2023 Washington Annual Conservation Report

May 31, 2024

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

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

Front cover: Spokane, Washington

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INTRODUCTION

Palouse Hills, Whitman County, Washington

INTRODUCTION

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

The *2023 Annual Conservation Report* is intended to acknowledge the verified savings recognized by Avista for meeting the targets set forth in RCW 19.285.040(1) and is consistent with WAC 480-109-120(3), which outlines requirements for annual reporting and planning.

In 2023, the lingering effects of COVID-19 finally started to abate as customers in Avista's service territory began to take advantage of new and existing programs and services at participation rates similar to pre-COVID. While customers and contractors continued to report some supply chain constraints and labor shortages, program participation had a strong recovery, particularly in the fourth quarter of the year. One factor driving this increase in participation was customer participation in Avista's innovative new program offerings in 2023 – specifically the Midstream and Small-Business Direct-Install Lighting Programs. Avista programs continue to focus on affordability and flexibility, with a large emphasis on customer-centered energy solutions.

Avista also continued to develop and implement programs to meet goals outlined in the company's Clean Energy Implementation Plan (CEIP), which was the first in the state to be approved by the Washington Utilities and Transportation Commission in July 2022. The company continued to convene its Energy-Efficiency Advisory Group (EEAG) as well as its Equity Advisory Group (EAG), consulting members for input on program design attributes and outreach efforts. Non-energy impact values (NEI) continue to be identified and integrated into cost-effective calculations for the portfolio.

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

FIGURE 1 – ELECTRIC AND NATURAL GAS SERVICE AREAS

TARIFF RIDER BALANCES

At the start of 2023, the Washington electric and natural gas (aggregate) tariff rider balances were overfunded by roughly $2,800,000. Approximately $22.3 million in tariff rider revenue was collected to fund energy efficiency during the year, while around $35 million went to operate energy-efficiency programs. The $10.0 million deficit of collections over expenditures includes approximately $8.0 million in deficit revenue on the electric side, as well as an underfunded balance of approximately $2.1 million for natural gas programs. Combined, these ending balances resulted in a net underfunded balance of $10,032,786 by the end of the year.

Table 1 illustrates 2023 tariff rider activity by fuel type.

TABLE 1 – TARIFF RIDER ACTIVITY

	Electric	Natural Gas	Total
Beginning Balance (Underfunded)/Overfunded	**$ 4,659,613**	**$ (2,025,091)**	**$ 2,800,161**
Energy-Efficiency Funding Collected in 2023	$ 14,169,774	$ 8,087,070	$ 22,283,814
Total Funding Available in 2023	$ 18,856,357	$ 6,227,618	$ 25,083,975
Energy-Efficiency Expenditures	$ 26,864,052	$ 8,252,709	$ 35,116,761
Ending Balances (Underfunded)/Overfunded	**$ (8,007,695)**	**$ (2,025,091)**	**$ (10,032,786)**

WASHINGTON ACHIEVEMENTS

- ***Electric Conservation:*** For 2023, Avista's electric energy-efficiency program achieved 40,029 MWh of conservation from local programs and cost-effectiveness ratios of 1.71 for total resource cost (TRC) and 1.74 for utility cost test (UCT). Additionally, the new Generation, Transmission, and Distribution projects contributed an additional 11,324 MWh, bringing the total to 51,354 MWh. Finally, savings from NEEA's programs added an additional 5,322 MWh, bringing the overall savings achieved in 2023 to 56,676 MWh.

TABLE 2 – WASHINGTON ELECTRIC ACHIEVEMENTS

	Savings Achieved (MWh)
Commercial/Industrial	35,507
Residential	4,071
Low-Income	451
Generation, Transmission, and Distribution	11,324
Total Local Program	**51,354**
NEEA	5,322
Total	**56,676**

- ***Natural Gas Conservation:*** For 2023, Avista's natural gas energy-efficiency program achieved 587,779 therms of conservation from local programs and cost-effectiveness ratios of 1.62 for TRC and 1.09 for UCT. After including savings from NEEA's programs, the overall savings achieved in 2023 was 651,333 therms.

TABLE 3 – WASHINGTON NATURAL GAS ACHIEVEMENTS

	Savings Achieved (Therms)
Commercial/Industrial	137,839
Residential	435,191
Low-Income	14,749
Total Local Program	**587,779**
NEEA	63,554
Total	**651,333**

