjustment factor applies to utility NEIs, or NEIs that result from changes to utility costs. This adjustment factor can be applied to NEIs that include but are not limited to transmission and distribution savings, arrearages, and bad debt write-offs. These NEIs can be adjusted using the average utility cost per MMBtu in each state.

$$Residential\ Utility\ Costs_{State} = \frac{Total\ Residential\ Energy\ Revenue_{State}}{Total\ Residential\ Energy\ Usage\ MMBtu_{State}}$$

Intrastate Adjustment

For Avista, DNV used updated EIA information containing residential utility costs segmented by utility service territory (EIA Electricity Data, 2019). These data were then used to compare the revenue per residential energy consumption for Avista to the state total's revenue per residential customer.

$$Residential\ Utility\ Costs_{Avista} = \frac{Total\ Residential\ Energy\ Revenue_{Avista}}{Total\ Residential\ Energy\ Usage\ MMBtu_{Avista}}$$

7.1.5 C&I Economic Adjustment Factors

This section covers the state and Avista economic factors used to adjust NEIs for commercial and industrial programs. C&I adjustment factors are based on the theory of profit maximization. These factors consider how the new technologies associated with energy programs affect a participant's marginal cost or total profit. Further detail explaining the economic theory behind C&I economic factors can be found in Appendix E: Non-energy Impact Theory. Each factor discussed in Section 7.1.5.1 generates a single value for a geographic region. Section 7.1.6 describes how these geographic values are used in relation to one another.

7.1.5.1 Types of C&I Economic Adjustment Factors

As with the residential adjustment factors, each adjustment factor will result in a single monomial represented by X_{Avista}. Use of these monomials and interpretation will follow in Section 7.1.6 with an example in Section 7.1.7.

Labor Costs (wage-based)

State-to-State Adjustment

Many C&I NEIs relate to cost savings such as O&M and other labor costs. These NEIs include, but are not limited to: operation and maintenance, administrative, material handling and material movement. The adjustment factor for these NEIs represents the variation in wages across states (BLS, Occupational Employment Statistics - Wage, 2018). This factor is determined for both WA and the state from which the respective study in the JS was completed.

$$Labor\ costs\ (Wage-based)_{State} = [Median\ Hourly\ Wage]_{State}$$

Intrastate Adjustment

DNV identified county level median wage for Washington counties for all jobs covered by unemployment insurance, except for private households and federal government (Washington Employment Security Department, 2018). DNV then used count of C&I customers to weight the county level wage data to a single Avista median hourly wage.

$$Labor\ costs\ (Wage-based)_{Avista} = \left[\sum (Median\ Hourly\ Wage \times \%\ Customers)_{WA\ County}\right]_{Avista}$$

Revenue & Productivity

State-to-State Adjustment

NEIs that correspond to changes in revenue and productivity are more appropriately adjusted using a measure of output than the measure of wages. DNV used GDP to reflect the level of output in a state (BEA, 2018). NEIs associated with this adjustment factor include, but are not limited to: energy savings, durability, product quality and life, sales revenue, and output. This factor is determined for both WA and the state from which the respective study in the JS was completed.

$$Revenue\ and\ Productivity_{State} = [GDP]_{State}$$

Intrastate Adjustment

DNV further differentiates the revenue and productivity of the Avista service territory using county level per capita GDP (BEA, 2019). DNV then used count of C&I customers to weight the county level GDP to a single Avista GDP.

$$Revenue\ and\ Productivity_{Avista} = \left[\sum (Per\ Capita\ GDP \times \%\ Customers)_{WA\ County}\right]_{Avista}$$

Utility Cost – C&I

State-to-State Adjustment

The final C&I NEI adjustment factor applies to utility NEIs, or NEIs that result from changes to utility costs such as bad debt, arrearages, and hedging. Assuming average cost pricing, we use the combined average energy price for each sector (commercial and industrial) to represent the C&I cost of service.

$$C\&I\ Utility\ Costs_{State} = \left[\sum \left(\frac{Total\ C\&I\ Energy\ Revenue}{Total\ C\&I\ Energy\ Usage\ MMBtu}\right)_{Sector}\right]_{State}$$

Intrastate Adjustment

For Avista, DNV used updated EIA information (EIA Electricity Data, 2019) containing utility costs segmented by sector and utility service territory. The same process as at the state level was then applied to create a Avista specific C&I utility cost that could be compared to entire state.

$$C\&I\ Utility\ Costs_{Avista} = \left[\sum \left(\frac{Total\ C\&I\ Energy\ Revenue}{Total\ C\&I\ Energy\ Usage\ MMBtu}\right)_{Sector}\right]_{Avista}$$

7.1.6 Final Economic Adjustment Calculation

The resulting output from the above calculations created values usable in two separate ratios for each NEI category. The first set of values (state-level) provides the necessary inputs for a state index from which to compare Washington's economic environment to that of an NEI study's original jurisdiction.

$$Index_{state} = \frac{X_{WA}}{X_{Original\ Jurisdiction}}$$

The second set of values (utility-level) provides the necessary inputs for a Avista-specific index to compare against Washington as a whole. This allows the NEI study to account for diversity in the populations served throughout the state by different utility providers. This index takes the form:

$$Index_{utility} = \frac{X_{Avista}}{X_{WA}}$$

When multiplied together, the Washington values will cancel out and leave a single index with which to compare Avista's service territory to the economic conditions of the original jurisdiction. One important limitation to note is the potential for discrepancy between each Washington value. In order to create a true representation of Avista's economic standing in relation to the state as a whole, the data used to create the utility value was also used to create a new Washington value. In some cases, this was because updated data were being used, and in others it was because the original state comparison used state values instead of county or service territory values. While identified as a potential limitation, this NEI study is comparing relational differences, which are more accurately depicted when the same data used for Avista's value is also used to make a new Washington value. The resulting index is shown below:

$$Index_{Avista} = \frac{X_{WA}}{X_{Original\ Jurisdiction}} * \frac{X_{Avista}}{X_{WA}}$$

With the final index created to relate Avista's service territory to the original jurisdiction, NEIs can now be calibrated to work across jurisdictions in respect to economic conditions. This is done by multiplying the index by the NEI value to scale it from one region to another. For example, if the index was equal to 0.7 (meaning Avista's economic environment for this NEI was determined to be about 70% of the original jurisdiction), and the original NEI value was $10/unit, the calibrated NEI was $7/unit. This interpretation follows for all indexes created to calibrate NEIs with the final product taking the form:

$$NEI_{Calibrated} = Index_{Avista} \times NEI_{Uncalibrated}$$

7.1.7 Example - Residential Health Impacts Adjustment

For the purposes of providing an example, DNV chose a 2018 study from Massachusetts containing values for residential health and safety NEIs. This example will focus on a 95% efficient boiler corresponding to NEI generation of $0.88/installed measure/year.

State-to-State Adjustment

Average residential health care spending differs between Massachusetts and Washington. Using the publicly available data (KFF, 2014), the state-to-state index will be 0.75.

$$Health\ Index_{WA} = \frac{\$7{,}913\ per\ Person\ Health\ Care\ Spending_{WA}}{\$10{,}599\ per\ Person\ Health\ Care\ Spending_{MA}} = 0.75$$

Intrastate Adjustment

A different and newer dataset (Medicare Geographic Variation, Public Use Files, 2018) was then used to create the Avista and updated Washington value with which to further account for economic differences impacting residential health spending. This new dataset is segmented by county and lists a new Washington value per capita value of $8,163 standardized per capita health costs. Developing county weights from the tracked energy savings means the Avista adjustment accounts for how much of a county's population Avista serves. These weights can then be applied to the county health data (Table 10).

Table 10. Customer Weighted Residential Health Costs, 2018

County	Percent of Tracked Energy Savings (MMBtu)	Per Capita Health Costs (Dollars)	Energy Savings Weighted Health Costs (Dollars)
Adams	1.38%	$9,414.98	$129.61
Asotin	3.77%	$8,736.82	$329.51
Cowlitz	0.00%	$8,382.29	$0.36
Ferry	0.24%	$6,524.97	$15.60
Franklin	0.05%	$8,711.85	$4.55
Grant	0.18%	$7,701.36	$13.91
Island	0.04%	$6,848.45	$2.64
Kitsap	0.31%	$7,557.13	$23.15
Klickitat	0.19%	$7,334.36	$14.18
Lewis	0.27%	$7,891.11	$21.25
Lincoln	1.25%	$8,980.77	$112.42
Mason	0.39%	$7,668.88	$30.04
Pend Oreille	0.20%	$6,887.21	$13.48
Pierce	1.08%	$8,241.44	$88.68
San Juan	0.61%	$6,928.36	$42.42
Skagit	0.11%	$8,374.49	$9.35
Skamania	0.09%	$7,292.57	$6.88
Snohomish	0.12%	$8,170.77	$9.55
Spokane	77.67%	$9,043.92	$7,023.99
Stevens	5.58%	$7,466.22	$416.33
Walla Walla	0.02%	$8,479.68	$1.70
Whitman	6.46%	$8,233.42	$531.58
Avista Value	**Sum of weighted health cost**		**$8,841**

Summing the customer weighted health costs produces a rounded value of $8,841 per capita health spending in the Avista service territory. The intrastate index comparing Avista with the rest of the state is then 1.08.

$$Health\ Index_{Avista} = \frac{\$8{,}841\ per\ Person\ Health\ Care\ Spending_{Avista}}{\$8{,}163\ per\ Person\ Health\ Care\ Spending_{WA}} = 1.08$$

Adjusted NEI Value

The final Avista health impacts economic adjustment for a value that originally came from Massachusetts would then be 0.75 x 1.08, or 0.81. The economically adjusted NEI value would then be $0.71/installed measure/year.

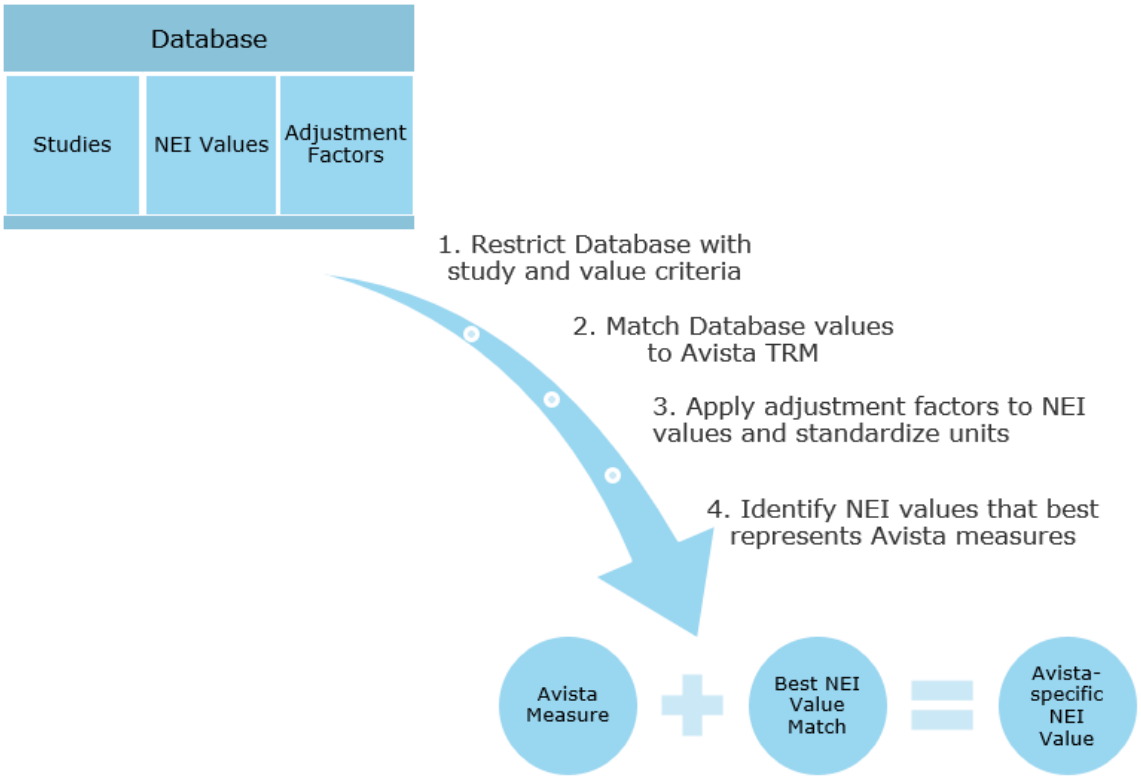
$$\$0.88/Installed\ Measure/Year_{MA} * 0.81_{Health\ Adj} = \$0.71/Installed\ Measure/Year_{Avista}$$

8 UTILITY-SPECIFIC CALCULATION AND SELECTION METHDOLOGY

DNV's NEI database contains multiple NEI values from different studies that can be applied to a single energy program measure. The goal of this analysis is to consider all options from the database, then choose the one that best represents each Avista energy program measure. This process, depicted in Figure 1, allows for a tailored NEI valuation approach with scalable specificity and confidence. For this analysis, DNV applies restrictions so NEI values are produced with a high level of specific matching accuracy and confidence in the study from which the value originates. The steps for producing these values are:

1. Restrict the Database to studies with a high degree of confidence and to values that are attributed to a specific technology (**Section 8.1**).
2. Use a standardized measure mapping to identify all possible relationships between Avista TRM and Database (**Section 8.2**).
3. Translate all potential values from their original jurisdiction to the Avista service territory, then modify with each value's associated CF and PF. Each value's unit from the original study is then converted to a standard unit (**Section 8.3**).
4. Choose the best NEI value by ranking of confidence, plausibility, and relationship of NEI value with the measure technology's energy impact (**Section 8.4**).

Figure 1. NEI Calculation and Selection Process



8.1 Database Exclusion Criteria

The first step for producing results with a high degree of confidence is to remove studies that do not meet a certain set of criteria. DNV uses three criteria to apply to the Database for producing NEI values for Avista's TRM. Note that the confidence factors (CF) and plausibility factors (PF) referenced in Section 4 and Section 5, respectively, help with this filtering but are not the only tools used. The exclusion criteria include:

1. **Accuracy of Match** – use only study NEIs where values have been identified at an end-use level specificity (e.g., HVAC, lighting, hot water) or higher (e.g., HVAC - New furnace replacement, Lighting - LED exit signs).
2. **Confidence in Study** – of all studies passing the first criteria, use only studies with CF in the top 50th percentile.
3. **Relevancy of NEI** – of all studies passing the first and second criteria, use only NEI values where the category of NEI is applicable to the measure with which it is being matched (e.g., NEI for indoor air quality is applicable to HVAC measures, but not lighting measures).

8.1.1 Accuracy of Match

DNV's NEI database includes studies ranging from very specific NEI estimates for measure types (Level 6 below), to those with broad NEI estimates referencing all aspects of a given program (Level 2 below). As detailed in Section 3.2, DNV maps measures in the NEI database to Avista's TRM using 7 LoAs. DNV places extra importance on the ability for Avista measures to match with the Database by at least the end-use level (Level 4). This idea is in line with the CF scoring Question 1: ("Is the study measure specific?"). While this question could be weighted heavier in the CF calculation to exemplify the importance of using end-use relationships, the analysis team found a restriction of the database more appropriate. Therefore, DNV considers only values in the database with the ability to match Avista measures by end-use. Table 11 provides an example of the threshold of what is and is not included according to Criterion 1 (Accuracy of Match). 23 of the 46 studies contained in the database passed Criterion 1.

Table 11. Match level Accuracy Example

Match Level Accuracy	Example	Does this pass Criteria 1?
Program Level	Study 20 reports NEI values that can be applied across an entire residential low-income program, but values are not associated with specific end-use technologies.	No
End-use Level	Study 47 reports NEI values for specific end-use technologies (water pipe insulation, showerheads, wall insulation) within a residential low-income program.	Yes

8.1.2 Confidence in Study

DNV then selects studies for which there is the most confidence. DNV chooses the best studies by selecting those in the top 50th percentile based on the assigned CF scoring. The median CF of the 23 studies to pass Criterion 1 (Accuracy of Match) was 0.66667. This further exclusion drops the number of studies to be used for the Avista valuation from 23 to 12, with Table 2 showing the CFs of the 23 studies to pass Criterion 1 and whether that study also passes Criterion 2 (Confidence in Study).

Table 12. Studies Meeting Criterion 1 and Whether they Pass Criterion 2: Confidence in Study

Confidence Factor	Study ID	Does this pass Criteria 2?

0.5	Study 0008	No
0.5	Study 0009	No
0.5	Study 0015	No
0.5	Study 0017	No
0.53333	Study 0011	No
0.53333	Study 0014	No
0.53333	Study 0016	No
0.53333	Study 0039	No
0.6	Study 0041	No
0.6	Study 0042	No
0.6	Study 0046	No
0.66667	Study 0010	Yes
0.66667	Study 0012	Yes
0.73333	Study 0004	Yes
0.73333	Study 0007	Yes
0.8	Study 0032	Yes
0.86667	Study 0002	Yes
0.86667	Study 0003	Yes
0.86667	Study 0005	Yes
0.86667	Study 0040	Yes
0.93333	Study 0047	Yes
0.93333	Study 0048	Yes
1	Study 0001	Yes

8.1.3 Relevancy

The last step for restricting the database values is to classify potential values as relevant or not relevant. The Database contains studies with NEI categories that might not make sense for the specific, matched Avista measures. DNV created a matrix to assign each level 4 match and NEI category combination a relevancy flag. Table 13 shows an example of where relevancy varies by end-use, but these designations can also vary by fuel, sector, program, and whether a measure is custom or prescriptive. Values stemming from combinations that are deemed not relevant are removed from the database.

Table 13. Example of Relevancy of NEI by End-Use

Level 4 Measure Categorization	NEI Category		
	O&M - Participant - Residential	Indoor Air Quality - Participant - Residential	Lighting Quality and Lifetime - Participant - Residential
Gas, Residential, Retrofit, Prescriptive, Hot Water	Relevant	Relevant	Not Relevant
Gas, Residential, Retrofit, Prescriptive, HVAC	Relevant	Relevant	Not Relevant
Electric, Residential, Retrofit, Prescriptive, Lighting	Relevant	Not Relevant	Relevant

8.2 Match Database to Avista TRM

After paring down the Database to relevant studies and NEI categories, DNV matches the measures in the Database to the Avista TRM using the standard set of Level 0 through Level 6 match codes. As discussed in Section 3.2, DNV standardizes and assigns the same LoAs listed above (Section 8.1.1) to each Avista measure. All studies in the Database had an original (observed) LoAs, but they varied in terminology from study to study. As such, these standardized codes assigned to both the Avista TRM and the Database provide matches between the two at each LoAs. A Linear LED measure is broken out into the LoAs as follows:

Table 14 - Example of Standard Level of Aggregation for Avista Measures

Standard Levels of Aggregation	Example of Standard Levels of Aggregation Details
Detailed Measure Level (Level 6)	Linear LED
Broad Measure Level (Level 5)	LED
End-Use Level (Level 4)	Lighting
Prescriptive/Custom (Level 3)	Prescriptive
Program Level (Level 2)	Retrofit
Sector (Level 1)	C&I
Fuel (Level 0)	Electricity

The following table illustrates how these Standard LoAs come together to form the matching IDs.

Table 15. Example of Concatenated Matching IDs

Match Level ID	Concatenated Matching ID
6	Electricity_C&I_Retrofit_Prescriptive_Lighting _LED_Linear LED
5	Electricity_C&I_Retrofit_Prescriptive_Lighting _LED

4	Electricity_C&I_Retrofit_Prescriptive_Lighting
3	Electricity_C&I_Retrofit_Prescriptive
2	Electricity_C&I_Retrofit

A match occurs when the concatenated match codes exist in both the Avista TRM and in one or more studies in the Database. First, all matches are identified that happen at a Level 6. These observations are kept and designated as a Level 6 match. Next, all matches are identified that happen at a Level 5, but which did not happen at a Level 6. These matches are designated as a Level 5 match. DNV iterated this process to Level 4 (end-use) for Avista, meaning a study value has to match with the Avista measure at least by end-use for the value to be considered.

Using the measure from Table 14, Figure 2 shows an example where 2 values are identified as potential matches. One is a perfect match (designated as Level 6 match), while the other only matches to broad measure level (LED) but not to the detailed measure level (Linear LED), thus designating it a Level 5. There can be many potential matches in this instance with values coming from multiple studies. All options will be considered, but only the best fit based on CF and PF is selected as representing that Avista measure (Section 8.4).

Figure 2. Example of 2 Potential Matches

8.3 Avista-Specific NEI Calculation

After the Database is restricted and all potential matches with Avista's TRM are identified, values are standardized so they can be compared and ultimately applied. This standardization is done in 2 steps:

1. Apply economic adjustment factors, CF, and PF
2. Standardize units

8.3.1 Apply Adjustment Factors, CF, PF

As discussed in Section 7, the economic adjustment factor gets applied to the original NEI value to account for socio-economic differences between where the original study took place and Avista's service territory. Then, this economically adjusted NEI value is multiplied by the CF and PF to derate final values, which helps account for unknowns in the original study or the strength of the NEI applicability.