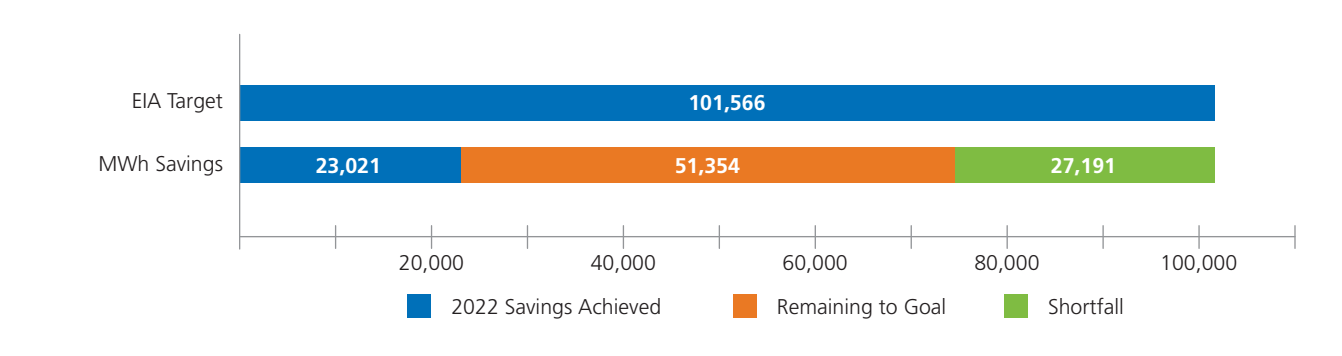
For the 2022-23 biennium, Avista's Washington Energy Independence Act (EIA) penalty threshold is 91,054 MWh, which is derived from several target elements, including the conservation potential from the company's conservation potential assessment (CPA) and excluding savings derived from the NEEA program. The utility-specific conservation goal is 96,132 MWh, which also includes Avista's 5 percent decoupling commitment. Table 4 summarizes the target calculation.

TABLE 4 – 2022–23 EIA TARGET

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

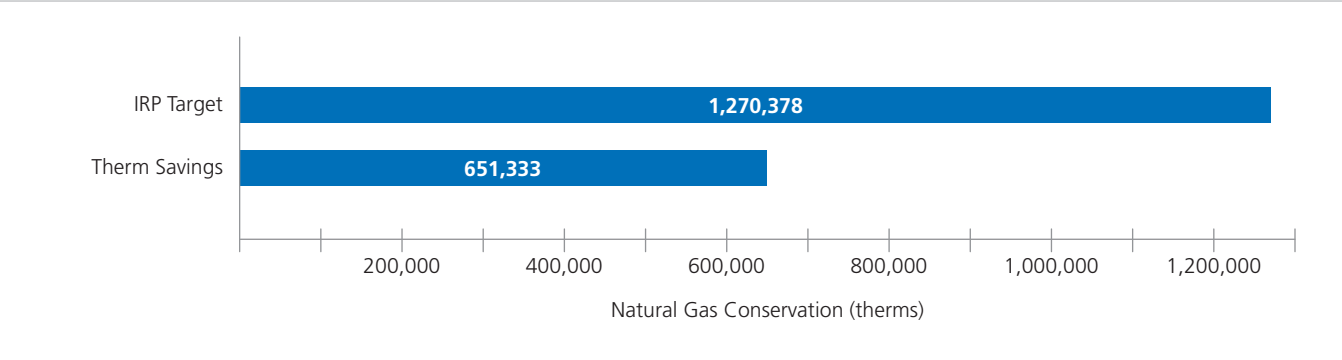
For the 2022-2023 biennium, Avista met 82 percent of its Utility-Specific Conservation Goal, achieving 74,375 MWh through conservation programs. By using 4,841 MWh of surplus conservation savings carried forward from the two prior biennia, Avista achieved 87 percent of its EIA Penalty Threshold of 91,054 MWh.

FIGURE 2 – 2023 CONSERVATION ACHIEVED VS. EIA TARGET



Avista's natural gas conservation target is set according to the company's 2023 natural gas *Integrated Resource Plan* (*IRP*). Based on this study, the conservation potential for 2023 was estimated to be 288,491 therms. During the 2023 program year, Avista's natural gas program achieved 651,333 therms, which is 51 percent of the *IRP* target. The 2023 achievement includes savings from the NEEA portfolio.

FIGURE 3 – 2023 NATURAL GAS SAVINGS VS. IRP TARGET



Portfolio Trends

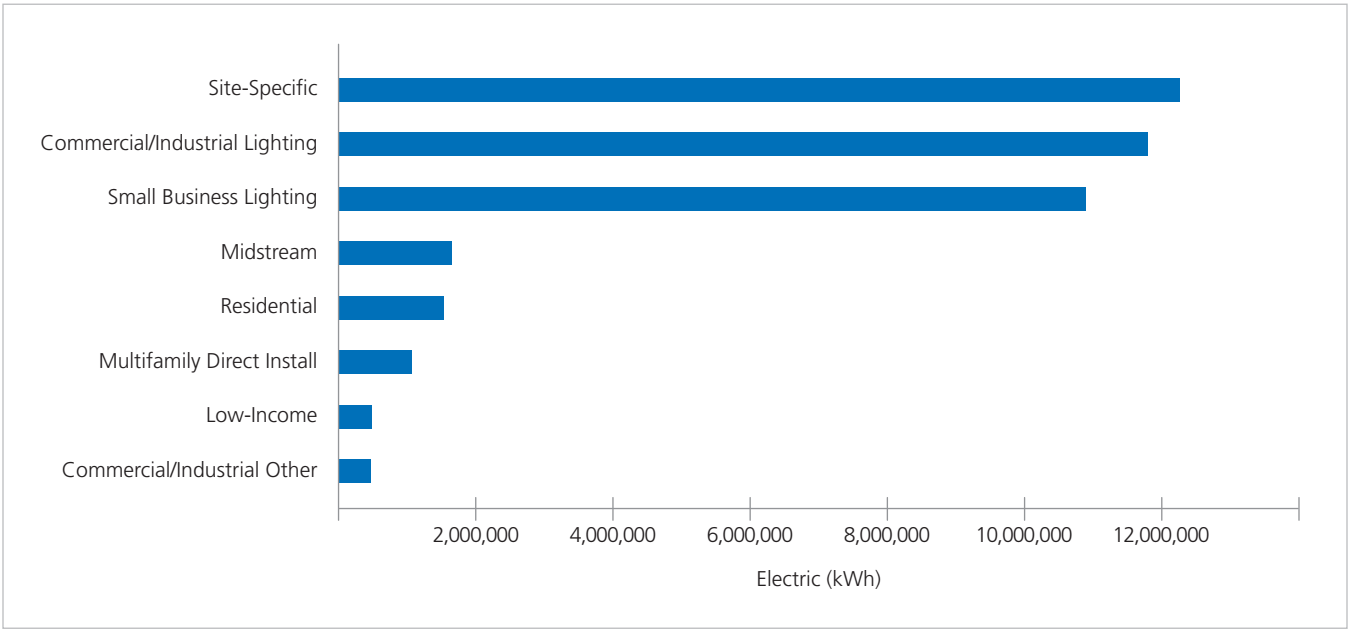
As shown in Table 5, Avista achieved significantly higher electric energy savings in 2023 than in 2022 (40,029,256 kWh vs. 23,020,657 kWh). This increase is attributable to an increase in commercial/industrial savings of 70 percent and an increase in residential savings of 133 percent, reflecting increased customer participation in Avista's efficiency programs as the region emerged from COVID restrictions in late fall of 2022. Higher program participation continued throughout 2023, as economic conditions began to normalize, and the region continued to recover from the pandemic.