Equation 8: Create Avista-Specific NEI

$$NEI\ Value_{\ Original\ Juristiction} * CF * PF * Economic\ Adjustment_{\ Avista} = NEI\ Value_{\ Avista}$$

NEI values can now be applied to Avista's service territory, but not all values are in the same unit. Having the same unit can be important for choosing a top value in the case where there are multiple values from which to choose and for applying values consistently across the TRM.

8.3.2 Standardize Units

This analysis uses $/kWh or $/Therm as the final unit for reporting NEI values. After restricting the database to studies with a high degree of confidence (Section 8.1.2), many of the values are already in $/kWh or $/Therm and are ready to be applied after Equation 8.

For NEI values that are not already in $/Therm or $/kWh, this analysis uses a combination of tracking data and information from the TRM to convert. As an example, consider a value with the original value reported in $/project/lifetime. Information necessary for making this conversion are the measure lifetime, the measure energy impact, and the number of measures per project. Synthesis of these variables is shown below:

- **Measure Lifetime –** This variable is taken from the TRM; however, it is not available for every measure. Measures without a stated lifetime will not consider any NEI values where the original value is reported by lifetime.
- **Energy Impact –** This value is derived from the historic tracking data as the average reported energy impact by measure type. Measures without an observed energy impact in the tracking will not consider any NEI values for which the original value was reported in anything except $/kWh or $/Therm.
- **Number of Measures per Project –** For units needing conversion from per building, per project, per participant, etc., ratios are developed from the tracking data to approximate what this rate might be. These ratios are developed with respect to match level and sector, so for the example of $/project/lifetime for residential there are 3 ratios that can be applied depending on match level:
    - Level 6 Ratio – Average of all tracking data for the number of identical level 6 measures installed for a single project.
    - Level 5 Ratio – Average of all tracking data for the number of identical level 5 measures installed for a single project.
    - Level 4 Ratio – Average of all tracking data for the number of identical level 4 measures installed for a single project.

The final unit conversion for a residential NEI that's originally reported as $/project/lifetime and is matching to a Avista measure as a Level 5 (L5) is then:

Equation 9: Example of unit conversion for Avista-specific NEI

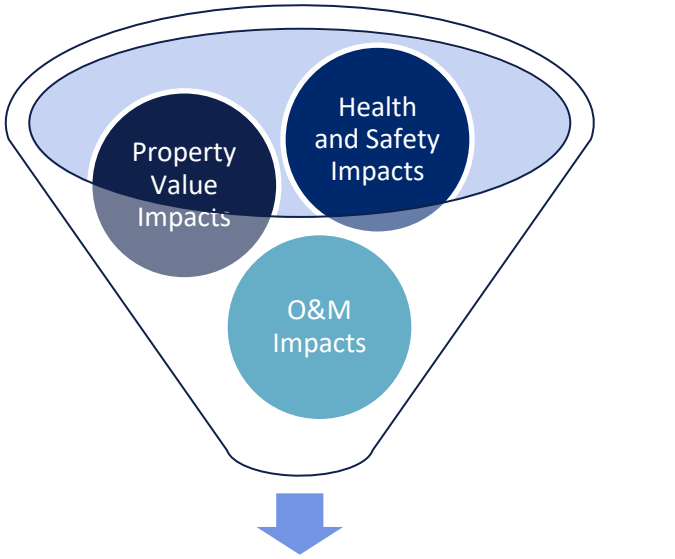
$$\$NEI\ per\ energy\ impact_{Avista} = \frac{\$\ NEI\ per\ project\ per\ lifetime}{Lifetime\ of\ measure_{Avista}} * \frac{1}{Average\ \#\ of\ L5\ measures\ per\ project} * \frac{1}{Energy\ impact\ per\ measure_{Avista}}$$

For measures that have an observed impact on both electricity and gas usage, this conversion includes the Mmbtu ratio of energy-specific impact to create a $/kWh and $/Therm value that avoids any double counting.

8.4 Identifying Best NEI Estimate from all Potential Matches

The result of Sections 8.1, 8.2, and 8.3 is a list of standardized NEI values linking to specific studies that can be applied to the correspondingly mapped Avista measure. The database contains studies with different areas of focus, meaning a single Avista measure can end up with multiple NEI categories all working toward an inclusive NEI total (Figure 3).

Figure 3. Amalgamation of NEI Categories into Measure's Total NEI



Each combination of Avista measure and NEI category can have multiple studies competing for which provides the best NEI value estimate. Because there can be only one study value associated with each NEI-measure combination, DNV chooses the best based on the product of the CF and PF, then in rare cases of a tie, the most conservative value estimate takes precedent (Section 8.4.1).

After identifying the study value that best estimates each possible measure-NEI combination, results are subject to engineering review. This review provides a more in-depth analysis of the relevancy of measure-NEI combinations than what was done in Section 8.1.3 as well as reviewing the magnitude and sign (+/-) of NEI estimates (Section 8.4.2).

8.4.1 Assignment of Best Value

Assignment of the best value to represent a unique Avista measure-NEI combination depends first on the Combined Score (CF × PF). In the rare event of a tie where values from two studies have the same Combined Score, the NEI ratio ($NEI: $Energy Impact) is used to choose the most conservative estimate.

Combined Score

The Combined Score is created by multiplying the CF (ranking of study) by the PF (ranking of match level, age of study, and end-use energy consumption changes). This Combined Score identifies the NEI value estimate with the best combination of study confidence and accuracy of study-to-Avista measure similarity.

Table 16 shows an example where Avista measure "LTGO: Lamp - TLED - 2 3 or 4 foot" corresponds with the measure mapping detailed in Section 8.2. This designation matches with 3 potential value estimates originating from 3 separate studies for the NEI category Operations and Maintenance (O&M). The table shows all potential studies match at a Level 4, meaning the Database does not currently have O&M values specific to LED lighting for measure categorizations that otherwise match at least at a Level 4 (Electricity C&I Retrofit Prescriptive Lighting). In this instance, the value from Study 01 is chosen because it has the highest combined score.

Table 16. Choosing Best Match by Combined Score to Represent O&M NEI Value for Avista Measure - LTGO: Lamp - TLED - 2 3 or 4 foot

Measure Mapping	Study ID	NEI Value	Match Level	Combined Score
Electricity, C&I, Retrofit, Prescriptive, Lighting, LED, Linear LED	01	$0.022/kWh	4	0.65
	02	$0.012/kWh	4	0.53
	05	$0.007/kWh	4	0.60

NEI Ratio

It is uncommon for ties to occur between potential values when ranking by combined score. However, when they do, the analysis team selects the NEI value with the most conservative estimate. This metric is developed as an NEI ratio relating the value of the NEI to the value of energy. This ratio is calculated by taking the absolute value of the NEI and dividing by the absolute value of the average Avista consumer price for the energy type in dollars:

Equation 10: NEI Ratio

$$NEI\ Ratio = \frac{|\$NEI\ per\ energy\ unit|}{|Average\ Avista\ consumer\ price\ of\ energy\ per\ unit|}$$

The average Avista consumer price of energy per unit represents the monetary impact of the energy savings that will be felt by installing a particular measure. That means the NEI ratio is a comparison of the (monetized) non-energy impact with the (monetized) energy impact. The analysis team calculates average costs using combined residential and C&I energy usage and come out to $0.88/Therm for natural gas (Utility Natural Gas Sales, 2020) and $0.09/kWh for electricity (Utility Electricity Sales, 2020).

Table 17 shows an example where two studies compete to provide the NEI value for Bad Debt Write-Offs associated with the Avista Measure “Duct Sealing: single family; electric.” Both study values have the same combined score, so in this case the one from Study 47 is chosen to represent the Avista measure because it has the lower NEI ratio.

Table 17. Choosing Best Match by NEI Ratio when Combined Score are Tied

Measure Mapping	Study ID	NEI Value	Match Level	Combined Score	NEI Ratio
Electricity, Residential, Low-Income, Prescriptive, HVAC	47	$0.004/kWh	4	0.79	0.04
	48	$0.050/kWh	4	0.79	0.60

8.4.2 Review of Results

The best study values to represent each NEI-measure combination as identified in Section 8.4.1 are output and reviewed. During the review process, a senior engineer considers the following questions for each NEI value estimate:

1. *Do all potential NEI-measure combinations make sense at the most detailed level*? A more detailed relevancy than that discussed in Section 8.1.3 is completed for each NEI-Measure combination. This catches nuances at the end-use level such as a situation where NEI generation from reduced incidence of fires makes sense for water heaters

(Level 4 = Hot Water), but not for aerators (Level 4 = Hot Water). The associated NEI values are removed if an NEI-measure combination is flagged by a senior engineer.

2. *Do value estimates for all potential NEI-measure combinations have the correct sign?* During the engineering review, NEI value estimates are reviewed with respect to if they are a negative or positive. If the sign seems incorrect (e.g., negative for LED O&M), the source study for this value is investigated along with the match-level and the specific measure. It could be the case that the value matched at a Level 4, but when considering the actual Avista measure the sign is incorrect. If this is the case, the analysis team identifies if there is a next best estimated NEI value not chosen in Section 8.4.1 with the correct unit, then applies it for review with the rest of the top values with respect to question 3.

3. *Do chosen NEI value estimates have the correct magnitude for what can be expected?* During the engineering review, chosen NEI value estimates are reviewed if the NEI ratio described in Section 8.4.1 is greater than 1. DNV uses this threshold because it identifies scenarios where the NEIs are the main impact from the measure's implementation, and energy is the secondary impact. While it is possible for a measure to generate more value from quantifiable NEIs than from energy impacts, it is not common. Usually, if an NEI ratio is greater than 1, it is the result of uncertainty in the unit conversion when the original study does not report values in $/kWh or $/Therm. If this is the case, the analysis team reviews the NEI estimates and assesses if it is defensible for the NEI ratio to be greater than 1. If not, an alternative source for the NEI is used.

9 FINAL RESULTS

The final output from this process is a list of Avista measures that have reasonable, defensible, and quantifiable NEIs. Each of these measures can be generating value from multiple NEI categories, with the value of each category linked to a specific study.

9.1 Avista-specific NEI Example

This section will walk through an example calculation to illustrate how Equation 8 mentioned above (and restated below) is used to generate a Avista-specific NEI value. The example will consider how the NEI quantifying changes in bad debt write-offs is calculated for a *low-income window replacement* measure matching at a Level 5 to the Database. The original study for this NEI is the *Washington Low Income Weatherization Program Evaluation, Measurement & Verification Report (2020)* referred to as Study 48.

$$NEI\ Value_{\ Original\ Juristiction} * CF * PF * Economic\ Adjustment_{\ Avista} = NEI\ Value_{\ Avista}$$

1. **Start with the unadjusted NEI value from the original study**. For this example, the starting value from Study 48 is $0.0295 per kWh from the Database. This value was calculated by dividing the 2016-2017 total program non-energy benefit for economic impact in Study 48's Table 6-5 by the net verified kWh savings in Study 48's Table 6-3.

$$NEI\ Value_{\ Original\ Juristiction} = \frac{\$10{,}024}{339{,}561\ kWh} = \$0.03/kWh$$

2. **Multiply the unadjusted NEI value by the CF and PF**. The starting NEI is first adjusted to 2021 dollars using the consumer price index (Consumer Price Index, 2020). This adjustment happens so values reflect current monetary impacts and better align with data used for economic adjustment factors. This value is then adjusted by its corresponding assigned CF and PF from the Database to obtain the Combined Score. The CF for Study 48 is 0.933, and the PF for a Level 5 match assuming a 50% minimum floor is 0.846. These values are obtained from the Database.[4]

$$NEI\ Value_{\ Original\ Juristiction\ 2018\ \$} * CF * PF = Adjusted\ NEI\ Value$$

$$\frac{\$0.03}{kWh} * 0.933 * 0.846 = \frac{\$0.024}{kWh} = Adjusted\ NEI\ Value$$

3. **Multiply by the Economic Adjustment Factor**. The economic adjustment factor used for the NEI category *Bad Debt Write-offs – Utility – Residential* is the residential utility cost factor. Since this was a Washington study, the state-to-state adjustment factor is 1. If the original study was completed in a different state, then a ratio would be used to adjust the value from the original state to Washington state. For the intrastate adjustment, DNV calculated an Avista utility cost of $8,997 per customer. For all of Washington, this value is $8,820.

$$Adjusted\ NEI\ Value * Economic\ Adjustment_{\ All\ Washington} * Economic\ Adjustment_{\ Avista} = NEI\ Value_{\ Avista}$$

$$\frac{\$0.024}{kWh} * 1 * \frac{\$9{,}232}{\$8{,}820} = \frac{\$0.025}{kWh}$$

Thus, the final *Bad Debt Write-offs – Utility – Residential* NEI value for Avista for this low-income window measure is $0.025 per kWh.

[4] Study 48 scored 14 out of 15 possible, so the CF for this would be 93% (14/15=.93). The scoring was based on the 5 CF questions previously detailed in Section 4. For the PF, the study scored a 4 for Age, 2 for UES change, and 5 for Match score. This would result in the study receiving a score of 11 out of a possible 13, so the PF for this would be 85% (11/13=.846).

9.2 Total NEI Value Example

Table 18 shows an example of three Avista measures and the associated NEI values. As described in the beginning of Section 8.4, these NEI categories can be added together to estimate the total NEI of a specific measure.

Table 18. Example of Final Results

Avista Measure	Total NEI Value	Health and Safety	Thermal Comfort	Bad Debt Write Offs	Other NEI Categories
Windows, Low-Income Retrofit Program	$0.46/kWh	$0.32/kWh	$0.08/kWh	$0.03/kWh	$0.03/kWh
Air source Heat Pump, Retrofit Program	$0.032/kWh	$0.000009/kWh	$0.0003/kWh	-	$0.03/kWh
Duct Sealing, Low-Income Retrofit Program	$0.29/Therm	$0.023/Therm	$0.006/Therm	-	$0.261/Therm
Heat Pump Water Heater, Retrofit Program	$0.002/kWh	$0.00001/kWh	-	-	$0.00199/kWh

Avista should use the results of this analysis to calculate the planned or actual NEI value generated by a program, measure, portfolio, etc. This segmentation into different categories also provides estimates for value generation for perspective program participants. In a marketing aspect, the O&M value can be factored into benefit-cost-ratios when participants are considering whether to undergo certain energy-use upgrades.

10 GAP ANALYSIS APPROACH

The purpose of the gap analysis is to classify the measures and initiatives that currently lack NEIs and identify areas in which follow-up research is worthwhile to confirm or quantify NEIs occurring within Avista territory. The gap analysis includes the following activities:

- Identify energy-efficiency measures that do not have NEIs
- Identify gaps where no NEI is matched to the TRM but NEIs exist in the published literature
- Identify NEIs that are heavily discounted
- Inventory NEI types that have not been previously studied
- Identify initial priority opportunities for future research based on the potential value gained compared to the cost to conduct the research.

10.1 Measures Without NEI Values

Of the 1,767 measures in the final TRM, 48% (n=843) of them were matched to NEI values in the Database. DNV began the gap analysis review by cataloguing the 924 unmapped measures into groups to determine whether there are any similarities to measures mapped to NEIs. This was done by sorting measures by match code irrespectively of program type in the TRM. We then flagged any measure without a mapped NEI that was “similar” to a measure mapped to an NEI. 15 unmapped measures for which a similar measure with an NEI was identified. Avista could potentially calculate NEIs for these 15 based on the differences between the unmapped measure and the similar mapped measure(s) identified.

Table 19 shows the 15 unmapped measures for which a similar measure with an NEI was identified. Avista could potentially calculate NEIs for these 15 based on the differences between the unmapped measure and the similar mapped measure(s) identified.

Table 19. NEI Values Exist for a Similar Measure

Sector	Fuel	Measure Group	Measures without NEI Values	Measures with NEI Values
Residential	Gas	Air Sealing	1	2
	Gas	Gas Furnace	1	2
	Gas	High Efficiency Windows	5	1
	Gas	Insulation	8	3
Total			**15**	**8**

In addition, two (2) of the unmapped measures did not receive an NEI value from the Database despite being matched to an NEI value; this was because calculating the NEI requires a unit conversion in order to properly allocate the NEI value to the Avista per unit measure savings. NEI values that are not already in $/Therm or $/kWh require a unit conversion. This conversion could not be performed for measures missing a mean savings value in the tracking data and/or an expected useful lifetime estimate. Unit conversation gaps can often be filled by use of assumptions that are developed based on program information or measure characteristics. The resulting NEIs are often then estimates until sufficient program activity occurs to calculate a more confident per unit NEI value.

10.2 Heavily Discounted NEIs

As discussed in Section 8.3.2, values in the Database must be standardized so they can be compared and accurately applied. This standardization is done in two steps:

1. Apply economic adjustment factors, CF, and PF
2. Standardize units

DNV flagged high-value NEIs that were discounted to less than 60% of their original value as a result of the first standardization step. This process identified 39 measures in the Avista TRM as heavily discounted NEIs. The heavily discounted NEIs come from the following studies in Table 20:

Table 20. Studies with Heavily Discounted NEIs

Study ID	Title	State	Year
Study0002	Final Report – Commercial and Industrial Non-Energy Impacts Study	MA	2012
Study0004	Non-Energy Impact Framework Study Report	MA	2018

There are a variety of reasons why the NEI values from a study may be discounted. For example, in Study0004 the original values were discounted in part because the original study only incorporated economic factors based on theory (e.g., property value based on the Hedonic Price theory), although they did not clearly identify the factors in the study. Section 5 details how the original NEI values were further discounted to account for the age of the study, changes in energy consumption over time, and how well the measures in the study matches to those in Avista's TRM. Furthermore, Section 7 also explains how the original NEI values were further discounted to account for socio-economic differences between where the original study took place (MA) and Avista's service territory. As shown in Table 20 above, the heavily discounted NEI values are taken from studies that originally took place in the Northeast region of the United States.

10.3 NEIs Not Previously Studied

WAC 480-100-640 (2)(a)(i) requires that Avista demonstrate progress towards ensuring all customers benefit from the transition to clean energy through,

> "the equitable distribution of energy and nonenergy benefits and reductions of burdens to vulnerable populations and highly impacted communities; long-term and short-term public health and environmental benefits and reductions of costs and risks; and energy security and resiliency."

DNV used this legislative requirement as a guide for our review. The energy security and resiliency benefit identified in the CETA legislation is the only NEI type for which there are no estimates available in the Database. Possible research areas to address this gap include,

- Property durability and resilience to climate change impacts
- Customer-specific outage costs and value of uninterrupted service

11 FRAMEWORK FOR FUTURE RESEARCH

The team developed a framework for prioritizing NEI research. This section describes the framework DNV created and the results of gap analysis.

11.1 Prioritization Criteria and Assignment of Levels of Priority

The prioritization framework is based on scoring two criteria: level of effort and value. Table 21 summarizes the four criteria and the associated scoring. Each criterion is discussed in more detail in the sections that follow.

Table 21. Framework Prioritization Scoring

Criterion	Priority Score (higher score = higher priority)		
	1	2	3
Value of NEI Research	Low value study. Meets 1 Utility Priority criterion, but NEI values already exist for measure group; or meets 0 Utility Priority criteria.	Moderate value, meets 1 Utility Priority criterion and no NEI values exist for measure group; or meets 2-3 Utility Priority criteria, but NEI values exist for measure group.	High value study. No NEI values for measure group and 2-3 Utility Priority criteria met.
Level of Effort	High level of effort, might require additional primary research	Moderate level of effort, further secondary research is likely to produce NEI values	Low level of effort, missing values likely easily accessible in regional databases (RTF, 2021 Power Plan, NEEA)
Utility Priority	Meets 1 of these criteria: 1. NEIs applicable to measure group with low cost-effectiveness; or, 2. CETA benefit categories, or 3. High install measure group	Meets 2 of the criteria	Meets all 3 of the criteria

11.1.1 Value of NEI Research

The “Value of NEI Research” criterion assigns higher priority to studies that will provide NEIs to address identified gaps for measures within initiatives and measure groups, and lower priority to studies for which the targeted group of initiatives and measures has existing NEIs. The Value of NEI Research criterion also depends on three Utility Priority criteria that account for the specific needs of Avista and the legislative requirements that a gap study should meet:

- Satisfies any requirements mandated by the CETA legislation—benefits low income households, has nonenergy benefits related to public health, energy security, or the environment,
- Top measure in the PY2021 projected program savings; and
- Had a TRC benefit-cost ratio of less than 1.2, but more than 0.00 in Avista’s 2021 program plan

- **High value:** A measure would be scored as high value if it does not have NEI values assigned it. A high value gap would also meet at least 2 of the Utility Priority criteria, as it is important to ensure the gaps being filled will meet the needs of Avista and the legislative requirements.
- **Moderate value:** Filling an NEI gap for a measure group would be considered of moderate value if it either of the following conditions are met:
    - No NEI values exist, but it would meet 1 Utility Priority criterion
    - NEI values do exist, but it would meet 2 to 3 Utility Priority criteria
- **Low value:** A measure would be score as low value if it already has NEI values associated with it or if filling the gap would not meet any of the Utility Priority criterion. These gaps would be assigned the lowest priority.