TABLE 5 – ELECTRIC ENERGY SAVINGS (KWH)

Program Segment	2022	2023
Residential (including low-income programs)	2,119,973	4,522,040
Commercial/Industrial	20,900,684	35,507,217
Total	**23,020,657**	**40,029,256**

Of Avista's overall electric portfolio in 2023, the Commercial/Industrial Prescriptive Lighting Program achieved 60 percent of savings and Site-Specific Programs achieved 21 percent. Residential programs comprised 7 percent of savings. All other programs combined achieved the remaining 6 percent (see Figure 4).

FIGURE 4 – ELECTRIC ENERGY SAVINGS PORTFOLIO



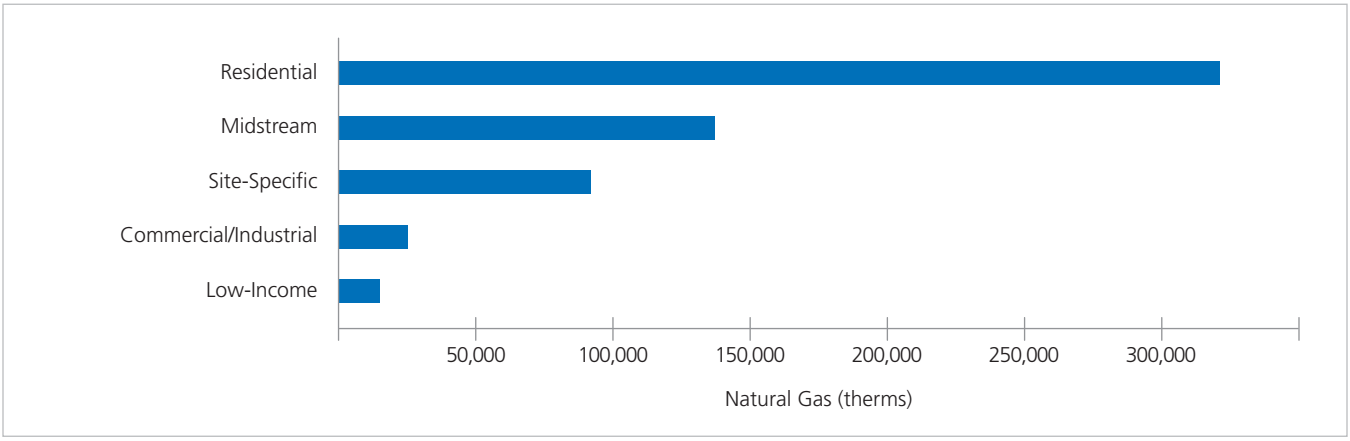
As shown in Table 6, Avista's natural gas portfolio experienced a slight increase in savings in 2023 compared to the prior year. While residential savings experienced a 7 percent decrease from the prior year, commercial/industrial savings saw a 134 percent increase, reflecting similar trends in increased participation for commercial customers as in the electric efficiency portfolio.

TABLE 6 – NATURAL GAS ENERGY SAVINGS (THERMS)

	2022	2023
Residential (including low-income programs)	486,950	449,940
Commercial/Industrial	58,819	137,839
Total	**545,769**	**587,779**

Residential programs obtained 74 percent of the natural gas savings portfolio in 2023. This is attributed primarily to high-efficiency natural gas furnace measures, which were installed in 1,826 homes and achieved savings of 166,603 therms. Commercial/Industrial Prescriptive Programs achieved 23 percent of the overall savings total, with Low-Income and Site-Specific Programs achieving the remaining 3 percent (see Figure 5).

FIGURE 5 – NATURAL GAS ENERGY SAVINGS PORTFOLIO



Verified Savings

As part of the Evaluation, Measurement, and Verification (EM&V) process, Avista's evaluators review the reported savings provided by the company and adjust savings where necessary. The details of these adjustments are included in the impact evaluation reports that have been appended to this report. In 2023, the electric portfolio reported savings of 41,402 MWh and achieved evaluated savings of 40,029 MWh, resulting in a realization rate of 97 percent. The natural gas portfolio reported 815,006 therms and achieved evaluated savings of 587,779 therms, resulting in a 72 percent realization rate.

Tables 7 and 8 illustrate the reported and evaluated savings and the resulting realization rates.

TABLE 7 – ENERGY-EFFICIENCY SAVINGS BY SECTOR – ELECTRIC

	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Commercial/Industrial	35,480,894	35,507,217	100%
Residential	5,394,701	4,070,617	75%
Low-Income	526,675	451,422	86%
Total	**41,402,270**	**40,029,256**	**97%**

TABLE 8 – ENERGY-EFFICIENCY SAVINGS BY SECTOR – NATURAL GAS

	Reported Savings (Therms)	Gross Evaluated Savings (Therms)	Realization Rate
Commercial/Industrial	129,300	137,839	107%
Residential	670,154	435,191	65%
Low-Income	15,552	14,749	95%
Total	**815,006**	**587,779**	**72%**

The primary factor contributing to a lower-than-expected realization rate for residential electric programs is a low realization rate for Residential Midstream Program savings as well as a low realization rate for Residential Shell Programs. Although these rates were offset somewhat by higher-than-expected realization rates for the Small Home/ Multifamily Weatherization Program and the Multifamily Direct Install Program, the overall realization rate was found to be 56%. With regard to the residential midstream realization rate, as noted in the impact evaluations, the primary difference between estimated savings and verified savings was the use of code baseline versus the RTF market practice baseline. Avista will work with its midstream partner to better align the baseline assumptions used in residential measures moving forward in 2024. As for shell programs, many of these realization rates can be attributed to differences between the Avista Technical Reference Manual (TRM) categories and Regional Technical Forum (RTF) Unit Energy Savings (UES) assumptions. In several instances, the Avista TRM utilizes an average range of RTF UES values rather than specific values for a number of project attributes – including, for example, equipment efficiency values, housing types, heating zones, and fuel types. Avista will consider adding granularity of measures to its TRM for 2023; however, the company believes that granularity of data should be balanced with potential additional administrative burden for both the company and for program participants.

Expenditures

While the 2023 Annual Conservation Plan, filed with the Washington Utilities and Transportation Commission in November 2022, provides an expectation for operational planning, Avista is required to pursue all cost-effective measures under Tariff Schedules 90 and 190. Because of this requirement, variances may exist between planned and actual spending. For 2023, spending on conservation programs was less than anticipated, because expenditures were projected with the assumption that savings targets would be met. Although program participation increased for electric programs as well as for commercial/industrial natural gas programs, and savings increased in these areas, expenditures were lower than if both fuel savings targets had been achieved.

Table 9 provides a detailed comparison of budgeted to actual energy-efficiency expenditures by fuel type.

TABLE 9 – ANNUAL CONSERVATION PLAN BUDGET TO ACTUAL EXPENDITURES COMPARISON

	Electric	Natural Gas
2023 Annual Conservation Plan		
Incentives Budget	$ 21,770,656	$ 8,219,858
Non-Incentives and Labor	$ 1,905,687	$ 272,434
MT, CPA, EM&V	$ 5,904,991	$ 1,828,835
Total Budgeted Expenditures	**$ 29,581,334**	**$ 10,321,127**
Actual 2023 Expenditures		
Incentives	$ 17,335,482	$ 5,369,452
Non-Incentives and Labor	$ 7,585,666	$ 2,338,649
MT, CPA, EM&V	$ 1,669,903	$ 544,518
Total Actual Expenditures	**$ 28,864,052**	**$ 8,252,619**
Variance	**$ (2,717,282)**	**$ (2,068,508)**

Table 10 illustrates the top five programs with the highest impact on the expenditure variance across both fuel types. As expected, the largest variance occurred in programs that have historically had the most incentive expenditures. The Residential Prescriptive Program had the greatest negative variance, with program expenditures under budget by $108,180.

TABLE 10 – PROGRAMS WITH THE HIGHEST IMPACT ON EXPENDITURE VARIANCE

Program	Planned	Actual	Variance	Variance Percentage
Residential Prescriptive (Electric)	$ 1,618,250	$ 1,510,070	$ (108,180)	(7)%
Commercial/Industrial Midstream (Electric)	$ 110,381	$ 37,106	$ (73,275)	(66)%
Food Services Equipment (Electric)	$ 36,904	$ 1,657	$ (35,248)	(28)%
HVAC (Electric)	$ 120,000	$ 85,851	$ (34,149)	(28)%
Grocer (Electric)	$ 9,170	$ 3,175	$ (5,995)	(65)%

EVALUATION APPROACH

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

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

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

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

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

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

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

COST-EFFECTIVENESS

Avista's portfolio offerings are evaluated throughout implementation and at the conclusion of each program year to gauge the level of cost-effectiveness. Cost-effectiveness tests determine whether a program is beneficial from the company's and customers' perspectives. Avista uses four metrics to evaluate cost-effectiveness: the UCT, the TRC test, the Participant Cost Test (PCT), and the Ratepayer Impact (RIM) test. The UCT is a comparison of program administrator costs to supply-side resource costs, the TRC is a comparison of program administrator and customer costs to utility resource savings, the PCT measures quantifiable costs and benefits to the customer participating in a program – including, for example, the incentive paid by the utility under the program, as well as non-energy impacts (NEI) – and the RIM is a comparison of administrator costs and utility bill reductions to supply-side resource costs.