There is the highest value in filling gaps for measure groups that do not currently have NEI values associated with them. Because there is such a large gap, any secondary research into this NEI category would lead to better understanding these gaps and perhaps even conservative estimates that can be applied at a broad range of programs and end-uses. There is still moderate value in filling gaps for measure groups that have incomplete NEI values, if the measure meets multiple Utility Priority criteria. Further research into these NEI categories should be more focused on specific areas, with existing Database studies providing background on what to expect.

11.1.2 Level of Effort

The “Level of Effort” criterion assigns higher priority to research that can be completed with a lower level of effort, and thus faster and at a lower cost. Level of effort is an important planning and fiscal management metric to consider. DNV completed preliminary cost estimate ranges for the proposed studies, basing estimates on the number and types of gaps identified for the target NEIs and the type of research proposed to achieve study objectives.

- **High effort:** In order to fill the identified NEI gap, additional primary research could be required to generate a value estimate. For example, measures that did not match with the jurisdictional scan could require a new primary research study if there is no available NEI study applicable to those measures.
- **Medium effort:** All NEI gaps not clearly in the high effort or low effort category.
- **Low effort:** The NEI gap is due to a unit conversion issue, which means the bridge between Avista’s measure and DNV’s program exists but there is not enough information with regards to installed energy savings or installation lifetime to do the conversion. This information can be identified or approximated using similar measures, engineering review, or with the addition of supplemental data.

Measures with missing measure lifetime or observed energy impact values that are easily accessible in regional data sources such as the Regional Technical Forum (RTF) or 2021 Power Plan) were assumed to require the least amount of effort to address.

11.2 Framework output

DNV added the NEI gap’s value and effort scores together to calculate the final score for any NEI gap under consideration. The higher the score, the higher priority for future research. The highest priority gaps are easy and valuable to fill. The companion excel sheet has the full break down of each measure and the priority criteria assigned. The highest possible

score for an NEI gap is a 6, which represents a low effort, high value gap. While none of the NEI gaps identified in this analysis scored as a 6, several received a 5. Table 22 shows the top priorities based strictly on our scoring framework.

Table 22. Prioritization of Proposed Future NEI Studies

Total Score	Sector	Measure Group	Measure	Recommended Gap Study
5	Residential	Air Sealing	Insulated Door_R2.5 - R5_HZ2_Zonal (Energy Star Rated or Insulated R5)	Residential Weatherization
5	Residential	ELV Thermostat	Line Voltage Communicating Thermostat	Residential ELV Thermostat
5	Residential	ELV Thermostat	Line Voltage Thermostat	Residential ELV Thermostat
5	Residential	Gas Furnace	High Efficiency Wall Furnace (AFUE 90%)	None
5	Residential	Heat Pump Water Heater	Tier2-3 HPWH	Residential Heat Pump Water Heater
5	Residential	High Efficiency Windows	G Windows Dual Pane <0.30 U-value	Residential Weatherization
5	Residential	High Efficiency Windows	G Windows Single Pane <0.30 U-value	Residential Weatherization
5	Residential	High Efficiency Windows	Low E Storm Window	Residential Weatherization
5	Residential	High Efficiency Windows	NG Storm Windows	Residential Weatherization
5	Residential	High Efficiency Windows	Windows	Residential Weatherization
5	Residential	Insulation	G Attic Insulation	Residential Weatherization
5	Residential	Insulation	G Wall Insulation	Residential Weatherization
4	Commercial	Commercial Oven	Efficient convection oven full size	None
4	Commercial	Compressed Air	Compressed Air	None
4	Commercial	Food Cabinet	Efficient hot food holding cabinet, Double Size	None
4	Residential	High Efficiency Mobile Homes	Energy Star Homes - Manufactured, Electric, Dual Fuel	None
4	Residential	Insulation	Attic Insulation_R0 - R38_HZ2_Zonal	Residential Weatherization
4	Residential	Insulation	Attic Insulation_R0 - R49_HZ2_Zonal	Residential Weatherization
4	Residential	Insulation	Floor Insulation_R0 - R19_HZ2_Zonal	Residential Weatherization
4	Residential	Insulation	Floor Insulation_R0 - R30_HZ2_Zonal	Residential Weatherization
4	Residential	Insulation	G Floor Insulation	Residential Weatherization
4	Residential	Insulation	Wall Insulation_R0 - R11_HZ2_Zonal	Residential Weatherization

One additional gap that was not evaluated in this framework was the Economic Development NEI that was originally transferred from the following report that was prepared for Pacific Power by ADM: Washington Low Income Weatherization Program Evaluation, Measurement &Verification Report 2016-2017 (2020). This study met the confidence threshold used in the valuation process, although the Economic Development NEI was excluded from the final results after meeting with ADM and confirming we would need to calculate a per-kWh economic impact using lifetime savings before applying this NEI to Avista's measures.

11.3 Avista-Specific Gap Analysis Example

This section walks through an example that illustrates how DNV applied the gap analysis framework discussed in Section 11 to Avista-specific measures. In this example, we focus on the "High Efficiency Wall Furnace (AFUE 90%)" measure in Avista's Gas Residential HVAC program.

First, DNV assessed the NEI gaps applicable to the measure in order to determine the 'Level of Effort' that filling the gaps would require:

- The measure does not have a mapped NEI value, but it is similar to other measures that mapped to an NEI value; and
- This specific measure was not implemented recently, preventing DNV from having the necessary information to calculate an NEI value.
- Based on the Framework Prioritization Scoring in Table 21, this measure would receive a score of 3 for the Level of Effort criterion. Since similar measures exist that were installed and have calculated NEIs, the level of effort required to find a proxy value for the missing information required is low.

Next, the 'Value of NEI Research' is determined by looking at the 'Utility Priority' criteria and whether NEI values already exist for the measure:

- This measure met the following 1 out of 3 Utility Priority criteria:
    - The measure has 'Health and Safety – Participant' benefits that are applicable to the CETA legislation.
- No NEI values are mapped to the measure.
- Based on the Framework Prioritization scoring in Table 21, this measure would receive a score of 2 for the Value of NEI Research criterion. The value of filling this NEI gap is moderate.

Lastly, DNV calculated the final priority score by adding together the level of effort score (3) plus the Value of NEI Research score (2), resulting in a NEI Study Priority score of 5 — filling its NEI gaps would be low effort and moderate value.

11.4 Prioritization of Research

DNV identified two studies that could quantify NEIs in all but one of the CETA benefit categories for 45 high priority measures. Table 5 summarizes each study and the NEIs addressed.

Table 23. Recommended Gap Studies and NEIs Addressed

Recommended Gap Study	Measure Group	# of Measures with Priority Gaps	# of Measures with Any Gaps	CETA-Benefits Addressed	NEI Values Addressed by Research											
					CETA-NEIs		Additional NEIs									
					Avoided pollution - Societal	Health and safety - Participant	Fires/insurance damage - Participant	Productivity - Participant	Thermal Comfort - Participant	Ease of Selling or Leasing - Participant	Noise - Participant	O&M - Participant	Other - Participant	Other Impacts - Utility	Bad Debt Write-offs - Utility	Calls to utility - Utility
Residential ELV Thermostat	ELV Thermostat	2	2	Public Health, Environmental	X				X						X	X
Residential Weatherization	Air Sealing	1	3	Low Income Households, Public Health, Environmental	X	X	X		X		X		X	X	X	X
Residential Weatherization	High Efficiency Windows	5	7	Public Health		X			X		X			X	X	X
Residential Weatherization	Insulation	2	8	Public Health, Environmental	X	X			X		X	X		X	X	X
Residential Heat Pump Water Heater	Heat Pump Water Heater	1	2	Low Income Households, Public Health, Environmental	X	X	X		X	X		X			X	X

Study 1: Residential Weatherization

DNV proposes that a residential weatherization study should be completed first, due to the significant existing gap in available NEI information regarding these measures. Conducting research to address the NEI gaps in the weatherization measures scoring high in the prioritization framework would address the following CETA benefit requirements:

- Public health—Avoided pollution
- Environment—Avoided pollution
- Reduction of burdens to vulnerable populations—Low income programs

DNV recommends a residential weatherization study that encompasses the Air Sealing, High Efficiency Windows, and Insulation measure groups due to the overlap in research that would be required to address the gaps. This study could potentially provide NEI values for 14 measures for which NEI values currently do not exist. This research would also touch on 4 measures in low income programs that are receiving heavily discounted NEI values. The high priority NEI gaps are in gas measures in Avista's Multifamily Weatherization, Shell, and HVAC programs. These measures did not receive any NEI values and stand out as top energy savers in Avista's PY2021 Plan and/or have low cost-effectiveness that would increase with the addition of non-energy benefits. Cross-program or cross-measure proxies may be used where applicable if no further studies can be found to fill the NEI gaps.

Study 2: Residential ELV Thermostat

Another study we recommend pursuing is a residential electronic line voltage thermostat non-energy impacts study. Conducting research to address the NEI gaps in the line voltage thermostat measures scoring high in the prioritization framework would address the following CETA benefit requirements:

- Public health—Avoided pollution, health & safety
- Environment—Avoided pollution

This study would address both the communicating and non-communicating ELV thermostats in Avista's Multifamily Weatherization program. Both measures are currently receiving partial NEI values due to a unit conversion gap. Further research to provide these measures with all of the NEI values they were matched to in the jurisdictional scan would be low effort and of moderate value to Avista.

Study 3: Low-Income Heat Pump Water Heater

Another small low effort, moderate value study we recommend pursuing is a low-income heat pump water heater non-energy impacts study. Conducting research to address the NEI gap in the low-income heat pump water heater measure would address the following CETA benefit requirements:

- Public health—Avoided pollution, health & safety
- Environment—Avoided pollution
- Reduction of burdens to vulnerable populations—Low income programs

This study would address the unit conversion gap in the Tier 2-3 Heat Pump Water Heater measure in Avista's Low-Income portfolio. The measure is missing an observed savings value that is required to calculate some of the NEI values matched to the measure in the jurisdictional scan.

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13 APPENDICES

13.1 Appendix A: NEI Studies List

Table 24 below shows the list of studies in the Database, including the Study ID, study title, jurisdiction covered in the study, and the published year. DNV does not change the Study ID once the study enters the database. DNV does remove studies from the database over time so some Study IDs are missing from this list (ex. Study 26 has been removed).

Table 24. List of Studies in the Database

Study_ID	Title	State	Year
Study0001	AEP Ohio Non-Energy Impact - Final Report	OH	2018
Study0002	Final Report – Commercial and Industrial Non-Energy Impacts Study	MA	2012
Study0003	C&I New Construction NEI Stage 2 Final Report	MA	2016
Study0004	Non-Energy Impact Framework Study Report	MA	2018
Study0005	Non-Energy Impacts (NEIs) Final Report	MA	2018
Study0006	Non-energy Benefits to Implementing Partners from the Wisconsin Focus on Energy Program: Final Report	WI	2003
Study0007	Non-Energy Impacts (NEI) Evaluation Final Report	NY	2006
Study0008	Determining the Full Value of Industrial Efficiency Programs	WA	1999
Study0009	Ancillary savings and production benefits in the evaluation of industrial energy efficiency measures	CA	2005
Study0010	Capturing the Multiple Benefits of Energy Efficiency	USA	2014
Study0011	Productivity benefits of industrial energy efficiency measures	USA	2001
Study0012	Energy efficiency and carbon dioxide emissions reduction opportunities in the U.S. iron and steel sector	USA	1999
Study0013	Non-Electric Benefits from the Custom Projects Program: A look at the effects of custom projects in Massachusetts	MA	2007
Study0014	Exploring the Application of Conjoint Analysis for Estimating the Value of Non-Energy Impacts	USA	2007
Study0015	C&I Prescriptive Non-Electric Benefits	USA	2003
Study0016	Multiple Benefits of Business Sector Energy Efficiency: A survey of Existing and Potential measures	USA	2015
Study0017	Energy Conservation Also Yields: Capital, Operations, Recognition and Environmental Benefits	USA	2012
Study0019	An Evaluation of the Energy and Non-energy impacts of VT's Weatherization Assistance Program, for VT State Office Of Economic Opportunity	VT	1999
Study0020	Low Income Public Purpose Test (LIPPT 2000)	CA	2000
Study0021	Washington Low-income Weatherization Program, for Pacific Power	WA	2007
Study0022	Low-income Arrearage Study for PacifiCorp	UT	2007
Study0023	2004-2006 Oregon REACH Program	OR	2008
Study0024	Energy Smart Program Evaluation, Oregon HEAT	OR	2008
Study0025	Analysis of Low Income Benefits in Determining Cost-effectiveness of Energy Efficiency Programs	MA	2004
Study0027	Program Progress Report of National Weatherization Assistance Program (Schweitzer and Tonn)	USA	2002

Study0028	Analysis of PG&E's Venture Partners Pilot Program, - PG&E Low Income Weatherization Assistance Program 1994	CA	1994
Study0029	Evaluation of NU - MA ESP Program NEBs	MA	2002
Study0030	Evaluation of NU - CT ESP Program NEBs	CT	2002
Study0032	Non-Energy Benefits / Non-Energy Impacts (NEBs/NEIs) and their Role & Values in Cost-Effectiveness Tests: State of Maryland	MD	2014
Study0033	Memo from J. Oppenheim to Laura McNaughton Low income DSM NEB	USA	2000
Study0034	An Update of the Impacts of Vermont's Weatherization Assistance Program, for VT State OEO Weatherization. Program	VT	2007
Study0035	Low Income Pub Ben Evaluation, Non-Energy Benefits of Wisconsin Low Income Weatherization. Assistance Program, Wisconsin Dept of Admin, DOE	WI	2005
Study0036	Low Income Pub benefits, Wisconsin DOE	WI	2007
Study0037	Assessment of Green Jobs Created by the OPA Multifamily Buildings Programs, for Ontario Power Authority	MA	2009
Study0039	Development and Application of Select Non-Energy Benefits for the EmPOWER Maryland Energy Efficiency Programs	MD	2014
Study0040	C1641: Impact Evaluation of the Business and Energy Sustainability Program (prepared for CT Energy Efficiency Board (EEB))	CT	2018
Study0041	New Jersey Natural Gas 2015 SAVEGREEN Evaluation Final Report	NJ	2015
Study0042	Human Health Benefits of Reducing Residential Wood Smoke Emissions in Puget Sound Energy's Service Territory	WA	2018
Study0043	Preliminary Report: Quantifying the Health Benefits of Reduced Wood Smoke from Energy Efficiency Programs in the Pacific Northwest	PNW	2014
Study0044	Public Health Benefits per kWh of Energy Efficiency and Renewable Energy in the United States: A Technical Report	USA	2019
Study0045	Assessment of the Costs Avoided through Energy Efficiency and Conservation Measures in Maryland	MD	2014
Study0046	Macroeconomic Impacts of Rhode Island Energy Efficiency Investments	RI	2014
Study0047	Final Washington Low Income Weatherization Program Evaluation for Program Years 2013-2015	WA	2018
Study0048	Washington Low Income Weatherization Program Evaluation, Measurement & Verification Report	WA	2020
Study0049	Human Health Benefits of Reducing Residential Wood Smoke Emissions in PacifiCorp's Washington State Service Territory	WA	2018
Study0050	Human Health Benefits of Reducing Residential Wood Smoke Emissions in Avista Corporation's Service Territory	WA	2018

13.2 Appendix B: Confidence Factor Scoring

Table 25 below shows the CF scoring for the Database studies. Each of the questions are given a weight of 1. The weighted total score is the sum of the scores for each individual question, and a minimum CF floor of 50% is used. Note that some Study ID numbers are omitted in the table below since their CF scores could not be assessed. Original copies of those studies could not be found were only referenced in a different study.

Table 25. Confidence Factor Scoring for Database Studies

Study_ID	1. Is the study measure specific?	2. Is the study segmented by sector?	3. Was the sample drawn using statistical method?	4. Does the study incorporate identifiable economic factors?	5. Does the study not consider any of the following when appropriate: Open-ended questions, Additivity, Double Counting	Weighted Total Score	Adjusted Confidence Factor (no CF below Minimum CF)
Study0001	3	3	3	3	3	15	100%
Study0002	3	3	2	3	2	13	87%
Study0003	3	3	2	3	2	13	87%
Study0004	3	3	2	2	1	11	73%
Study0005	3	3	3	3	1	13	87%
Study0006	1	1	1	2	2	8	53%
Study0007	2	3	2	3	1	11	73%
Study0008	3	2	1	1	0	7	50%
Study0009	2	3	1	1	0	7	50%
Study0010	2	2	2	2	2	10	67%
Study0011	3	2	2	1	0	8	53%
Study0012	3	3	2	1	1	10	53%
Study0013	2	2	2	1	0	7	50%
Study0014	2	1	1	2	2	8	53%
Study0016	3	2	1	2	0	8	53%
Study0017	2	2	1	1	0	6	50%
Study0020	1	3	1	1	1	7	50%
Study0022	1	2	3	2	1	10	67%
Study0025	1	3	1	2	1	8	53%
Study0031	1	2	1	2	3	9	60%
Study0032	2	3	3	2	2	12	80%
Study0035	1	2	2	2	2	9	60%
Study0039	1	2	1	3	1	8	53%
Study0040	3	3	3	3	1	13	87%
Study0041	3	1	2	2	1	9	60%

Study0042	3	3	1	2	0	9	60%
Study0043	3	3	3	3	1	13	87%
Study0044	1	3	3	1	1	9	60%
Study0045	1	1	1	3	0	6	50%
Study0046	1	3	1	3	1	9	60%
Study0047	3	3	3	3	2	14	93%
Study0048	3	3	3	3	2	14	93%
Study0049	3	3	2	3	0	11	73%
Study0050	3	3	2	3	0	11	73%

13.3 Appendix C: Plausibility Scoring Metrics

Table 26 shows the scoring assignment for the end-use UEC efficiency change index. End-use categories that change very little over time are scored higher (maximum of 3) while technologies that change significantly over time are scored lower.

Table 26. End-Use UEC Change Score

Compound Annual Growth Rate by end-use		UEC change score
CAGR <= 3%	End-use with little change over time	3
CAGR >3% but <6%	End-use with some change over time.	2
CAGR >=6%	End-use with significant change over time.	1

Table 27 shows the end-use UEC scores for 2003-2012 using data from CBECS.

Table 27. CBECS End-Use Energy Consumption Scoring

Electricity energy intensity (thousand Btu/square foot in buildings using electricity for the end use)											
	Total	**Space heating**	**Cooling**	**Ventilation**	**Water heating**	**Lighting**	**Cooking**	**Refrigeration**	**Office equipment**	**Computing**	**Other**
All Buildings-2003	50.7	2.4	6.9	6.2	1.3	19.1	0.3	5.4	1	2.2	6
All buildings - 2012	50	1.7	8.3	8.1	0.5	8.7	3.7	9.1	2.1	5.2	9.1
Compound Annual Growth Rate (CAGR) in UEC	-3.2%	3.9%	-2.0%	-2.9%	11.2%	9.1%	-24.4%	-5.6%	-7.9%	-9.1%	-4.5%
CAGR % of Total Change		(1.21)	0.63	0.91	(3.47)	(2.83)	7.55	1.75	2.45	2.83	1.40
ABS of CAGR	3.2%	3.9%	2.0%	2.9%	11.2%	9.1	24.4%	5.6%	7.9%	9.1%	4.5%
Efficiency change index		1.21	0.63	0.91	3.47	2.83	7.55	1.75	2.45	2.83	1.40
1-3 Score (3 is best, 1 is worst)		**2.0**	**3.0**	**3.0**	**1.0**	**1.0**	**1.0**	**2.0**	**1.0**	**1.0**	**2.0**

Table 28 shows the end-use UEC scores for 2009-2015 using data from RECS.

Table 28. RECS End-Use Energy Consumption Scoring

	Average site energy consumption (million Btu per household using the end use)					
	Total	**Space heating**	**Water heating**	**Air conditioning**	**Refrigerators**	**Other**
All homes-2009	89.6	38.7	16.0	6.8	4.3	26.7
All homes - 2015	77.1	35.3	14.8	7.1	2.6	20.2
Compound Annual Growth Rate (CAGR) in UEC	3.1%	1.6%	1.3%	-0.8%	8.6%	4.8%
CAGR % of Total Change		51%	42%	-27%	280%	155%
ABS of CAGR	3.1%	1.6%	1.3%	0.8%	8.6%	4.8%
Efficiency change index		51%	42%	-27%	280%	155%
1-3 Score (3 is best, 1 is worst)		**3.0**	**3.0**	**3.0**	**1.0**	**2.0**

13.4 Appendix D: Plausibility Combinations

Table 29 shows the PF scores for the possible combinations of study age, UEC efficiency change index, and match level. Studies that are less than 5 years old receive the highest Age of Study Score while studies that are greater than 15 years old receive the lowest score.

Table 29. Plausibility Factor Scoring Table (assumes equal weighting)

Age of Study Score (<5, score=4) (6-10, score=3) (11-15, score=2) (>15, score=1) (A)	Unit Energy Consumption Change Score (B)	Matching Level Score (C)	Total Score (A+B+C)	% of Max Score (A+B+C)/13	Adjusted Plausibility Factor (No PF below Min PF)
4	3	6	13	100%	100%
4	3	5	12	92%	92%
3	3	6	12	92%	92%
4	2	6	12	92%	92%
4	3	4	11	85%	85%
3	3	5	11	85%	85%
2	3	6	11	85%	85%
4	2	5	11	85%	85%
3	2	6	11	85%	85%
4	1	6	11	85%	85%
4	3	3	10	77%	77%
3	3	4	10	77%	77%
2	3	5	10	77%	77%
1	3	6	10	77%	77%
4	2	4	10	77%	77%
3	2	5	10	77%	77%
2	2	6	10	77%	77%
4	1	5	10	77%	77%
3	1	6	10	77%	77%
4	3	2	9	69%	69%
3	3	3	9	69%	69%
2	3	4	9	69%	69%
1	3	5	9	69%	69%
4	2	3	9	69%	69%
3	2	4	9	69%	69%
2	2	5	9	69%	69%
1	2	6	9	69%	69%
4	1	4	9	69%	69%
3	1	5	9	69%	69%
2	1	6	9	69%	69%
3	3	2	8	62%	62%

2	3	3	8	62%	62%
1	3	4	8	62%	62%
4	2	2	8	62%	62%
3	2	3	8	62%	62%
2	2	4	8	62%	62%
1	2	5	8	62%	62%
4	1	3	8	62%	62%
3	1	4	8	62%	62%
2	1	5	8	62%	62%
1	1	6	8	62%	62%
2	3	2	7	54%	54%
1	3	3	7	54%	54%
3	2	2	7	54%	54%
2	2	3	7	54%	54%
1	2	4	7	54%	54%
4	1	2	7	54%	54%
3	1	3	7	54%	54%
2	1	4	7	54%	54%
1	1	5	7	54%	54%
1	3	2	6	46%	50%
2	2	2	6	46%	50%
1	2	3	6	46%	50%
3	1	2	6	46%	50%
2	1	3	6	46%	50%
1	1	4	6	46%	50%
1	2	2	5	38%	50%
2	1	2	5	38%	50%
1	1	3	5	38%	50%
1	1	2	4	31%	50%

13.5 Appendix E: Non-energy Impact Theory

NEIs for Residential Programs

A key concern for program evaluation is ensuring that the benefits claimed by utilities reflect true economic gains to the jurisdiction. This theoretical background focuses on how incentivizing technological change through EE results in economic benefits that manifest through increased wellbeing for consumers and increased profit for producers. We then define the factors used to adjust different types of NEIs that apply to residential programs.

EE programs result in NEIs that impact consumer or producer surplus[5] [6] [7], which reflect changes to the economic efficiency of society. By incorporating NEIs into TRC cost-efficiency tests, policy makers can better measure the economic efficiency of EE programs on the population.[8]

The concept of NEIs stems largely from the hedonic price theory of property values and wages developed by Rosen.[9] This theory states that "housing prices reflect differences in the quantities of various characteristics of housing and that these differences have significance in applied welfare analysis."[10,11] Rosen (1976) shows that house price is derived from the wellbeing (utility) that one receives from occupying a residence with a given set of attributes. One set of the attributes included in the individual's utility are the improved amenities, health, and well-being resulting from EE measures:

U(z, x, s):

Where

Hedonic z - measures the individual attributes of each housing unit

x – all other goods the household can purchase

s – measures the characteristics of the household residents (are they old, do they swim, how many people, how many cars)

The individual's utility function and budget constraints are then used to determine the individual's marginal utility (or demand) for the housing attributes at different prices, holding their income constant. The price function shows the bundles of housing attributes at which the household's willingness to pay for a property with that bundle of attributes is equal to its market price.

Given Rosen's theory, an individual's demand for housing represents the trade-off they are willing to make between receiving bundles of these attributes at different prices, given their income constraint and level of technology in the home. The maximum bundle of attributes they can afford is restricted by their income and a measure of their total wellbeing. Figure 4 shows an individual's demand for the housing attributes they receive at different prices before EE improvements (Demand

[5] Consumer Surplus as defined by Nicolson (1995) is "the Difference between the total value consumers receive from the consumption of a particular good and the total amount they pay for the good. It is the area under the compensated demand curve and above the market price, and can be approximated by the area under the Marshallian demand curve and above the market price."

[6] Producer Surplus as defined by Nicolson (1995) is "the additional compensation a producer receives from participating in market transactions rather than having no transactions. Short-run producer surplus consists of short-run profits plus fixed-costs. Long-run producer surplus consists of short-run producer surplus plus increased rents earned by inputs. In both cases the concept is illustrated as the area below market price and above the respective supply (marginal cost) curve."

[7] Nicholson, Water. "Microeconomic Theory: Basic Principles and Extensions." Sixth edition. Dryden Press. Harcourt Brace College Publishing. 1995.

[8] The Total Resource Cost (TRC) Test measures the net cost of an energy conservation program, viewing the program as a utility resource option. Both utility and participant costs and benefits are included. The TRC Test reflects the impacts of a program on both participating and non-participating customers. The test provides a measure of the cost-effectiveness of a utility-sponsored EE program, per the California Standard Practice Manual. https://beopt.nrel.gov/sites/beopt.nrel.gov/files/help/Total_Resource_Cost_Test.htm

9 Rosen, Sherwin. "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition," Journal of Political Economy 82, no. 1 (Jan. - Feb., 1974): 34-55.

10 Freeman III, Merick A. "The Measurement of Environment and Resource Values: Theory and Methods." Resources for the Future. Washington D.C. 1993.

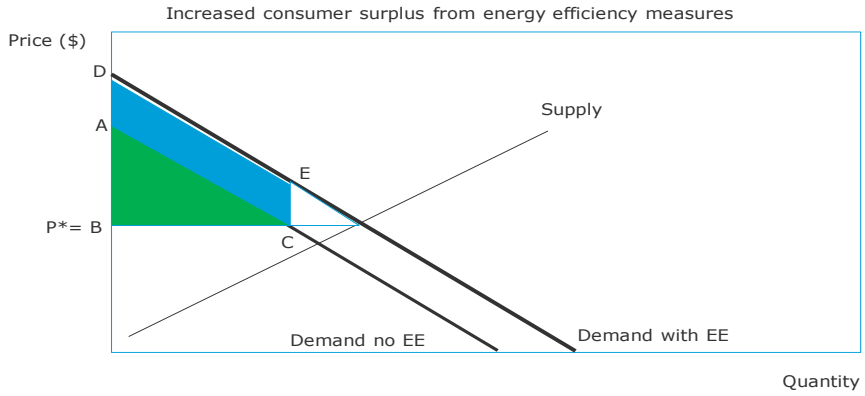
11 Rosen makes a similar case for the value of wages.

no EE). The supply of housing attributes is measured by S, providing a market clearing price for housing of P. Notice that the demand curve extends above the market clearing price, P. This is because residents would be willing to pay incrementally more for the initial set of housing attributes from market clearing point C up to point A, but they only pay one price for each unit of housing they purchase. The amount measured by triangle ABC is called Consumer Surplus. It measures the additional benefit consumers receive for paying only one price for the housing attributes they receive, rather than separate prices for each unit they receive.

Introducing EE improvements into their existing home represents a technological change to the home that raises the level of attributes the homeowner receives at each price point. In economic theory, this is explained as increasing the homeowner's utility (or wellbeing) while holding their income constant. In other words, when a person invests in improved insulation for their home, they receive energy impacts through reduced costs, but they also experience greater comfort and possibly greater health. The impact of these added benefits to consumers is shown by shifting their demand curve up to the right. This means for all prices, they now receive additional housing attributes that were previously only attainable through increased income. This implies that investing in EE measures increases the value of a home because the overall bundle of attributes offered by the home increases. However, the resident does not have to pay any more for their home because their price is fixed (i.e., they have a mortgage or lease with a fixed price). Therefore, they are seen to receive increased benefit, or wellbeing, beyond what they originally paid.[12]

In another example, an upgraded HVAC system can increase health and improve comfort. These benefits provide a range of benefits that were not included in price P, the price the homeowner paid for their home. This increase in benefits reflects an increase in that resident's demand for their home, shifting the demand curve out and to the right. This shift means that residents would be willing to pay more for each additional unit of housing they receive, however, the price they pay is fixed at point P* since they are most likely locked into a mortgage or lease. The additional benefits they receive can be measured by the area ACED. Residents will receive these benefits until they sell their home, at which time the benefits translate into an increase in property value and are included in the price of their home. The focus on NEI studies is to estimate these economic benefits absent the market transaction.[13]

Figure 4. Impact of NEIs on consumer surplus



NEIs for C&I Programs

For commercial and industrial (C&I) customers, NEIs reflect increased profitability resulting from EE measures. The increase in profitability can exist either because the installed measures decreased the cost of production (such as reduced O&M costs) or increased revenue (such as increased sales or production). Theoretically, a firm would be willing to pay more for a

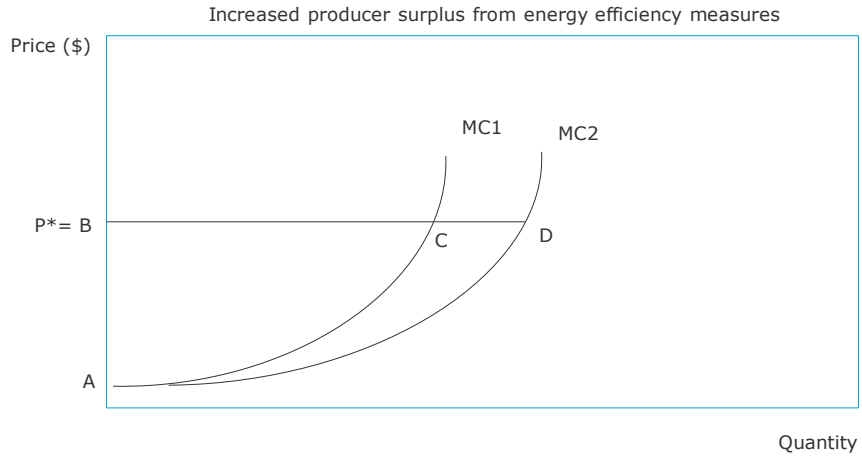
[12] Once they sell their home, this increased value will translate into an increase in price, but they still receive the increased value in terms of increased wellbeing prior to selling their home.

[13] The willingness-to-pay techniques outlined in 110 are well documented and used extensively to estimate such impacts

facility that either lowered its costs of production or increased revenues. Again, because rents typically do not change unless the firm renegotiates a lease or sells the facility, this provides increased profitability.

Figure 5 presents the impact of EE measures on the O&M costs and profitability of a firm. The figure shows that, prior to installing EE measures, the firm operates with marginal costs MC_1, which reflects the cost of producing each additional unit of a product, with market clearing price of P*, denoted by point B. The firm's profit can be measured by the area of the shape ABC. If the firm then installs EE equipment that reduces their marginal costs of production, this shifts the marginal cost curve out and to the right. This means they can produce more for each unit of cost they incur. This change in costs results in an increase in profitability that can be measured by the shape ACD. This increase in profit is one measure of NEIs resulting from the installation of EE measures. Other NEIs may impact profit through direct revenue increases resulting from increased sales.

Figure 5. Impact of EE on O&M costs and profit



Finally, firms may also experience an increase in revenue resulting from increased sales. For example, installing LEDs is argued to improve the visual display of showrooms. If this results in greater sales, this will increase the firm's revenue directly which can be measured by the formula:

$$Revenue = (Price\ of\ the\ good) \times (Quantity\ sold)$$

About DNV

DNV is a global quality assurance and risk management company. Driven by our purpose of safeguarding life, property and the environment, we enable our customers to advance the safety and sustainability of their business. We provide classification, technical assurance, software and independent expert advisory services to the maritime, oil & gas, power and renewables industries. We also provide certification, supply chain and data management services to customers across a wide range of industries. Operating in more than 100 countries, our experts are dedicated to helping customers make the world safer, smarter and greener.

APPENDIX E

RFP Framework

Avista Energy Efficiency

Request for Proposal (RFP) Framework

October 1, 2021

Version 1.0

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Introduction

Avista's Energy Efficiency Program ("EE Program" or "Program") is comprised of various goal-specific programs and has a long track record of lowering energy costs for customers and deferring capital investments to provide safe and reliable energy. A component of these efforts involves the partnership with outside parties to support or complement Avista's internal efforts. Avista engages with a variety of outside consultants ("Vendors") who have specialized expertise in topics related to energy efficiency in order to achieve conservation goals.

Examples of engagements that Avista undertakes as a part of its Energy Efficiency Program activities include, but are not limited to, (i) the development of conservation targets for each of the jurisdictions Avista serves; (ii) design and development of programs in service of those targets; (iii) implementation of conservation programs; (iv) participation in regional efforts related to emerging technologies, studies to support energy efficiency; and (v) verification of conservation achievements from year to year.

Avista practices fair and equitable consideration when selecting Vendors to support these various aspects of Program design, implementation, and evaluation. The purpose of this *Energy Efficiency RFP Framework* document ("Document") is: (i) to identify and define the framework used when selecting such Vendors; and (ii) provides guidance for establishing fair practices that are replicable and transparent.

Applicability

The RFP framework covers any significant engagement between Avista's and an external party for its Energy Efficiency Program including, but not limited to:

- Evaluation Measurement and Verification (EM&V)
- Conservation Potential Assessment (CPA)
- Contracted third-party implementation and programs
- Commissioned studies and analyses
- General services supporting energy efficiency

Avista's Approach to Procurement & General Policies

Supply Chain Management (*Buyers/Contract Managers*) acts as the authorized agent and primary contact for Avista, unless otherwise delegated, for the procurement of goods and services to protect the financial and commercial interests of Avista and to obtain the maximum value for each dollar of expenditure. Buyers and Contract Managers in Avista's Supply Chain Management group are responsible for acquiring goods and services to meet Avista's financial, quality, quantity and timing requirements; for negotiating for the optimum value for these goods and services; and for developing and maintaining fair, ethical and effective relationships with suppliers.

The following policies govern all Supply Chain Management activities at Avista:

1) A written contract is required for all services, including construction, professional, general, and field service, regardless of value. The use of open-ended or "evergreen" contracts, or time and materials service contracts with no set "not to exceed" amount (NTE) is discouraged.
2) All contracts are required to meet corporate financial, tax, insurance, legal and risk management standards. Supply Chain Management is responsible for identifying and evaluating any liabilities as well as negotiating terms that result in a well-balanced and fair contract. The Legal and/or Risk Management Departments must be consulted, as needed.
3) Avista's standard contract terms and conditions govern all contracted activities. Significant deviations from Avista's standard terms and/or use of terms and conditions provided by the counterparty must be approved by Avista's Legal Department.
4) An Avista Representative, authorized to act on Avista's behalf, is identified for all contracts. The Avista Representative acts as the primary point of contact with the Vendor during the performance and administration of the contract.
5) Avista utilizes a Contract Review and Approval Form for significant engagements, to document review and approval of arrangements for goods and services by authorized representatives of Supply Chain, Legal, Energy Efficiency BU Management, and Risk Management.

Contract Managers on the Supply Chain Management team work closely with the Energy Efficiency BU manager ("EE Manager") who has overall accountability for the results of any particular contract in the Vendor selection process. All expenditure requests for purchases and contracts are approved by the EE Manager, in accordance with established corporate signature authority levels, which are maintained in a Signature Authority Log by the Supply Chain Management group. The Supply Chain Management Group also maintains a database of record for all procurement contracts. The EE Manager for any given project is responsible for ensuring that the contract on file in the database of record is complete and legible.

Avista's Competitive Bidding Process

Avista is committed to contracting via competitive bidding processes for significant engagements to the maximum extent practical, and strives to invite a sufficient number of suppliers, including qualified diversity and/or local suppliers, where possible, to assure sound competitive offerings. Bids are by invitation only.

Supply Chain Management is responsible for administering Avista's competitive bid processes, serves as the Single Point of Contact ("SPC") throughout the bid process, and works closely with the EE Manager throughout the process. The SPC is responsible for managing all communications, including clarifications or modifications to the RFP documents, and ensuring that any modifications to the RFP are issued simultaneously to all potential bidders.

Competitive bids are solicited through a formal, confidential RFP process when the potential value of the contract is $100,000 or more. RFP's of lesser value are evaluated for opportunity and subject to competitive bidding or written quotations as advised by Supply Chain Management, but generally in accordance with the following protocol based on contracted value:

CONTRACTED VALUE	BIDDING GUIDELINES
Over $100,000	Formal RFP from Qualified Bidders Absent an RFP, a Sole Source Form is required.
$50,000 - $99,999	Written Quotations from Qualified Suppliers
Less than $50,000	EE BU Decision based on Relevant Experience

Answers to questions posed by one bidder under the RFP Process are provided to all potential Bidders at the same time to keep a level playing field.

Bids are opened privately only after the Due Date established in the RFP. Supply Chain Management conducts an initial review process to ensure bidders meet minimum needs of the engagement and to identify any outliers based on evaluation criteria specific to the engagement. An internal team of reviewers with relevant expertise reviews the proposals and assigns them each a competitive score. Generally, proposals are evaluated with the following evaluation criteria:

Following proposal review, the top scoring Vendor is selected as the winning bidder, a contract is negotiated/executed with the Vendor, and the work then begins. Alternately, Avista may invite a short list of qualified bidders whose proposals are deemed most responsive to the RFP, to participate in a second round of evaluation, which could include interviews and/or additional requests for information. The selection pathway is determined by the EE Manager.

A more detailed explanation of RFP evaluation criteria follows.

1. Vendor Expertise and Competency

   Avista will assess the perceived expertise and competency for each Vendor in consideration. The overall competency will be weighed the highest among the criteria as it ensures that value will be received from the engagement and that customer funds are prudently spent. Key metrics include:

   - Knowledge of the project
   - Expertise of staff
   - General expertise and experience of firm

2. Regulatory and State policy knowledge and/or capabilities

   Avista is regulated at the state and federal level with varying requirements in each jurisdiction. Potential Vendors must demonstrate their ability to meet several regulatory and state requirements, demonstrate knowledge of developments and policy changes, and be proactive in modifying their offerings to ensure that the engagement is within those guidelines. Key metrics include:

   - Knowledge and understanding of Avista requirements (business & regulatory)
   - External perception of engagement

3. Engagement pricing and value

   Bidders should competitively price their proposal, or demonstrate that the overall value of the service offered is justified within their pricing. While pricing is a key consideration in Vendor selection, it is evaluated relative to the level of service and value included within the proposal. Scoring for price is based on this perceived level of value and not on the price alone. Key metrics include:

   - Perceived value given the proposed engagement cost
   - The overall engagement cost in relationship to other proposals in terms of alternatives

4. Program and Company Risk

   Each bidder is independently assessed according the level of perceived, known, and tolerable risk associated with the potential engagement. Varying levels of risk are acceptable depending on the regulatory requirement, the work to be performed, and the desired outcome. Key metrics include:

   - Complete and sufficient proposal
   - Organization and communication
   - Reliability and accuracy of work
   - Financial strength of vendor
   - Security and data protection

5. Community and Equity

   In relation to the potential engagement, the Company factors in any differentiating considerations for supporting communities within its service territory. Key metrics include:

- Employment opportunities for underserved customer segments
- Vendors that are located within Avista's service territory and local communities

Quantitative Analysis and Vendor Scoring

Each proposal meeting the general qualifications will be evaluated on ten (10) characteristics that inform the general evaluation criteria listed above. Weightings are determined based on importance to Avista to meet its specific goals for the engagement. The evaluation scoring may change depending upon proposals with circumstances not considered in this evaluation methodology.

The table below identifies each key metric associated with the general evaluation criteria used when assessing an RFP bid. Actual weighting percentages will vary based on the engagement.

Characteristic	Weighting (%)
Complete and sufficient proposal	10%
Knowledge and understanding of Avista requirements (business & regulatory)	10%
External perception of engagement	5%
Pricing	10%
Knowledge of the project/energy efficiency	10%
Sufficiency of staff	10%
Organization and communication	10%
Reliability and accuracy of work	20%
Expertise and experience	10%
Employment opportunities for underserved customer segments	5%

- The criteria items identified in the above table have been used in the past but are also subject to change, depending on the nature of a specific Vendor engagement.