Since many customers do not base their decision to participate in a program entirely on quantifiable variables, the PCT test cannot be a complete measure of the benefits and costs of a program to a customer. The RIM test must therefore be used to measure impacts to customer bills or rates due to changes in utility revenues and operating costs related to the program portfolio. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.

While UCT is still measured, beginning with the 2022-2023 biennium the TRC became the most significant test for measuring the cost-effectiveness of both Washington electric and natural gas programs, due to it incorporating NEI. Avista's cost-effectiveness goal for the electric and natural gas program portfolios is a TRC and a UCT above 1.00, which indicates that the benefits to the utility exceed the costs of implementing the program. In 2023, UCT ratios were 1.74 for electric and 1.09 for natural gas. TRC benefit/cost ratios were 1.71 for electric and 1.62 for natural gas.

TABLE 11 – PORTFOLIO COST-EFFECTIVENESS RESULTS – ELECTRIC

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 56,561,179	$ 33,049,582	1.71
UCT	$ 48,730,709	$ 28,059,243	1.74
PCT	$ 66,993,212	$ 25,342,025	N/A
RIM	$ 48,730,709	$ 76,529,253	0.64

TABLE 12 – PORTFOLIO COST-EFFECTIVENESS RESULTS – NATURAL GAS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 20,544,822	$ 12,663,924	1.62
UCT	$ 10,401,740	$ 9,556,100	1.09
PCT	$ 58,704,098	$ 10,329,568	N/A
RIM	$ 10,438,166	$ 126,433,444	0.08

Tekoa Museum and Library, Tekoa, Washington

COMMERCIAL/INDUSTRIAL SECTOR

Overview

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

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

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

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

- ***48,830 commercial/industrial electric measures in 2023:*** Total savings of 35,507 MWh, an increase of 70 percent from the previous year (20,901 MWh).
- ***144 commercial/industrial natural gas measures in 2023:*** Total savings of 137,839 therms in 2023, an increase of 134 percent from the previous year (58,819 therms).