Programs Exempted from RFP Requirements

Consistent with WAC 480-107-065(3)(c)(i), Avista does not solicit RFPs for the following programs.

- Low Income Weatherization – This program effects conservation through the administration of Washington State Community Action Agencies or other qualified third parties.
- CETA Implementation Programs – These Programs are intended to provide services and or solutions towards populations designated within the Clean Energy Transformation Act or within the Clean Energy Implementation Plan and are limited to specific Vendors.

Sole Sourcing Engagements

Circumstances exist in which certain programs, services, or offerings can only be provided through (i) a specific Vendor; (ii) a specific Vendor who has established themselves as a dominant regional expert; or (iii) a Vendor who has an established history/relationship with Avista with regard to the specific circumstances. In these cases, Avista may use a sole source approach to establishing an engagement. In addition, Avista may sole source for engagements that are valued at or below $100,000, at the EE Manager's discretion. This approval process is also applied when a vender who is not the lowest bidder is selected, if the engagement is in excess of $100,000.

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APPENDIX F

Energy Burden Assessment








AVISTA®

ENERGY BURDEN ASSESSMENT

ENERGY BURDEN REDUCTION STRATEGY

empower dataworks

AVISTA ENERGY BURDEN ASSESSMENT

ENERGY BURDEN REDUCTION STRATEGY

SEPTEMBER 2021

PREPARED FOR

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Empower Dataworks

INTRODUCTION

This report presents a suggested strategy for Avista to meet its energy burden reduction goals. It begins with an overview of Avista's current customer energy burden, followed by a list of potential actions for reducing customer energy burden.

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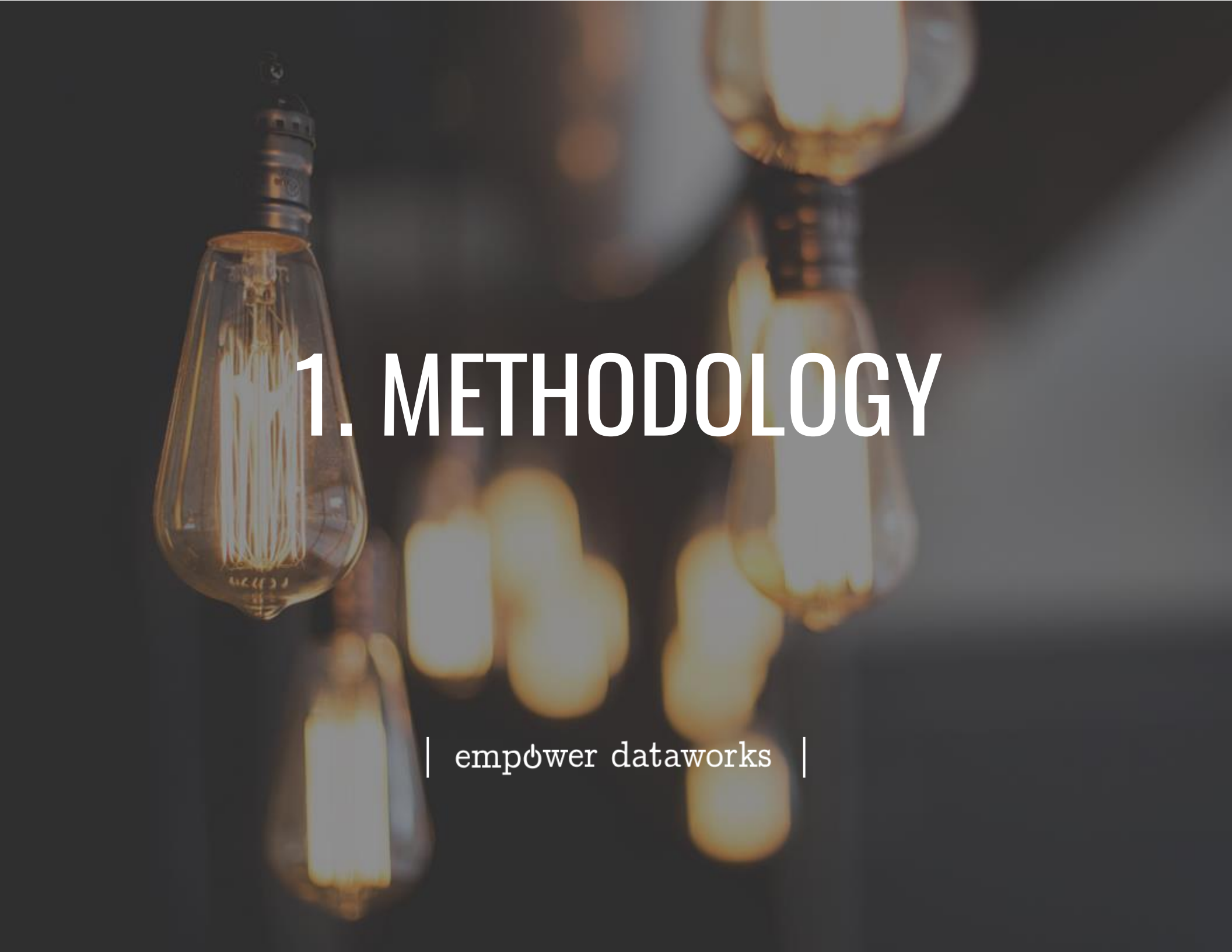


1. METHODOLOGY

empower dataworks

1.1 GENERAL APPROACH

This energy burden assessment relies on collecting customer-level data, modeling missing attributes, then aggregating key metrics by geographic, demographic or building variables for analysis. The customer data comes from various sources as described in the rest of Section 1. Some demographic attributes were modeled or inferred using statistical techniques due to lack of primary data in CIS or other sources. American Community Survey data was mainly used to sanity check aggregate statistics of customer-level data at the census tract level.

Three types of metrics were calculated:

- Metrics related to energy burden based on demographic and geographic characteristics
- Participation and funding in Avista's Energy Assistance Programs
- Customer energy use characteristics

The final dataset and results will be packaged in a web dashboard for Avista staff and the final underlying dataset will also be provided in a later deliverable.

1.2 DATA SOURCES

The data sources leveraged for the analysis are described in this section.

DATA PROVIDED BY AVISTA

Customer Information System (CIS): This data included monthly electricity bills for 24 months in 2019-20, account numbers and service addresses. A separate data extract included the dates and customer accounts that received late payment notices, allowing us to calculate the on-time payment rate for different customer segments.

Direct Assistance Program Data: We received a list of participating accounts in six of Avista's direct assistance programs (LIHEAP, LIRAP, Senior/Disabled Rate, Project Share, Housing Assistance and other miscellaneous assistance) in 2019-20, along with discount amounts and dates. This allowed us to calculate the total assistance funding at the household level.

Energy Efficiency Program Data: We received a list of participating accounts in the Low Income Energy Efficiency Program in 2019-20, along with installed measures, estimated kWh savings and rebate amounts. The rebate amounts were used to aggregate the "assistance funding" provided to the customer, while the deemed kWh savings were used to estimate the annual bill impact based on average bill savings of 9.4 cents/kWh. This rate is in the middle of Avista's tiered residential rate and we expected it be a good estimate of the true bill savings. Avista also provided participation data for the Multifamily Direct Install and residential energy efficiency measures – these will be used in later phases of the energy burden assessment to fully quantify the energy burden reduction of non-low-income programs.

2022-45 Conservation Potential Study: A copy of Avista's 2022-45 Conservation Potential Study was provided. This gave a big-picture view of anticipated conservation opportunities for the general population in Avista's service territory and helped frame some of the recommendations for energy burden reduction opportunities.

DATA OBTAINED FROM OTHER SOURCES

Geocoding: All customer addresses were geocoded to a latitude/longitude pair to facilitate geographic analysis. In addition, we mapped the latitude/longitude pairs to census tracts, block groups and blocks in order to pull additional aggregate statistics.

County Assessor Data: We obtained publicly available assessor data from the following counties: Spokane, Stevens, Whitman, Adams, Asotin, Lincoln, Ferry and Pend Oreille. A handful of customers in other counties were still included in the analysis but without assessor data. The assessor data included appraised values for homes, square footage, building year built, Washington state building use codes (residential, mobile homes, commercial and industrial), number of buildings on a land parcel, and other minor data points that were useful for performing general QA.

The addresses in this dataset were standardized to US Postal Service format, then matched with addresses in the CIS data. Some addresses existed in the CIS data but not in the assessor data (typically happens when multiple buildings occupy the same land parcel). For Spokane county, we were able to match most of these addresses to the appropriate land parcel using a "point-in-polygon" algorithm. This algorithm detected whether a given latitude/longitude pair (obtained from geocoding) fell within a particular land parcel (the Spokane county assessor made available a GIS file of parcel boundaries).

Customer Demographics: Data was purchased from a third-party data compiler that aggregates data from public sources and credit bureaus. This data was mapped to the CIS dataset using customer addresses and included total household income, age of occupants, and homeownership status for a little over 60% of residential households. Demographic attributes for some customers were modeled due to lack of primary data in CIS or other sources. The modeling approaches are described in the next section.

American Community Survey (ACS): ACS data (2019 5 year estimates) was primarily used for QA to ensure that aggregate counts for various demographic attributes match the expected distributions from ACS.

1.3 FINAL ATTRIBUTES AND METRICS

The calculation methods for the metrics and attributes used in this report are described in this section. For all attributes, we also capture metadata related to the source of data and the confidence in the value (for example, data from primary sources has a high confidence, while modeled data has lower confidence). All of the data is robust for aggregate analysis, while high confidence data is better suited to customer-level marketing and program targeting.

Household Income: Income data was only available for 60% of households in Avista's service territory. To estimate the incomes for the remaining 40%, we used an iterative procedure.

Starting from the households for which we had income data, we applied an imputation model – this is a statistical method for filling in missing data by using the home's location, home value and building type. In other words, each household is assigned an income range based on the incomes of similar households in their area. This is the initial guess for that household's total annual income. Then, an iterative calibration procedure uses those initial guesses and adjusts them to ensure that the overall income distribution within a census tract is similar to the overall income distribution from the ACS. The calibration iteratively takes a small sample of households (under 10%) and bumps them up or down by one income level within certain bounds until the modeled income distribution resembles the ACS income distribution.

Validation: The modeling procedure yields fairly good results - it is able to reproduce the incomes accurately for a hold-out set of data from the original dataset, with errors under $5k/year in household income for 85% of the test set and errors under $20k/year in household income for the other 15%. Larger errors tend to happen for households with a larger income, which are not the focus of this study anyway. More importantly, the aggregate metrics related to energy burden (e.g. energy assistance need and overall burden) are very robust to errors in individual results because we are ensuring that overall distribution of income is as accurate as possible, while

the energy use does not change dramatically among similar households.

Poverty Status: The number of people living in a household cannot be easily obtained from any public data sources. This makes it difficult to identify a household's poverty status compared to the Federal Poverty Limit or the Area Median Income, both of which are defined by household size. The median household size in Avista's service territory is 2.4 and all figures that require poverty status in this report are given as ranges between a household size of 2 and 3. Household size for income thresholds is a configurable parameter in the data dashboard.

Validation: According to the US Census Bureau, approximately 14% of households in Avista's service territory would fall under 100% of the Federal Poverty Limit. In this analysis, the range is between 12 and 17%, depending if we assume all 2-person households or 3-person households, respectively.

Building type: Meters were classified into one of five building types: single family, mobile homes, multifamily apartments, commercial or master metered and unoccupied. Commercial meters were those tagged with a specific commercial use by the county assessor or that were on a commercial rate class (unless they were clearly apartments). Additionally, we filtered out meters using in excess of 60,000 kWh per year as those are likely associated with commercial uses or are master metered. Meters that showed energy consumption less than 1200 kWh/year were flagged as potentially unoccupied.

Overall, the number of household meters excluding commercial and unoccupied meters was 224- 225,000. Addresses with multiple units or tagged as multifamily properties by the county assessor were flagged as apartments. Mobile homes were either labelled as such by the county assessor or were sited in a mobile home park. Non-multifamily homes with addresses but without an identified land parcel are usually accessory dwelling units, trailers or mobile homes – these were all included in the "mobile home" category.

Validation: The aggregate housing type counts (66% single family, 25% multifamily and 9% mobile/manufactured homes) agree well with data from the American Community Survey for the five main

counties in Avista's service territory (approx. 67% single family, 25% multifamily).

Homeownership Status: Homeownership status (rent vs. own) was determined using two methods. The demographic dataset included homeownership for approximately 60% of customers. For the other 40%, households in multifamily apartments were tagged as "Likely Renters", and households without any account changes during the two year analysis period were tagged as "Likely Homeowners". This can potentially undercount long-term renters and tag them as homeowners and it can undercount homeowners who have just purchased their home. We are also exploring whether we can incorporate home sales data – the intent is to tag households with an account change and an accompanying sales record as homeowners. However, the accuracy of the approach seems sufficient for the purposes of large-scale aggregate analysis as in this study.

Validation: The aggregate homeownership rate from this analysis (61%) is slightly lower than the owner-occupied housing rate from the American Community Survey (62%) for Avista's service territory.

Load Disaggregation and Heating Type: A simple load disaggregation was applied for all households using their monthly energy bills. This involved taking the tenth percentile of monthly energy use (normalized by the number of days in a billing period) as the assumed base load. Then, the energy use that exceeded the base load in the winter months (October through April) was designated as "heating-related energy use", while the energy use that exceeded the base load in the summer months (May through September) was designated as "cooling-related energy use".

Homes with a heating-related energy use that exceeded 10% were flagged as potentially utilizing electric heat, while homes with under 10% heating-related energy use were flagged as gas heated homes.

Validation: The approach has been previously tested by Empower Dataworks vs. a variable-base degree day regression and it yields similar results but at a much smaller computational cost. The penetration of electric heat using this approach (56%) is slightly lower than that in Avista's 2022-45 Conservation Potential Study (58.7%), but within the margin of error.

Energy Burden and Energy Efficiency Potential thresholds: These thresholds were set as follows:

- Electrically heated:
  - High-burden threshold: Greater than 6%
  - High efficiency potential threshold: Greater than 10 kWh/sq.ft.
- Gas heated:
  - High-burden threshold: Greater than 3% (this might change through future CETA rulemaking)
  - High efficiency potential threshold: Greater than 7 kWh/sq.ft.

Energy Burden: Energy burden for a household is calculated simply by dividing annual electricity expenses by gross household income.

$$Energy\ Burden = \frac{Annual\ Electricity\ Expenses}{Annual\ Household\ Income}$$

Excess Burden: Excess burden is the portion of a household's energy burden in excess of the 6%/3% threshold.

$$\begin{aligned} Excess\ Burden \\ &= \max(0, Energy\ Burden \\ &\quad - High\ Burden\ Threshold) \\ &\quad \times Annual\ Household\ Income \end{aligned}$$

On-Time Payment Rate: This is the proportion of all energy bills that did not require a late payment or disconnect notice to be sent out.

Energy Assistance Funding: The dollar amount of funding flowing through energy assistance programs (including discount, donation and weatherization programs) through discounts or rebates.

Customer Bill Reductions (**Avoided Burden**)**:** The total bill impact from energy assistance programs. This is the same as the assistance funding for direct assistance programs and is based on measure savings for energy efficiency programs as described in Section 1.2.

Avoided Need: The total bill impact specifically for customers flagged as “high-burden”.

Census Tract Statistics: Since each customer has been mapped to a census tract and block group, we are also able to match customers to census tract average statistics (e.g. highly impacted communities, presence of children, non-English speakers, education level, environmental pollution etc.). These will be used in later stages of the analysis and for coordination with Avista’s Clean Energy Implementation Plan.

Energy Assistance Need: This is the sum of excess burden across all customers.

Comparison to LEAD tool estimates: Energy assistance need was compared to estimates based on the Department of Energy's LEAD tool (currently the only other estimate for energy assistance need). For Stevens, Whitman, Adams and Asotin counties, the LEAD estimates are 51% higher on average than the actuals from this analysis. This is primarily driven by the customer electricity bills that are consistently higher in the LEAD dataset than actual customer bills from Avista's CIS system. The data used in the LEAD tool is sampled from a small portion of the population (under 10%) and extrapolated across a large area. The energy use data is self-reported and for a single month in the year, which is then extrapolated to a full year. This calls into question the reliability of energy burden estimates based on this data for Avista. Through previous assessments, Empower Dataworks has found that the tool can be accurate in some jurisdictions but inaccurate in others. For Spokane county, the LEAD estimates include the entire county (with areas outside Avista's service territory), whereas this analysis only includes Avista customers, so the difference is larger.

	Average Annual Electricity Bill ($)		**Total Assistance Need (million $)**	
County	**Avista's CIS System**	**LEAD dataset**	**Current Analysis**	**LEAD dataset**
Adams	1,322	1,616	1.0	1.3
Asotin	1,066	1,279	1.2	1.6
Spokane	1,018	1,215	16	29
Stevens	1,239	1,528	3.2	5.2
Whitman	941	1,213	2.0	3.1

2. AVISTA'S ENERGY BURDEN BASELINE

2.1 AVISTA RESIDENTIAL SECTOR PROFILE

Avista's service territory in Washington state was composed of approximately **235,000 residential meters, of which 225,000 were found to be occupied households** (with a detectable energy use and not designated as shops or garages).

Ethnicity: According to the U.S. Census Bureau, approximately 83% of residents in counties within Avista's service territory are non-Hispanic white. In particular, Stevens, Whitman and Adams counties have sizeable populations of Hispanic, American Indian and Asian customers.

Household Income: The median household income for residents in counties within Avista's service territory is approximately $55,000, well below the state average of $70,000. Approximately **11%** of households would fall under 100% of the federal poverty limit, **32%** would fall under 200% of the federal poverty limit and **42%** of households would fall under 80% of the Area Median Income.

Employers: Data from the Employment Security Department of Washington state shows that other than Spokane County which has a very diversified economy, the other counties within Avista's service territory rely on jobs in agriculture, education and government and could be more susceptible to recessions and other macroeconomic trends[1].

[1] Washington State Employment Security Department. https://esd.wa.gov. Retrieved August 2021.

Energy Bills: Avista's residential electricity rates are about average for the Northwest. This results in generally affordable annual energy bills for most (non-low-income) households (**approximately $1040/year with an average annual consumption of 10,800 kWh**), despite the high penetration of electric heating in the county (55-60%). Figure 1 shows that the distribution of annual energy bills has a long tail; a minority (~6%) of households pay more than double the overall average energy bill.

Home Vintage: Approximately 30% homes in Avista's service territory were built after 1980 and 45% were built between 1940 and 1980[2]. There are about 30,000 homes that are more than 100 years old. Generally, older homes have more opportunities for weatherization, while newer homes could benefit more from lighting, controls and efficient appliances.

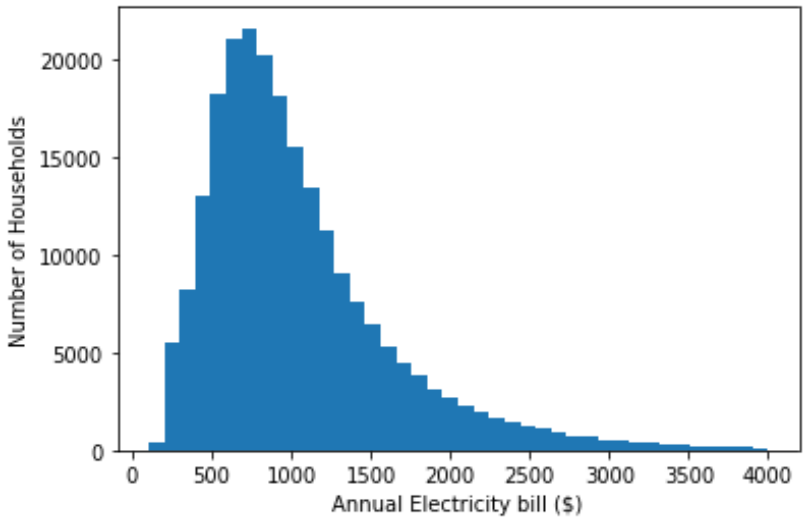


Figure 1. Household electricity bill distribution for Avista's residential customers

[2] County Assessor Data for all Avista counties.

2.2 ENERGY BURDEN

Avista customers have an **average and median energy burden of 3.4% and 1.7%**, respectively. Figure 2 compares Avista's median energy burden to values published in other jurisdictions.

Avista's median energy burden is similar to that of the Seattle region. It is also lower (on average) than rural areas in the Pacific states.

The average household paid $1040/year in electricity bills in 2019-20. Of Avista's 225,000 identified households, **42,000 were deemed to have a high energy burden**, meaning that annual electricity bills exceeded 6% of their income for electrically-heated homes and exceeded 3% of their income for gas-heated homes. These high-burden customers paid an average of $1300 in annual electricity bills; the higher bill average reflects their higher likelihood to live in less efficient or older homes. The on-time bill payment rate is moderate for residential customers in general (87%) and much lower (79%) for high-burden customers. The **total energy assistance need for Avista is approximately $25M**—the total reduction that would bring all customer electricity bills below the high burden threshold (6% of income for electric heat and 3% for gas heat).

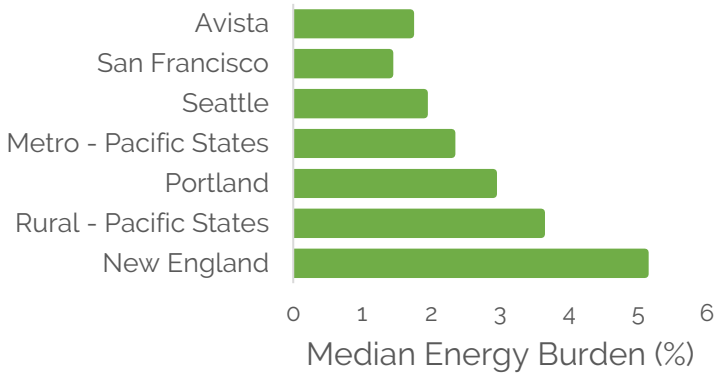


Figure 2. Energy burden benchmarking vs. other regions

Although averages and medians give a general indication of energy burden across a service territory, the reality is that **energy burden is a customer-level metric** and its distribution is a better indicator of the burden that customers experience. The distribution of energy burden among Avista customers is shown in Figure 3. The blue dashed line represents the 3% high burden threshold for gas heat and the green dashed line represents the 6% high burden threshold for electric heat.

Number of Households

~225,000

Low Income Households

80% AMI: **~94-100k**

200% FPL: **~72-82k**

High Burden Households

~42,000

Energy Burden

Median: **~1.7%**
Average: **~3.4%**

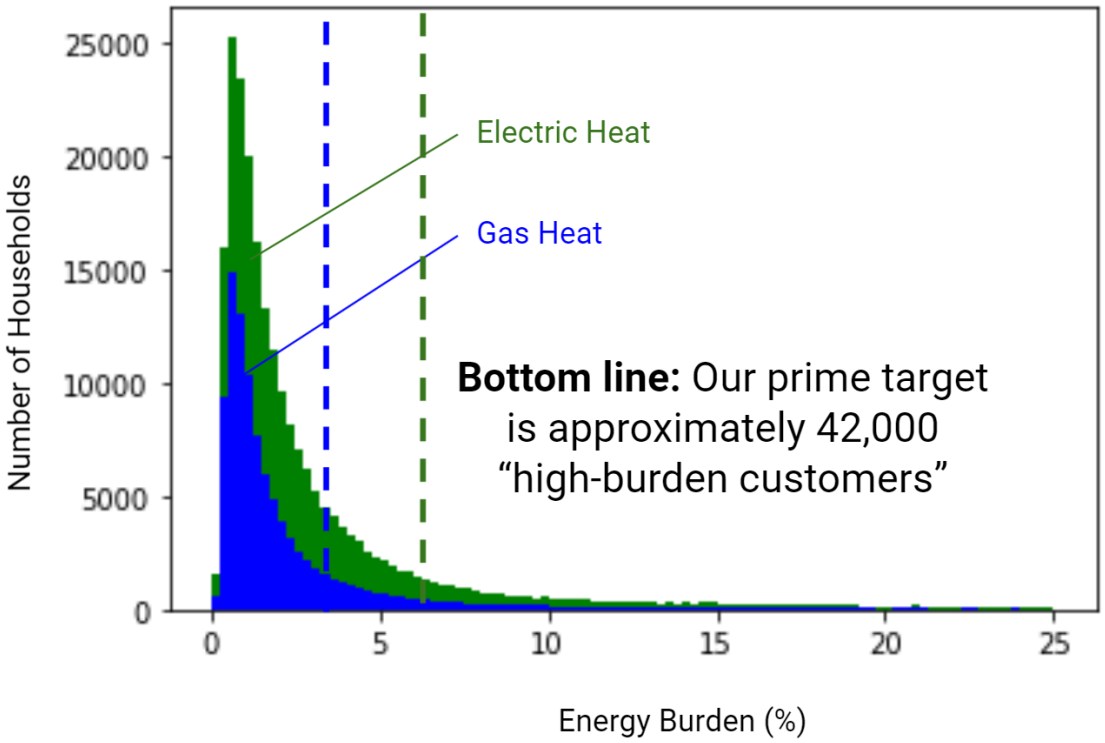


Figure 3. Distribution of energy burden among Avista customers.
Green line indicates 6% threshold of high energy burden for electric heat.
Blue line indicates 6% threshold of high energy burden for electric heat.

The goal of an effective energy assistance portfolio should be to prioritize the customers who most need the assistance, i.e. the customers to the right of the 6%/3% thresholds.

Approximately half of the energy assistance need is borne by single family households, with the other half distributed among multifamily and mobile home dwellers. The highest concentration of need is in mobile home dwellers, requiring more than $800/household in assistance on average, compared to $500/household for multifamily and $600 per household for single family households.

Approximately, 65-70% of the energy assistance need for Avista customers is among renters, indicating that conservation programs targeted at high-burden customers will need to grapple with the split incentive problem between landlords and tenants, but energy burden among homeowners should not be neglected. By sheer volume of need, senior (60+) homeowners in the Spokane area and renters in the Spokane area bear a large amount of energy burden. However, other rural areas have a much higher concentration of need (i.e. high-burden customers need more assistance on average).

Other customer segments will be investigated in more detail in later stages of this energy burden assessment.

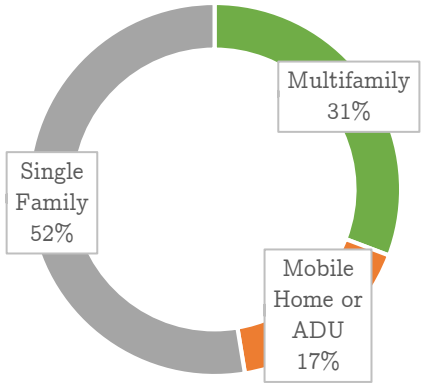


Figure 4. Distribution of energy assistance need by housing type.

2.3 LOW INCOME CUSTOMER SEGMENTS

Figure 6 shows the distribution of energy burden and energy efficiency potential (defined through Energy Use Intensity thresholds) across all low-income residential customers. In a perfect world, the energy assistance portfolio would match these customer segments. For example:

- Conservation programs should primarily serve **high burden, high potential** households
- Direct assistance programs should primarily serve **high burden, low potential** households
- Crisis/emergency programs should primarily serve **low burden, low potential** households
- Traditional conservation programs with financing should serve **low burden, high potential** households

Aligning targeted customers with program strengths results are the most cost-effective pathway to energy burden reduction.

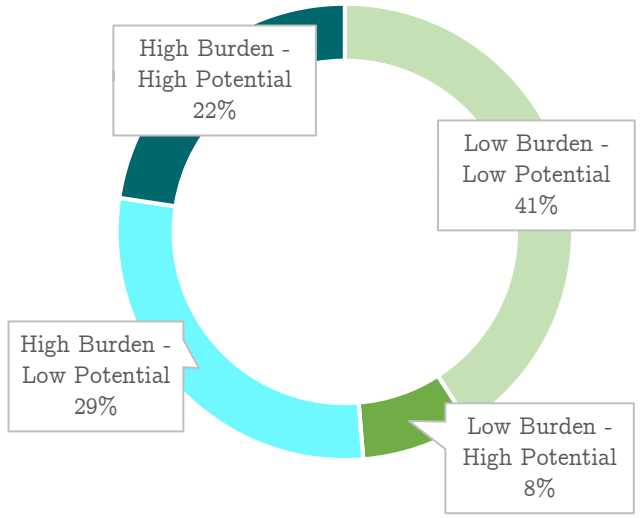


Figure 5. Avista's low-income customer segments by energy burden and energy efficiency potential.

Almost half of Avista's low-income customers are low-burden and low-efficiency potential. These customers' energy bills may not be a huge expense relative to housing, medical and education expenses, and they should not be prioritized in the more intensive programs, such as weatherization.

High burden customers are almost evenly split between high potential and low potential households. Since neither high or low potential customers dominate the high burden group, this indicates that a more holistic approach that combines conservation and direct assistance may be suitable for the first group, while direct assistance and lighter touch conservation is more suitable for the latter group.

In addition, as shown in the figure below, 55% of high-burden households require more than $400 in assistance to be brought under the high-burden threshold. These customers would likely benefit from "program stacking", i.e. being served by a combination of programs optimized to their need and the condition of their home.

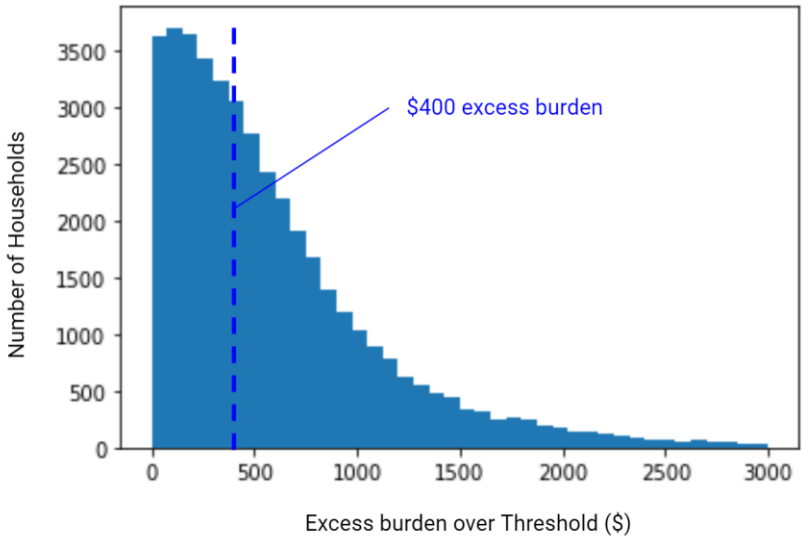


Figure 6. Distribution of Avista's high-burden customers' excess burden over the 6%/3% threshold.

2.4 ENERGY BURDEN PORTFOLIO EFFECTIVENESS

Washington State's Clean Energy Transformation Act (CETA) has set concrete goals for energy assistance funding by electric utilities. These goals are expressed as a percent of energy assistance need. Energy assistance need can fluctuate based on several factors:

- Household energy use and efficiency
- Household income levels and, by extension, unemployment rates
- Weather, especially the severity of cold winter weather

As shown in Figure 8, there are four program-related metrics that translate energy assistance program funding into actual avoided need.

- Energy assistance need is the total dollar amount required to bring all customer energy bills under a 6% electric heat/3% gas heat energy burden threshold

- Energy assistance funding is the total dollar amount that is made available to low-income customers through energy assistance programs. The ratio between energy assistance funding and energy assistance need is the *funding ratio*.

- Avoided burden is the actual dollar reduction in customer energy bills resulting from energy assistance programs. This is usually lower than the total energy assistance funding due to overhead expenses or non-cost-effective conservation measures. Efficiencies in program delivery and improvements in conservation program processes can help increase the avoided burden. The ratio between avoided burden and energy assistance funding is the *operational effectiveness.*

- Avoided need is the reduction in customer energy bills specifically for high-burden customers. This number is usually lower than avoided burden for programs that are not effective at reaching high-burden customers. Avoided need and avoided burden are close to each other in well-targeted programs. The ratio between the avoided burden and avoided need is the *targeting effectiveness.*

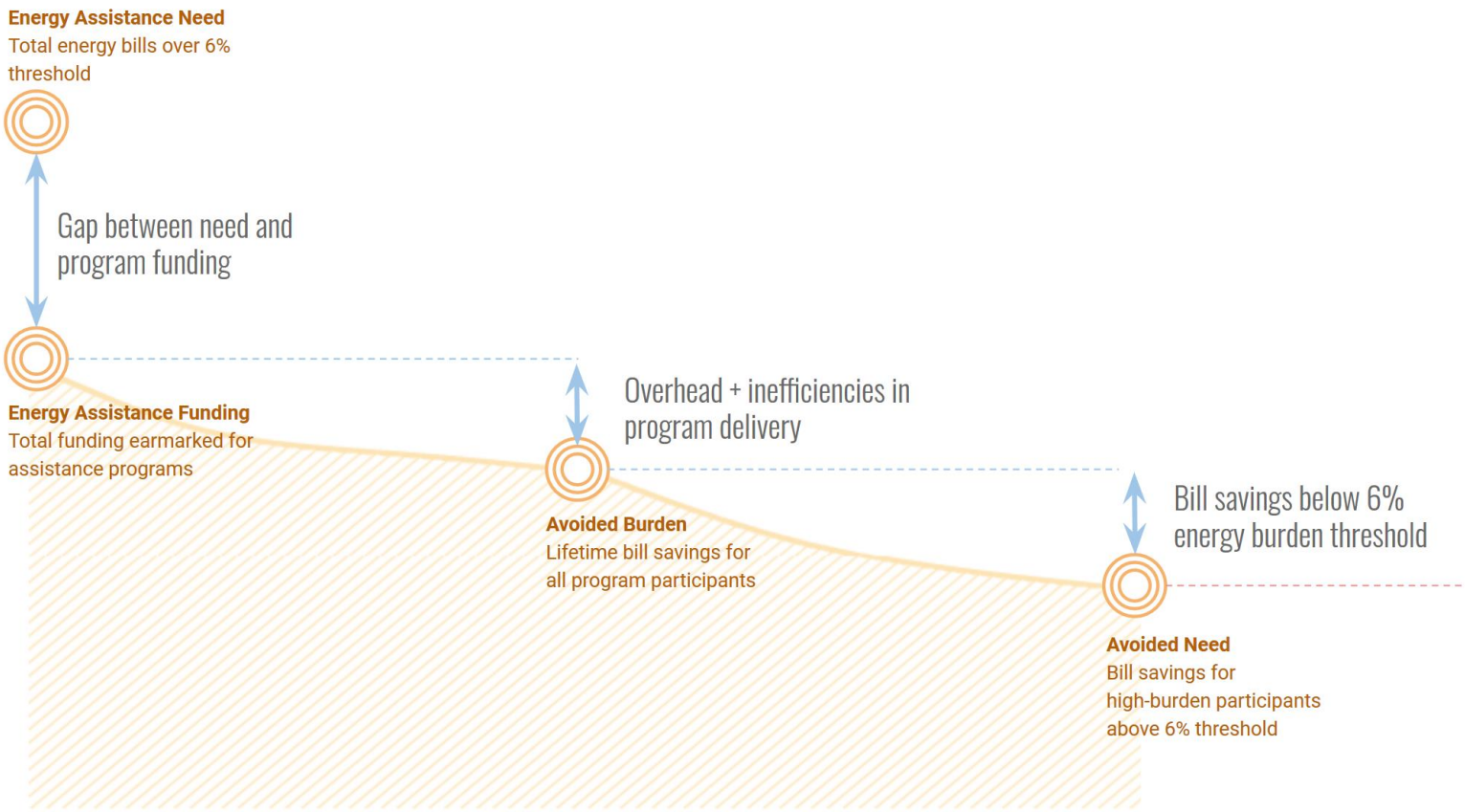


Figure 7. Energy assistance program effectiveness metrics

Effective energy assistance programs ensure that the difference between avoided need and energy assistance need is as small as possible. For the 2019-20 program years (Figure 9), Avista's energy assistance portfolio metrics were::

- **72% funding ratio:** Energy assistance need of $25M and energy assistance funding of $18M.
- **75% operational effectiveness:** 25% of energy assistance funding was used for overhead or the installation of non-cost-effective measures. The portfolio reduced the energy bills for approximately 25,000 households by $500 on average.
- **39% targeting effectiveness**: Primarily because some of the programs are not optimized for targeting high-burden customers (i.e. 61% of avoided burden was applied to customers *without* a high energy burden). The portfolio reduced the energy bills for 8,500 high-burden households by $500 on average. For 4,000 of these households, the assistance was sufficient to bring them below the high-burden threshold.
- So overall, the energy assistance portfolio is reducing the energy assistance need by approximately **22%**.
- **Funding levels appear to be generally sufficient at this time.** If energy burden reduction were to be pursued solely through increased funding, the assistance budget would have to be increased threefold to meet CETA's 2030 requirements and fivefold to completely eliminate the energy assistance need. Moreover, Avista's partner agencies are definitely not equipped to distribute that level of funding. Aside from standard annual budget adjustments or new budgets for pilots, we do not recommend significant budget changes in the near term, however, we recommend that the allocation of funds among programs be assessed through an energy burden potential forecast to ensure an optimal mix of short-term and long-term energy burden reduction.
- The most effective means to reduce Avista's customer energy burden over the next 5-10 years is to focus on better targeting of high-burden households through the existing programs.

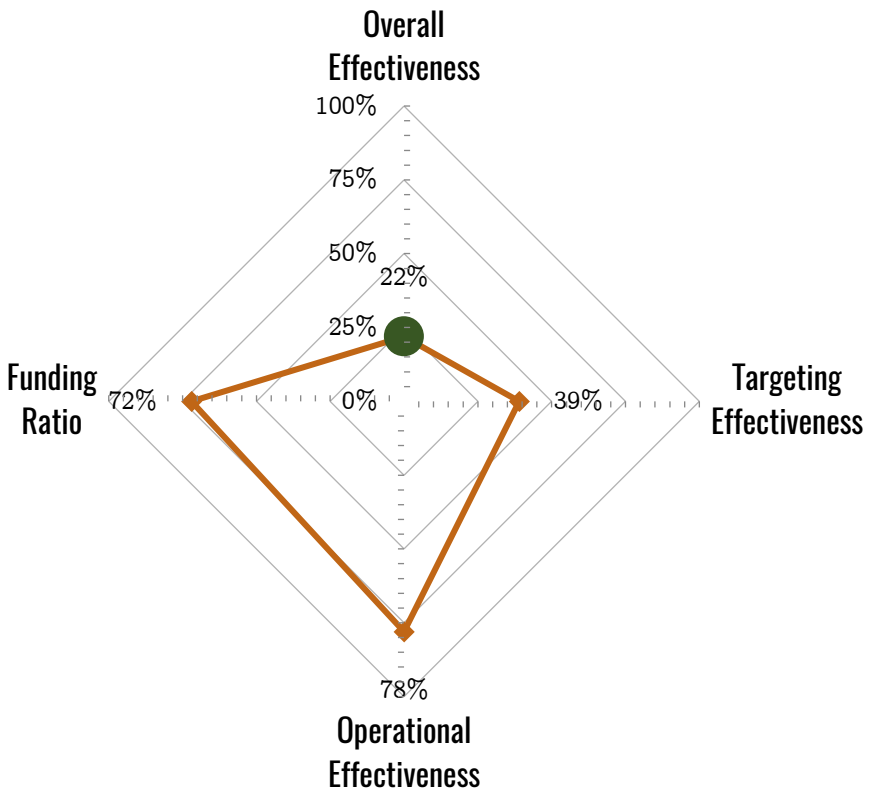


Figure 8. Performance metrics for Avista's energy assistance portfolio.