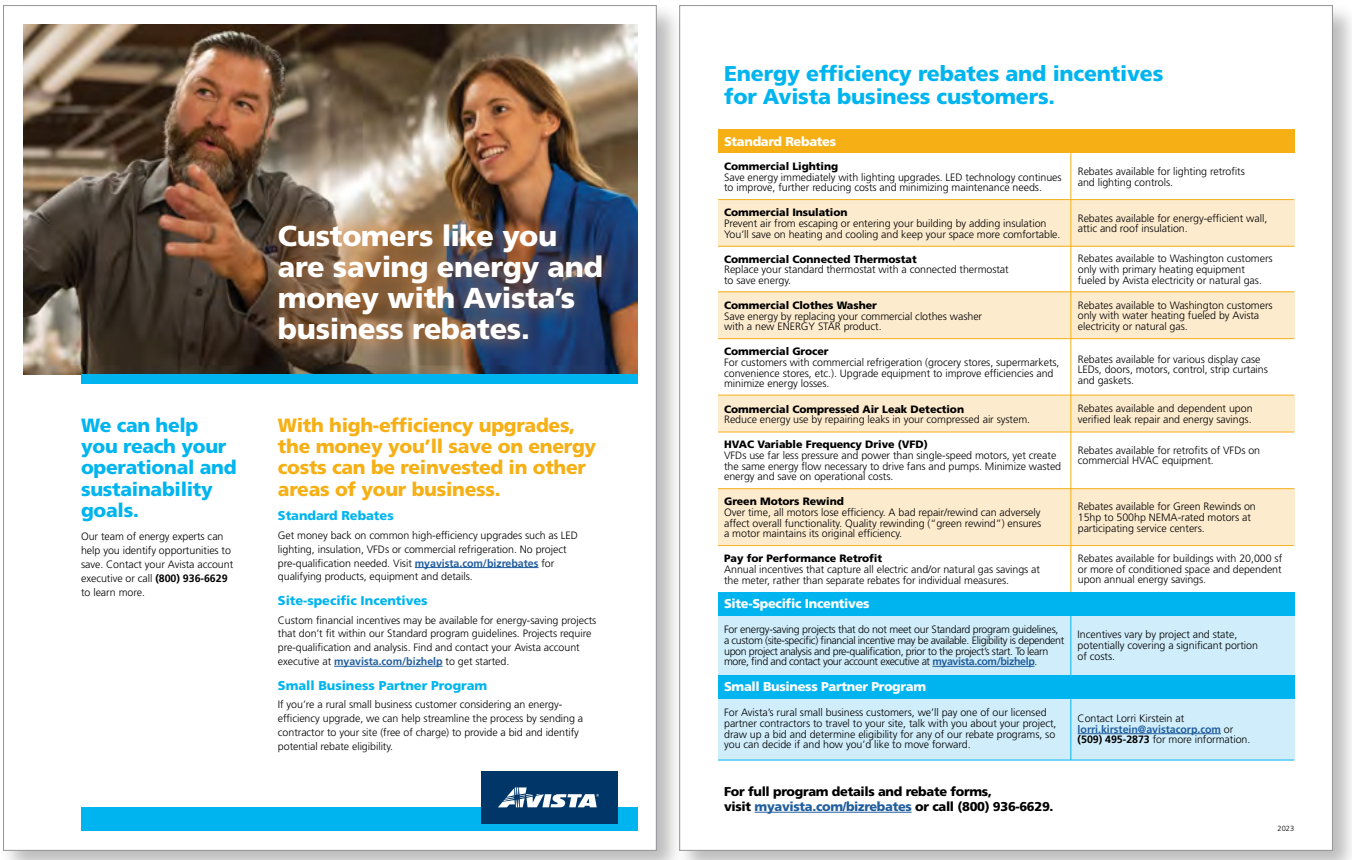
TABLE 13 – COMMERCIAL/INDUSTRIAL VERIFIED SAVINGS BY PROGRAM

Program	Electric Savings (kWh)	Natural Gas Savings (Therms)
Lighting	11,810,424	–
Small Business Lighting	10,922,204	–
Midstream	58,291	21,368
HVAC	329,852	9,987
Food Service Equipment	5,695	10,258
Grocer	16,288	–
Shell	87,012	4,263
Green Motors	4,535	–
Site-Specific	12,272,916	91,963
Total Commercial/Industrial	**35,507,217**	**137,839**

Marketing

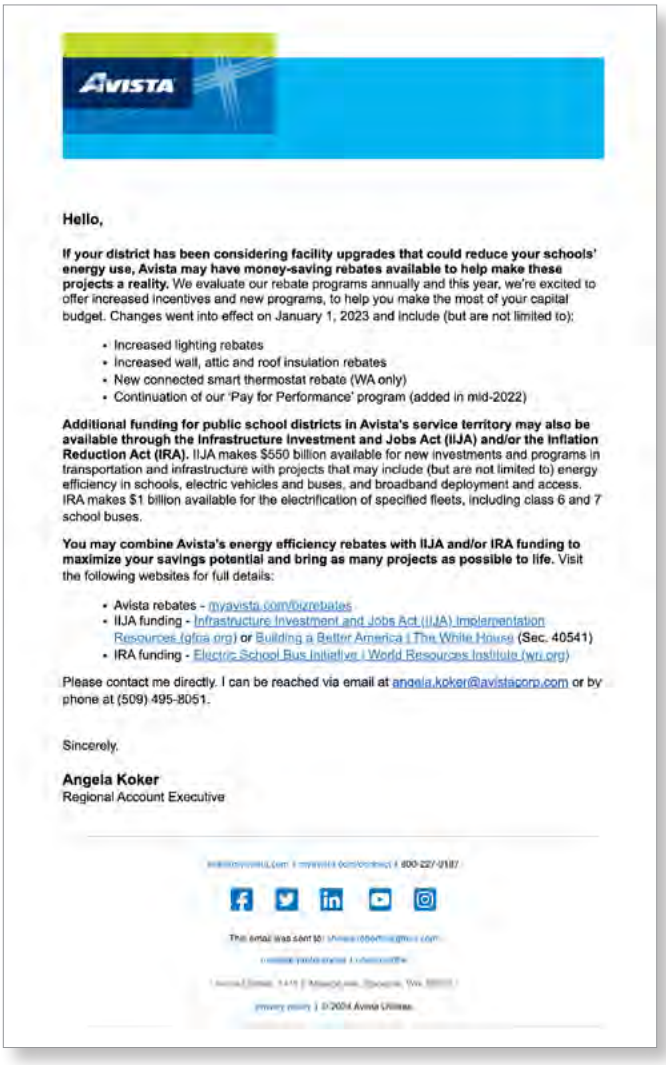
Avista expanded its approach to commercial and industrial energy-efficiency marketing in 2023. Education and awareness campaigns about ways to save energy, available rebate programs, and customer energy-efficiency success stories were developed. Avista's web pages offering business customers energy-saving advice and program information were all refreshed. Energy-efficiency rebate program ads were redeveloped, offering multiple creative options for customers to engage with. The company's regional account executives manage business customer projects and continue to play a large role in spreading program awareness and increasing engagement. Because this customer segment holds significant energy-saving potential, new case studies were developed to highlight successful customer energy-saving experiences. Short customer project highlights were also shared on LinkedIn. The purpose of these efforts was to engage the business audience in the energy-efficiency conversation, helping them see how saving energy (with the help of Avista's programs) can benefit their company.

FIGURE 6 – COMMERCIAL/INDUSTRIAL BUSINESS PROGRAMS OVERVIEW FLYER



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

FIGURE 7 – COMMERCIAL/INDUSTRIAL INCREASE ENERGY EFFICIENCY IN YOUR SCHOOLS EMAIL



Hello,

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

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

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

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

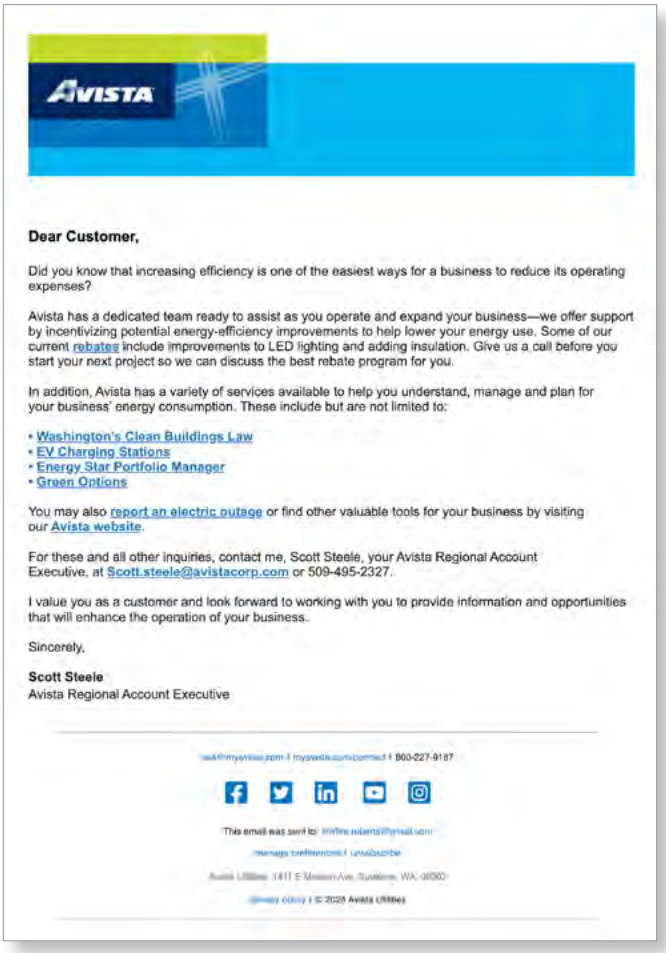
- Avista rebates - myavista.com/bizrebates
- IIJA funding - Infrastructure Investment and Jobs Act (IIJA) Implementation Resources (gfoa.org) or Building a Better America | The White House (Sec. 40541)
- IRA funding - Electric School Bus Initiative | World Resources Institute (wri.org)

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

Sincerely,

Angela Koker
Regional Account Executive

FIGURE 8 – COMMERCIAL/INDUSTRIAL PROGRAMS AND SERVICES FOR SCHEDULE 21 AND 25 CUSTOMERS EMAIL



Dear Customer,

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

Avista has a dedicated team ready to assist as you operate and expand your business—we offer support by incentivizing potential energy-efficiency improvements to help lower your energy use. Some of our current rebates include improvements to LED lighting and adding insulation. Give us a call before you start your next project so we can discuss the best rebate program for you.

In addition, Avista has a variety of services available to help you understand, manage and plan for your business' energy consumption. These include but are not limited to:

- Washington's Clean Buildings Law
- EV Charging Stations
- Energy Star Portfolio Manager
- Green Options

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

For these and all other inquiries, contact me, Scott Steele, your Avista Regional Account Executive, at Scott.steele@avistacorp.com or 509-495-2327.

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

Sincerely,

Scott Steele
Avista Regional Account Executive

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

FIGURE 9 – COMMERCIAL/INDUSTRIAL ENERGY SOLUTIONS EMAIL

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

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

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

FIGURE 10 – COMMERCIAL/INDUSTRIAL LUXURY LIVING, LLC PRINT ADVERTORIAL

Rural business owners save money and energy with Avista.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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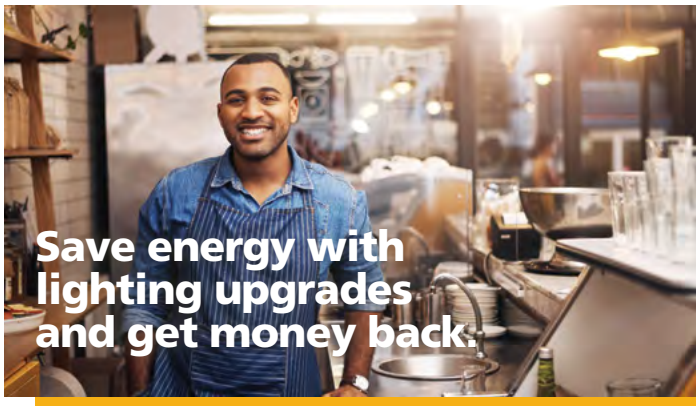
FIGURE 11 – COMMERCIAL/INDUSTRIAL LUXURY LIVING, LLC BROADCAST

FIGURE 12 – COMMERCIAL/INDUSTRIAL LUXURY LIVING, LLC DIGITAL ADS

FIGURE 13 – COMMERCIAL/INDUSTRIAL LIGHTING PRINT ADVERTORIAL



Save energy with lighting upgrades and get money back.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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FIGURE 14 – COMMERCIAL/INDUSTRIAL LIGHTING DIGITAL AD

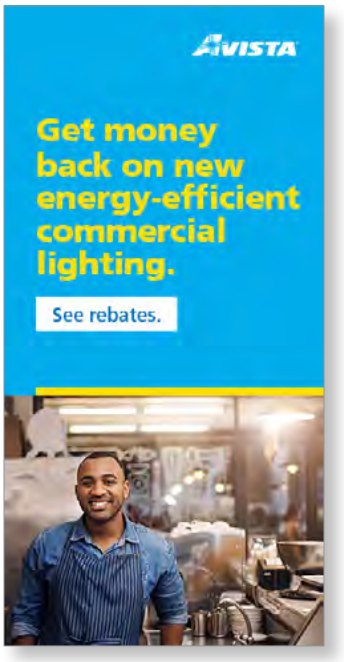

FIGURE 15 – COMMERCIAL/INDUSTRIAL GROCER PRINT ADVERTORIAL

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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FIGURE 16 – COMMERCIAL/INDUSTRIAL GROCER DIGITAL AD