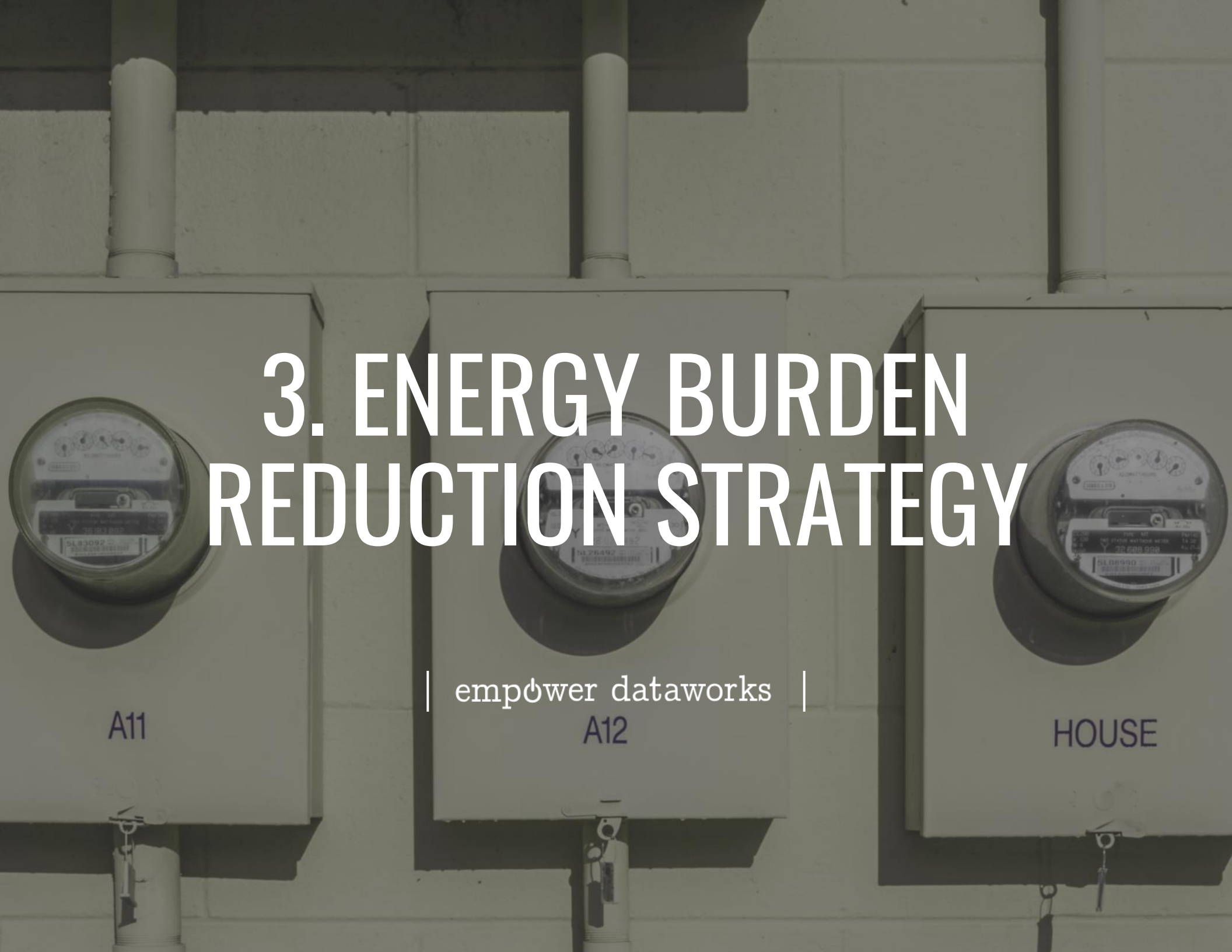
2.5 ADDITIONAL CONTEXT

- The top three measures in Avista's 2022-2045 Conservation Potential Assessment are:
  - Smart thermostats
  - Ductless mini-split heat pumps
  - Home energy management systems
  - Windows
  - Water heaters

  These measures account for almost 40% of Avista's residential potential but are highly inaccessible to low-income high-burden customers because of technical barriers or without incentives that cover 100% of cost.

- Aside from Avista's income-eligible conservation programs, the Multifamily Direct Install program will also be considered as part of Avista's energy assistance portfolio in the next phase of this assessment as it serves predominantly low-income renters (approximately 65-77% of program participants fall under 200% FPL).

- Avista's standard residential program (prescriptive measures and system conversions) has an approximate annual budget of $9M. Of all participants in this program, approximately 15% fall under 200% of the Federal Poverty Limit and half of those (approximately 8% of all participants) would be considered "high-burden". Low-income and high-burden customers are obviously under-represented in this program, but it is still contributing significantly to energy burden reduction.



3. ENERGY BURDEN REDUCTION STRATEGY

| empower dataworks |

2.1 POTENTIAL ACTIONS

The next 5-10 years will be a period of **diminishing conservation opportunities in the residential sector**. At the same time, equity requirements in CETA and Avista's BCP reinforce the need to prioritize energy burden reduction in high-burden households. To meet these challenges, Avista needs to pursue a holistic strategy that combines best practices in program marketing and delivery, combined with a full portfolio of interconnected program offerings.

Avista already has an impressive suite of energy efficiency and bill assistance program offerings that are well-designed and well-funded. Avista has also piloted or implemented numerous initiatives that are considered best practices. Empower Dataworks considers Avista's energy assistance program portfolio to be a gold standard, especially when it comes to funding levels and program design.

What comes next is the need to re-orient some of the programs to be able to achieve better energy burden reductions for high-burden customers.

To achieve this goal, we are presenting the following list of actions for Avista's consideration – these were selected to fit (i) Avista's current energy burden baseline, (ii) Avista's current robust program mix and (iii) best practices gleaned from conversations with peer utilities.

The actions fall in three categories:

i. *Research/Planning*: Actions needed to monitor and report energy burden reductions, and set realistic targets

ii. *Programs*: Actions related to tweaking current programs, or piloting new programs.

iii. *Funding*: Actions related to funding allocations.

The following parameters are given for each action:

- *Readiness level*: Has this action been widely deployed/researched in other jurisdictions?
- *Budget*: Expected budget range (outside of Avista staff time)
- *Avista staff time*: Time needed for project management or implementation
- *Energy burden impact:* The relative overall impact to Avista's customer energy burden. The actual impact will depend on the magnitude of investment in each action and its specific design.

	POTENTIAL ACTION	READINESS LEVEL	BUDGET	AVISTA STAFF TIME	ENERGY BURDEN IMPACT
RESEARCH/ PLANNING	Adopt energy burden reduction as a metric for all conservation programs	Intermediate	$		Foundational Action (No direct impact)
	Implement an energy equity monitoring plan	Intermediate	$ $		Foundational Action (No direct impact)
	Use Energy Burden in Program Design	Proven	$		
PROGRAMS	Implement a targeted marketing and outreach strategy	Proven	$ $		
	Deploy a One Portfolio Model for energy assistance programs	Intermediate	$ $ $		
	Community and small business energy efficiency in high-burden neighborhoods	Proven	$		
	Landlord-targeted energy efficiency	Pilot	$ $ $		
	Energy Ambassador program	Pilot	$ $		
	Democratizing the smart home	Pilot	$ $ $		
	Income self-certification	Intermediate	$		
FUNDING	Pre-weatherization incentives	Proven	$		
	Review regional and program-level funding allocations	Proven	$		

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ADOPT ENERGY BURDEN REDUCTION AS A METRIC FOR ALL CONSERVATION PROGRAMS

Type: Research/Planning

Readiness level: Intermediate

Main Goal: Measure program progress towards energy equity and affordability

Target Customer Segment: All program participants

Budget: Internal Staff Only

Required Avista Staff time: *Moderate* (Conservation staff time to make internal business case)

Description:

"*You cannot manage what you cannot measure*"

If Avista's programs are meant to prioritize high-burden customers, then they need to excel at reaching high-burden customers and identifying high-burden customers among program participants. This is not an insurmountable task, particularly for the low-income energy efficiency program, where incomes are already collected as part of the intake process.

As a first step, the Avista Conservation team will need to get internal buy-in to adopt energy burden-related metrics as formal program metrics. This includes developing the internal business case and verifying the feasibility of doing this through data sharing, technical infrastructure and reporting tools. Ideally, this would happen in coordination with the Energy Assistance team so that energy burden can be used for reporting across Avista's energy assistance portfolio.

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IMPLEMENT AN ENERGY EQUITY MONITORING PLAN

Type: Research/Planning

Readiness level: Intermediate

Main Goal: Evaluate the reduction in energy burden and access to programs for high-burden customers. Include metrics in annual conservation reports

Target Customer Segment: All program participants

Budget: *Moderate* (Planning studies and IT system setup)

Required Avista Staff time: *Moderate* (Conservation staff for project management, IT staff for 6-9 months to set up internal systems)

Description:

Following the adoption of energy burden as an internal program metric, the next step would be to build the infrastructure required to facilitate energy burden reporting. One potential option is for Avista to adopt the Energy Equity Monitoring Plan that was prepared as part of this Energy Burden Assessment. The plan details the methodology and types of studies/analysis that would be required on an ongoing basis, in order to plan, evaluate and design equitable programs.

Subtasks:

- Transfer income data from CAAs for all program applicants and program participants
- Set up internal database systems to facilitate energy burden calculations
- Develop 2-3 key metrics by program in order to assess energy burden reduction performance
- Integrate these metrics in standard program reporting

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USE ENERGY BURDEN IN PROGRAM DESIGN

Type: Research/Planning

Readiness level: Proven

Main Goal: Align program rules with energy burden reduction

Target Customer Segment: Program participants

Budget: Internal Staff Only

Required Avista Staff time: *Minimal* (Conservation staff)

Energy Burden Impact: *High* (primarily improves the targeting effectiveness of programs by directing more funding/offerings to high-burden customers)

Description:

Avista has already piloted a Percentage of Income Payment Plan (called the Income Based Payment Program). These programs are extremely effective at reducing energy burden because they specifically target high-burden households.

A natural extension of this idea for conservation programs is to use energy burden either as a hard qualifying criterion or as a more gradual adjustment factor in a **tiered incentive model**. For example, customers who fall between 0-50% of the Federal Poverty Limit can be allowed to access higher incentives (up to 100%) for some of the measures in Avista's standard residential energy efficiency offerings that are not currently provided through the federal Weatherization Assistance Program or Avista's Low Income Conservation program. These would include smart thermostats, washer/dryers, water heaters and potentially HVAC tuneups, other appliances or smart devices. Or a small portion (20-40%) of the incentive cost for low-burden customers could be shifted to zero-interest on-bill loans to free up and prioritize funds for high-burden customers.

Another way to use energy burden within the current energy efficiency programs is to add high-burden applicants to a **priority queue** that bypasses the standard wait times for weatherization and audits (which can be up to 2 years).

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IMPLEMENT A TARGETED MARKETING AND OUTREACH STRATEGY

Type: Programs - Operations

Readiness level: Proven

Main Goal: Improve participation of high-burden customers in current programs

Target Customer Segment: High-burden customers

Budget: $40-60k (strategy + marketing expenses)

Required Avista Staff time: *Moderate* (Communications + Energy Assistance + Conservation staff)

Energy Burden Impact: *High* (primarily improves the targeting effectiveness of programs, so more high burden customers participate)

Description:

Program targeting is a catch-all term and it could manifest as any of the following:

- Use a consistent, repeatable process for creating targeted marketing campaigns that are culturally and demographically relevant. One example is *Empower Dataworks Targeting Playbook*, but there are other frameworks that accomplish the same goal.
- Identify high-burden customers and neighborhoods using data from this Energy Burden Assessment and use these customer lists for targeted informational campaigns.
- Initiate a program of energy bill clinics in high-burden neighborhoods to raise awareness about energy efficiency and to provide an educational opportunity to customers about their bills.
- Build relationships with large property managers, trade allies and community organizations that serve high-burden neighborhoods.
- Test the *Whole Neighborhood Approach* to energy efficiency/weatherization, especially in concentrated pockets of energy burden in more rural areas. (https://www.osti.gov/biblio/1126788)

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DEPLOY A ONE PORTFOLIO MODEL FOR ENERGY ASSISTANCE PROGRAMS

Type: Program - Operations

Readiness level: Intermediate

Main Goal: Integrate all of Avista's energy assistance programs into one optimized and customizable customer offering

Target Customer Segment: Program participants

Budget: Depends on the specific subtasks, but likely on the moderate to higher end.

Required Avista Staff Time: *High* (IT + Communications + Energy Assistance + Conservation staff + Community Action Agencies + Program Implementation Contractors)

Energy Burden Impact: *High* (Through stacking multiple programs to bring energy burden for all participants below the 6%/3% threshold)

Description:

Given the energy burden characteristics of Avista's high-burden customers, it is unlikely that participation in one isolated program at a time would completely eliminate high energy burden for the majority of customers. Instead, most customers would benefit from stacking the energy burden reduction from multiple relevant programs. This will necessarily involve closer integration and coordination between the energy assistance and conservation teams, the community action agencies and program implementation contractors, so that customers receive the assistance that is most impactful and cost-effective.

This coordination might include:

- A single, unified intake and application process for all low-income programs.
- A unified customer triage system to serve customers an optimized program mix based on their energy burden and energy efficiency potential.
- An energy education/conservation component in all energy assistance programs.
- Tiered incentives that encourage cross-program participation.
- Formal processes for cross-referrals between programs, customer follow-ups, tracking customer referrals and cross-program conversion rates.

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COMMUNITY AND SMALL BUSINESS ENERGY EFFICIENCY IN HIGH-BURDEN NEIGHBORHOODS

Type: Program - Operations

Readiness level: Proven

Main Goal: Build rapport with trusted businesses and institutions in high-burden communities

Target Customer Segment: Businesses and community buildings in high-burden neighborhoods

Budget: Small increase in CEEP budget

Required Avista Staff Time: *Minimal* (Expansion of current program)

Energy Burden Impact: *Minimal* (Doesn't directly reduce energy burden but builds trust with potential participants)

Description:

Avista is successfully running a Business Partner program that targets outreach at rural small businesses and provides free energy assessments. This action would be a minor modification to the program to include community organizations (especially religious facilities and community centers) within the target customer segment. These organizations are great advocates for energy efficiency and can help Avista bridge the trust barrier with customers. In addition, we suggest that Avista expand outreach from just rural areas to any high-burden neighborhood, including within Spokane.

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LANDLORD-TARGETED ENERGY EFFICIENCY

Type: Program

Readiness level: Pilot

Main Goal: Directly reach the energy efficiency decision makers in rental housing

Target Customer Segment: Landlords and property managers of single family and small multifamily rentals

Budget: *High.* Can use staff if done as separate initiative – or integrated in Multifamily Direct Install program

Required Avista Staff Time: *Moderate-High* (Conservation staff to design and implement program)

Energy Burden Impact: *High* (Reduces renter energy burden)

Description:

Since most of Avista's customer energy assistance need is among renters, conservation programs that prioritize high-burden customers cannot avoid the split incentive question. A pilot program could test the potential of offering energy efficiency incentives (with increased incentives up to 90-100% of measure cost), to landlords in high-burden areas. This would ensure that the homes that are likely to house high-burden customers are made more efficient.

One of the biggest challenges for smaller "mom and pop" landlords is unexpected expenses from having to replace broken appliances or HVAC equipment.

This is an extremely opportune moment to engage with landlords by offering them either low-cost on-bill loans or incentives for efficient replacements (provided they agree to an energy audit, for example).

Aside from financial incentives, targeted communication to landlords should always highlight their specific benefits of energy efficiency (not energy bill reductions). These include lower tenant turnover rate and increased property values. Outstanding questions that should be handled during the program design, include disclosure of on-bill loans or the potential for rent increases after participation in an energy efficiency program.

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ENERGY AMBASSADOR PROGRAM

Type: Program

Readiness level: Pilot

Main Goal: Train community members in energy audits and the program application process

Target Customer Segment: 30-50 Energy Ambassadors + their communities

Budget: *Moderate* (Energy ambassador training/stipends)

Required Avista Staff Time: *High* (Conservation staff to design and implement program)

Energy Burden Impact: *High* for Energy Ambassadors, *Moderate* for their community members who enroll in programs.

Description:

A primary barrier to energy efficiency program participation by low-income customers is lack of trust. In many communities around Washington, there are regular customers who assist others in their communities explain the benefits. The Energy Ambassador program would formalize this process by paying a stipend to the "Energy Ambassadors" (usually low-income high-burden customers themselves) based on how many applications they bring in to the conservation programs.

As an extension to the referral portion of the program, the Energy Ambassadors could be trained to perform quick walkthrough energy audits and submit a simple audit form to Avista. These "citizen energy auditors" would be empowered through performance-based income while leveraging their trusted connections to encourage participation among their neighbors and families. The workforce development component would also serve Avista in the long run by reducing friction and expense in the intake/audit stage of energy efficiency programs.

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DEMOCRATIZING THE SMART HOME

Type: Program

Readiness level: Pilot

Main Goals: Increase access of high-burden customers to smart devices. Evaluate savings for future smart device programs. Set up high-burden customers for future participation in demand response programs.

Target Customer Segment: High burden customers interested in smart devices

Budget: ~$500-800/participant

Required Avista Staff Time: *Moderate* (Conservation staff to project manage)

Energy Burden Impact: *Moderate* (expected savings of 800-1000 kWh/year)

Description:

Avista's conservation potential includes smart thermostats and Home Energy Management Systems as two of the top 3 measures in the next biennial cycle. Smart devices offer convenience to customers and they usually deliver a fair amount of energy savings when used correctly. However, low-income households have been unable to access them, because of a lack of internet connectivity or their renter status or technical incompatibility (most low-income homes use zonal heat). In addition, low income customers may not be able to afford the purchase cost of these smart devices.

Avista can potentially pilot approaches to democratize access to smart devices through a smart device pilot to deploy smart devices in low-income homes. This would include hardware, software, a financing model and a marketing plan to sell the benefits of these devices to landlords and tenants.

The packaged solution should include line voltage thermostats, plug load controllers, humidity and leak detectors, and indoor temperature sensors connected to a 4G cellular hub. The data from the smart devices would be used to develop personalized home energy efficiency diagnostic reports that offer personalized behavioral energy-savings tips and home upgrade recommendations.

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INCOME SELF-CERTIFICATION

Type: Pilot

Readiness level: Intermediate

Main Goal: Reduce the paperwork required for customers to enroll and reduce the administrative burden of the Community Action Agencies

Target Customer Segment: High burden customers who are intimidated by documentation requirements

Budget: Internal Staff Only

Required Avista Staff Time: *Moderate* (mainly Conservation staff time for QA/QC or automated processes by IT)

Energy Burden Impact: *Low* (Encourages participation by high burden customers)

Description:

Income self-certification has proven to be an effective way to enroll customers in programs by reducing administrative hurdles. This potential action would test a sampling QA/QC approach, where income self-certification is accepted from all applicants to one of the conservation programs or pilots, with a small fraction of customers sampled for full income verification.

A proposed protocol for QA/QC is presented below:

1. For measures costing less than $500, sample 4-5% of program applicants at random. If their neighborhoods and home values do not align with expectations for a low-income household, request that they provide income documentation to the Community Action Agency before the application goes through.

2. If more than 10% of customers fail income verification or do not go through the process, increase the sampling rate in 5% increments

3. For measures costing over $500-$3000, use a 25% sampling rate to do internal data checks (using home values or income data) and forward another 5% to the relevant Community Action Agency for manual income verification.

4. Avista can also pilot an **opt-out program design**, where customers are automatically enrolled based on individual demographic data or by enrolling entire high-burden neighborhoods, with a similar audit protocol.

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PRE-WEATHERIZATION INCENTIVES

Type: Funding

Readiness level: Proven

Main Goal: Assist customers who intend to participate in weatherization but whose applications were deferred for other issues

Target Customer Segment: High burden weatherization participants with deferral issues in home

Budget: Internal Staff Only

Required Avista Staff Time: *Low* (Conservation staff to set up process for CAAs)

Energy Burden Impact: *Low* (Removes a key barrier to participation for many high burden customers)

Description:

This action involves allocating a portion of the low-income energy efficiency program budget as grants towards fixing issues in customer homes that would lead to deferral of weatherization (e.g. structural and electrical issues, asbestos). Some experiments with similar initiatives in Massachusetts have shown promise in making sure that interested customers are still served by programs after these issues are mitigated. In Avista's case, it is recommended that only high-burden customers (or customers who fall under 50% of the Federal Poverty Limit) are given access to this pool of funds.

Back to list of actions

REVIEW REGIONAL AND PROGRAM-LEVEL FUNDING ALLOCATIONS

Type: Funding

Readiness level: Proven

Main Goal: Ensure that budgets are sufficient to meet current program needs across different community action agencies. Ensure that the current program mix will meet long term energy burden goals.

Target Customer Segment: Program participants

Budget: Internal Staff Only

Required Avista Staff Time: *Low*

Energy Burden Impact: *Low*

Description:

This energy burden assessment has found no need for additional program funding at this time, aside from potential new pilot budgets. However, it would be useful to regularly review budget utilization across the different community action agencies and identify any that might need additional funds or a funding reallocation.

Optionally, if Avista undertakes an *energy burden potential study*, it will be possible to review the allocation of funding among programs and to judge whether the current allocation serves Avista's long-term energy burden reduction goals under CETA.

2.2 NEXT STEPS

The actions proposed in this strategy document have different readiness levels and will require different levels of effort. Realistically, it is unlikely that everything can be tested in the coming biennium. Therefore, we suggest that Avista consider these actions and then prioritize the most impactful or compelling ones for actual implementation.

Our recommended workflow for implementing these actions is:

> In the next 12-18 months (by the end of Q4 2022), we would recommend that Avista complete the two foundational planning actions (internal adoption of energy burden metrics and the energy equity monitoring plan). Another low hanging fruit that can be started in tandem is to begin identifying high-burden customers and neighborhoods and implementing a targeted marketing and outreach strategy. Strategic initiatives like the One Portfolio Model should be assessed for feasibility before implementation and this will take some time. Finally, depending on the Conservation and Energy Assistance team capacity, it is likely that between 1-3 pilot ideas can be tested annually. The activities that show potential can then be integrated into Avista's programs.

2.3 ADDITIONAL RESOURCES

POTENTIAL ACTION	RESOURCES
Adopt energy burden reduction as a metric for all conservation programs	Roger Colton, January 28, 2020. Presentation can be requested from WA Dept. of Commerce. Energy Trust of Oregon, Diversity, Equity and Inclusion Operations Plan. https://energytrust.org/about/explore-energy-trust/diversity-equity-and-inclusion/
Implement an energy equity monitoring plan	Refer to Energy Equity Monitoring Plan attachment in this energy burden assessment.
Implement a targeted marketing and outreach strategy	Empower Dataworks (hello@empowerdataworks.com) can share a Targeting Playbook and request a utility presenter to share their experiences.
Deploy a One Portfolio Model for energy assistance programs	D. Hernandez and S. Bird, Energy Burden and the Need for Integrated Low-Income Housing and Energy Policy, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4819257/
Landlord-targeted energy efficiency	Energy Trust of Oregon enhanced incentives for landlords: https://energytrust.org/incentives/landlords-property-managers-single-family-homes/
Energy Ambassador program	Can borrow some design elements from HVAC contractor training programs: https://www.aceee.org/files/proceedings/2012/data/papers/0193-000210.pdf
Democratizing the smart home	Empower Dataworks (hello@empowerdataworks.com) can share a concept paper upon request.
Income self-certification	Low-income/hard-to-reach energy efficiency programs in Texas use self-certification for income qualification – as an example: http://www.swepcogridsmart.com/texas/downloads/HTR%20Program%20Manual.pdf
Pre-weatherization incentives	Mass Save's Barrier incentive: https://www.masssave.com/save/barrier-incentive

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ENERGY BURDEN ASSESSMENT

ENERGY EQUITY MONITORING PLAN

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AVISTA ENERGY BURDEN ASSESSMENT

ENERGY EQUITY MONITORING PLAN

SEPTEMBER 2021

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INTRODUCTION

This report presents a proposed plan for evaluating and monitoring energy burden reduction through Avista's programs. The plan outlines planning, measurement and evaluation activities that should be implemented on an ongoing basis by the Conservation team and/or outside consultants.

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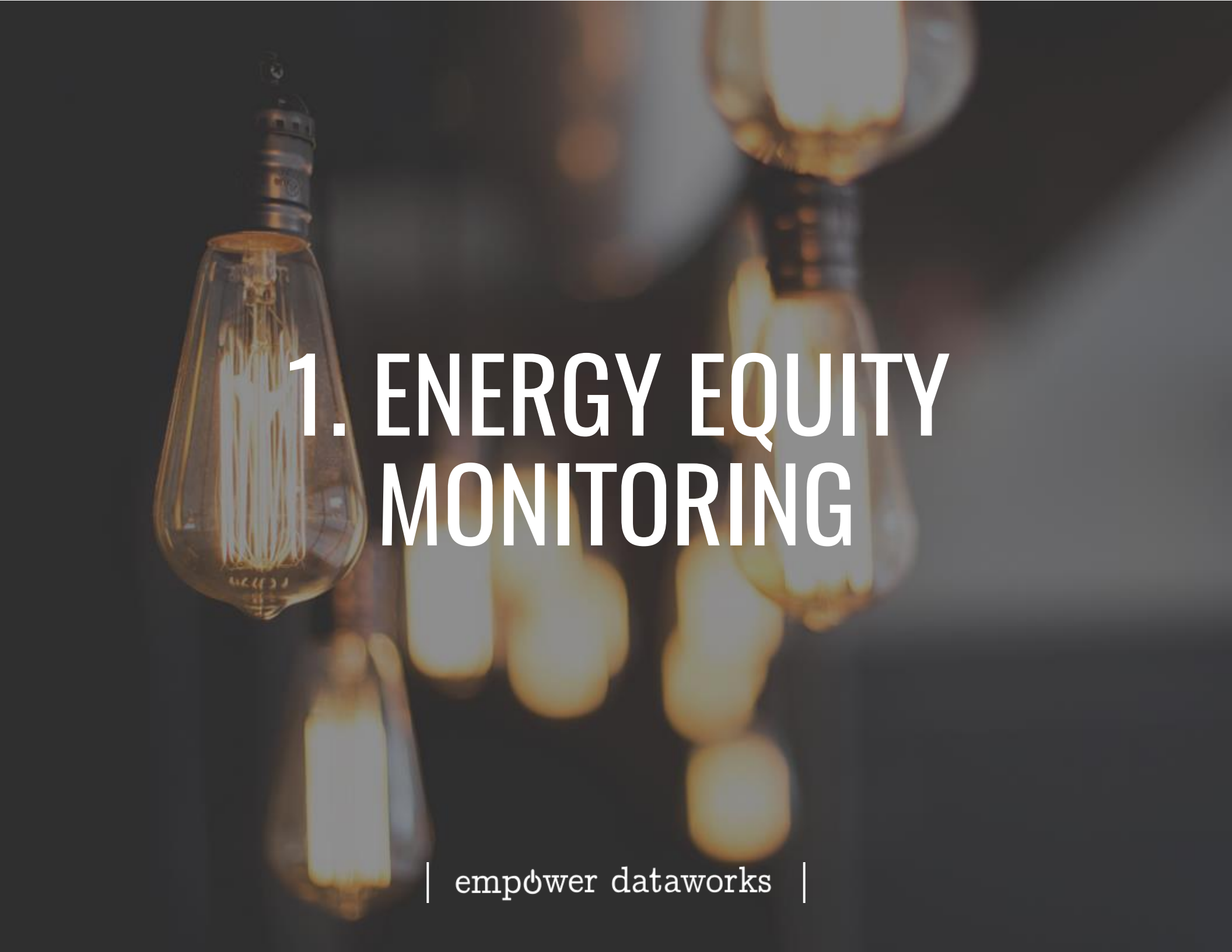

1. ENERGY EQUITY MONITORING

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1.1 GENERAL FRAMEWORK

Empower Dataworks is recommending that Avista adopt the Energy Equity Flywheel framework[1] for monitoring energy equity across its programs (see Figure on page 7).

The Flywheel framework relies on **strong feedback loops** between the different components of a program. Each feedback loop involves sharing data and information **to drive decisions** in other components of the flywheel. As the flywheel gains momentum and effective communication and reporting processes are put in place, the feedback loops become stronger. Program delivery becomes more **streamlined**, more customers are served, and program **cost-effectiveness improves**.

The flywheel is then able to keep rolling unless it meets significant resistance from any of the *"flywheel brakes"*, including funding issues, poor stakeholder engagement or breakdown of feedback and accountability.

There are four components to any well-run program:

Understand: This involves understanding low-income and high-burden customers in your service territory. Understanding the need and program gaps drives better program design and also allows your program evaluations to focus on the metrics and processes that matter. This is achieved using *energy burden assessments.*

Evaluate: This is a deep dive into the performance of your existing energy assistance programs. The purpose of this stage is to identify points of improvement in the delivery and cost-effectiveness of existing programs. This is implemented through *"equity-aware" program process and impact evaluations.*

Design: The data from energy burden assessments and program evaluations can be used in an *energy burden potential study* to forecast energy burden reductions under different scenarios, including different incentive/discount

[1] https://empowerdataworks.com/energy/white-paper-quantitative-energy-equity/

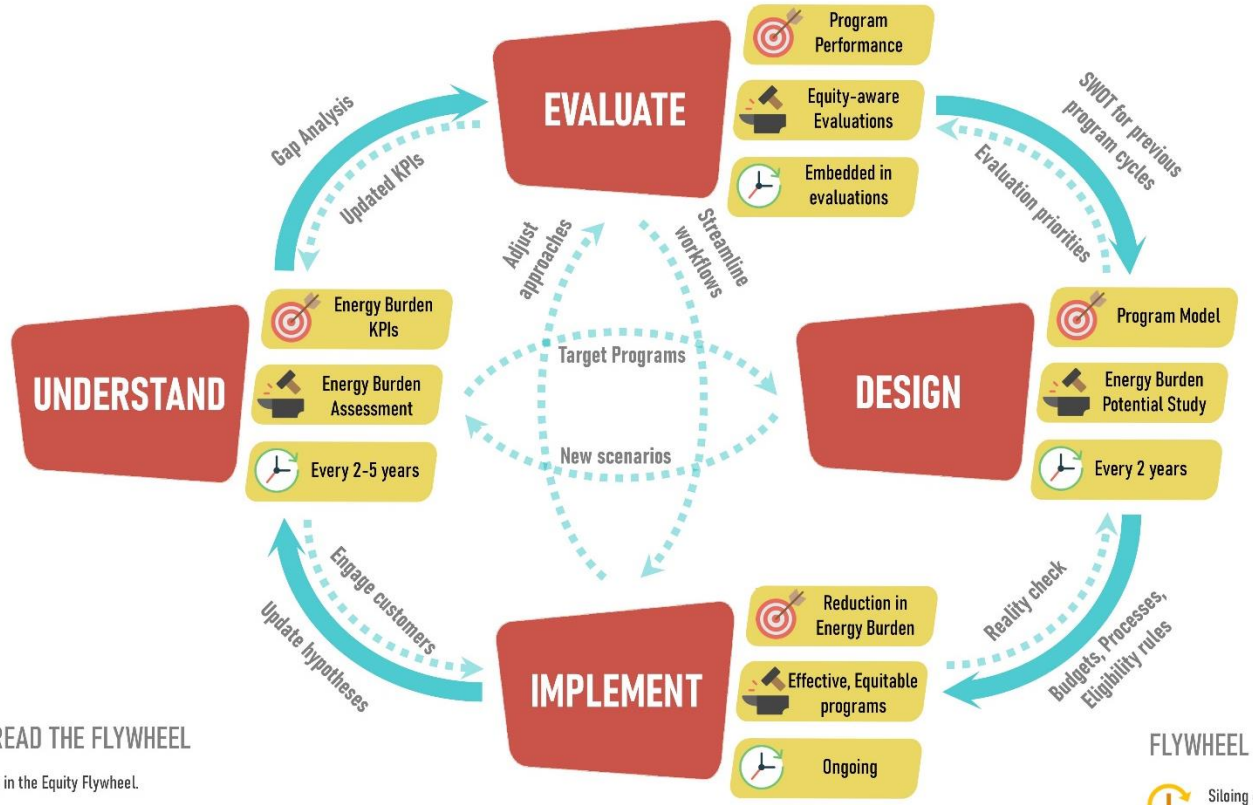
structure and economic analysis, and assessment of non-participants. This can then be used to drive program design decisions.

Implement: All of these different exercises are useless, unless they are used for program implementation. *Execution is key.* The understanding of customers, program performance and program design implications results in equitable and effective programs that are optimized for reducing energy burden. Front-line experiences should also be communicated back, so that evaluations, needs assessments and potential studies are more useful and usable in the future.

Keep in mind that the components in the Flywheel are nothing new. *It's the blue data connections that make the flywheel magical*, by making sure each component meaningfully informs every other one.

Details on the specific monitoring activities and their methodologies are provided in the sections 1.2-1.5. Then a proposed schedule and an organizational chart is provided in Sections 1.6 and 1.7, respectively

THE ENERGY EQUITY FLYWHEEL



HOW TO READ THE FLYWHEEL

- Stage in the Equity Flywheel.
- Key insights or outcomes of a stage.
- Key activity for a stage in the flywheel.
- Recommended frequency of applying a stage.
- Driver for the following stage.
- Feedback loop

FLYWHEEL BRAKES

- Siloing of Understand/Evaluate/Design/ Implement. Breakdown of feedback loops.
- Poor engagement with stakeholders and/or customers
- Insufficient budgets or restricted budget allocations

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1.2 ENERGY BURDEN ASSESSMENT

Budget Estimate	$60-100k
Staff Requirements	Project management and integration of findings into reports.
Timeline Estimate	5-8 months
Frequency	Once every 4-5 years, potentially with more frequent but lighter data updates to drive marketing/outreach

Description

An energy burden assessment is meant to quantify the energy burden and energy assistance need for Avista's customers. The goal of this study is to better understand the geographic, demographic and building attributes for low-income, high burden customers, in order to drive better program planning, design and implementation.

Key Questions

- Who are our low income customers?
- Who are our high-burden customers? How do they use energy?
- How many customers would be eligible for assistance programs?
- How much is the energy assistance need in our service territory?
- How are the current programs doing at reaching high-burden customers? Where are the gaps in program coverage?
- Where do our low income (and high burden) customers live?
- Have any of our programs struggled with low participation rates? Why?

Methodology

An energy burden assessment is a big data collection and analysis exercise that relies on collecting customer-level data, modeling missing attributes, then aggregating by geographic, demographic and other attributes for analysis. The customer data comes from various sources: the utility, county assessors, third party marketing data, and the Census Bureau.

The following metrics are gathered or calculated as part of an energy burden assessment (at the individual household level):

- Demographics (income, homeownership, age, ethnicity for some customers, likelihood to be late on bills)
- Building Characteristics (vintage, type, square footage)
- Energy use characteristics (energy use intensity, baseload, cooling and heating loads, fuel types)
- Program characteristics (participation, eligibility, likelihood to participate)

Individual households should also be geocoded and tagged with their census tract and block information, including environmental factors, second language speakers, seniors etc.

1.3 EQUITY-AWARE PROGRAM EVALUATIONS

Budget Estimate	~3-5% of standard program evaluation budget
Staff Requirements	Project management and interpretation of findings.
Timeline Estimate	In tandem with regular program evaluations
Frequency	Integrated with standard program evaluations

Description

This activity is about the inclusion of equity and energy burden metrics within Avista's standard EM&V process. The goal is to calculate the energy burden reduction resulting from Avista's low-income and non-low-income conservation programs.

Key Questions

- What are the savings and energy burden reductions among high-burden and low-income customers?
- Are our application processes streamlined and easy to follow?
- Do low-income customers benefit from all measures in our programs or are some harder to access?

Methodology

In a perfect world, this would be a simple add-on to Avista's current impact and process evaluations with the evaluators using Avista's energy burden reporting systems in combination with their standard evaluation protocols. See Section 1.5 for more details.

1.4 ENERGY BURDEN POTENTIAL STUDY

Budget Estimate	$40-60k
Staff Requirements	Project management and brainstorming.
Timeline Estimate	4-6 months
Frequency	Once every 2 years, to inform biennial energy burden reduction targets

Description

Energy burden potential studies are forecasts that use customer energy burden and program performance data to project the total achievable energy burden reductions over a certain time period. They help set realistic energy burden reduction targets and understand the requirements for meeting longer term goals (e.g. CETA) given a utility's customer and program characteristics. These studies are not purely quantitative – they also include a qualitative research component to understand the specific barriers to participation (information, transactional, stigma and trust) among a utility's *non-participating customers*. These studies are also a venue to plan a utility's entire energy assistance portfolio as one (instead of individually planning separate programs).

Key Questions

- What are the primary constraint for our most under-served customers? How important is each barrier?
- In a world without constraints, how much of our energy burden can we realistically eliminate?
- How much energy burden can we reduce in an economically cost-effective manner?
- How much energy burden can we reduce given program and funding constraints? What should our energy burden reduction target be?
- Should we reallocate funds between short-term and long-term energy burden reduction programs?

Methodology

- Interviews, focus groups and surveys with program non-participants to characterize barriers to participation and the desire to participate among different groups of customers.
- Qualitative analysis to forecast the cumulative energy burden impact over a 10-30 year horizon under different scenarios:
  - Status quo
  - Different funding levels and allocations between short-term and long-term programs
  - Different program combinations for program participants
  - Including the impact of targeting or new program designs (e.g. tiered incentives)

1.5 ENERGY BURDEN REPORTING

Budget Estimate	Internal effort
Staff Requirements	Project management and interpretation of findings.
Timeline Estimate	Setup will require 6-9 months, with standardized reporting after that
Frequency	Annual

Description

This activity captures the internal work by the Data Analytics and Customer Information Systems teams to set up Avista's internal databases and reporting systems to facilitate energy burden reporting both internally and for various regulatory requirements.

Methodology

This activity will involve the following subtasks:

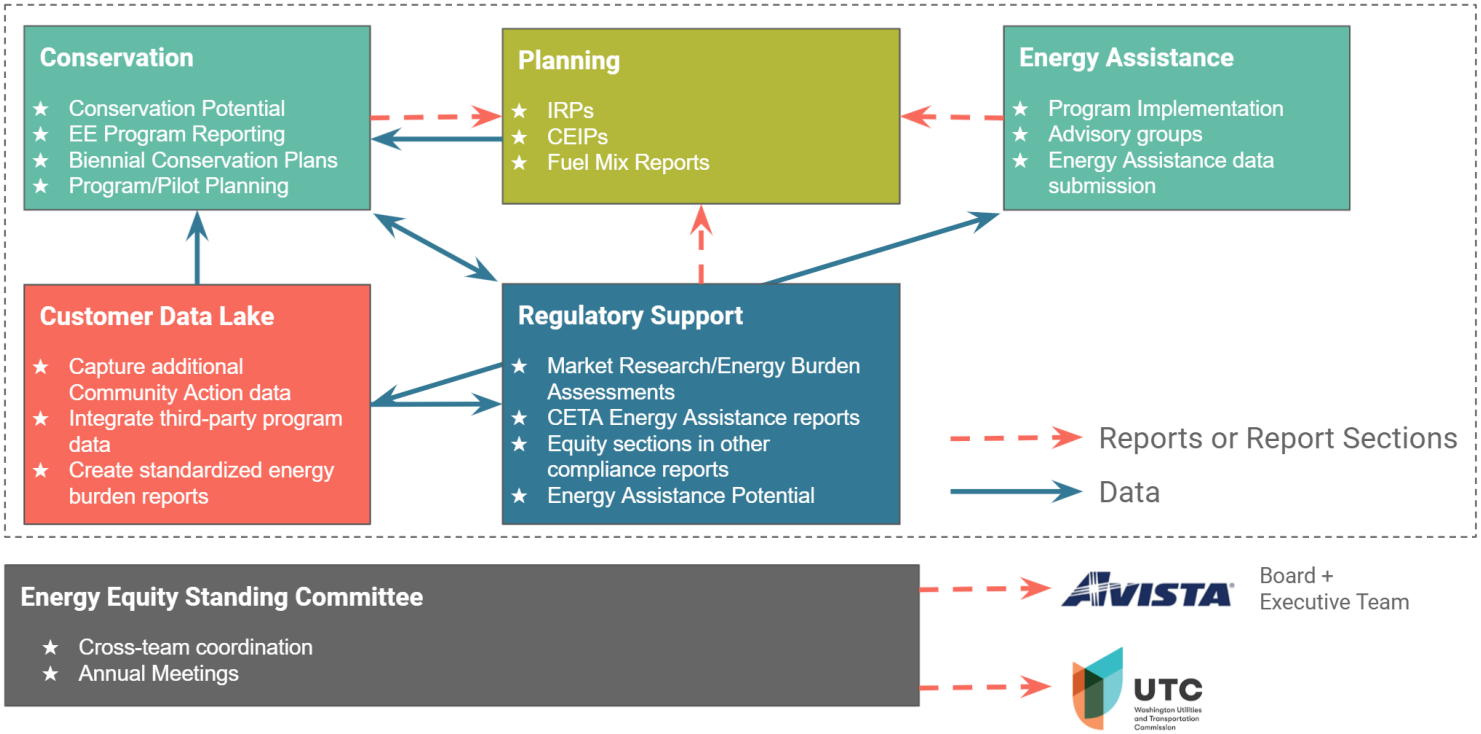
- Data sharing agreements with Community Action Agencies (CAAs) to provide customer demographic data. Ideally, all data collected in the application process should be shared, but at a minimum, the CAAs would provide income and homeownership status, home type and heating fuel.
- Standardization and integration of third-party program data into Avista's systems (esp. Multifamily Direct Install and Behavioral programs)
- Creating standardized reports for use by the Energy Assistance and Conservation teams. These reports should include the following metrics at the participant level and aggregated by program, calendar year, geographic location and other available demographic variables:
  - Energy burden prior to participation
  - Energy burden reduction resulting from program for all participants. For conservation programs, this will include calculating the lifetime energy burden reduction based on measure life.
  - Energy burden reduction for high-burden participants (aka reduction in energy assistance need)
  - Number of disconnection letters or past due notices
  - Number of customers brought under the high burden threshold by the program.
  - Map customer addresses to census tracts to enable further analysis by Conservation and Energy Assistance teams and for CEIP reporting

1.6 SUGGESTED SCHEDULE OF ACTIVITIES

	ACTIVITY COMPLETION DATE									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Burden Assessment	X				X				X	
Energy Burden Potential Study			X		X		X		X	
Equity-Aware Program Evaluation		Setup	Ongoing							
Energy Burden Reporting		Setup	Ongoing							
Annual Conservation Plan	X	X	X	X	X	X	X	X	X	X
CETA Section 120 Report (February)		X		X		X		X		X
Biennial Conservation Plan (October)	X		X		X		X		X	

1.7 ROLES AND RESPONSIBILITIES

Implementing an effective monitoring plan is complicated and will require the coordination of multiple teams and contractors across Avista. A schematic of the different flows of data and reports among the different roles and departments at Avista is shown below. Given this complexity, we recommend that Avista utilize a standing committee on energy equity that coordinates the different reporting requirements and ensures coordination among the different teams.



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