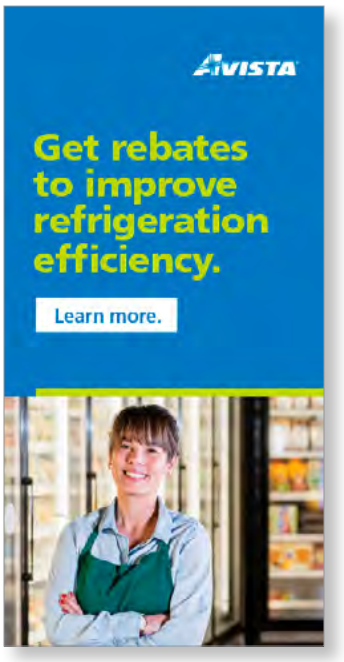
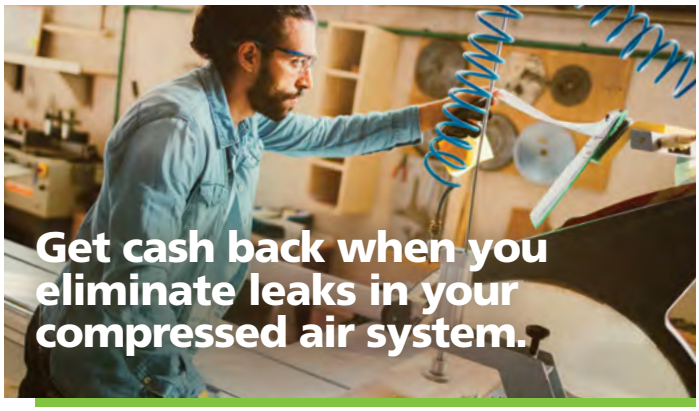


FIGURE 17 – COMMERCIAL/INDUSTRIAL COMPRESSED-AIR PRINT ADVERTORIAL



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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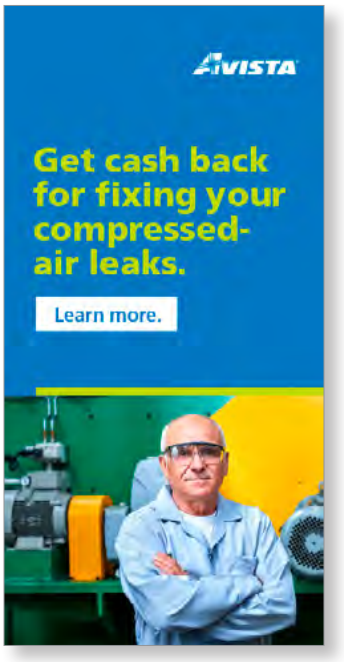
FIGURE 18 – COMMERCIAL/INDUSTRIAL COMPRESSED-AIR DIGITAL AD



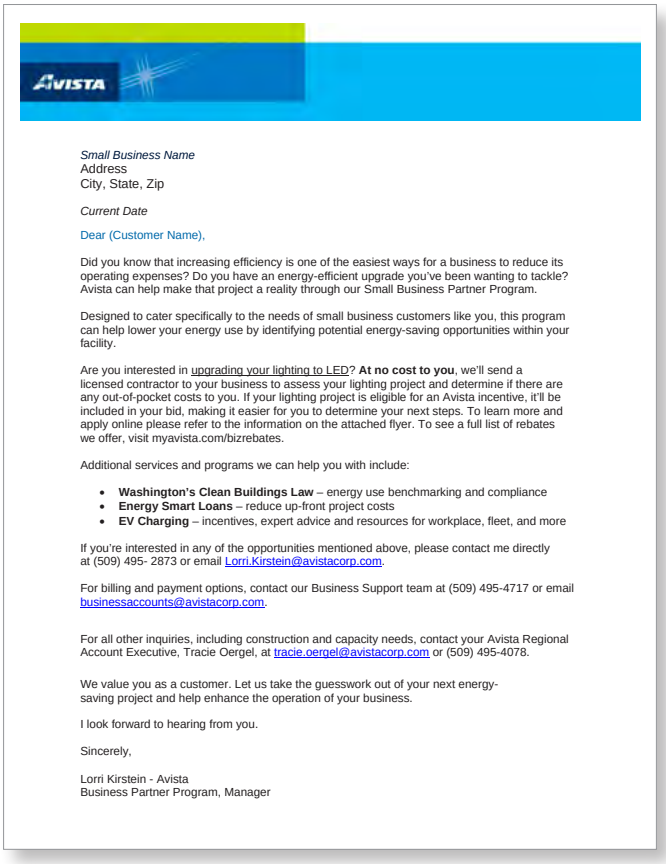
Business Partner Program

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

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

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

FIGURE 19 – COMMERCIAL/INDUSTRIAL BUSINESS PARTNER PROGRAM LETTER



Small Business Name
Address
City, State, Zip

Current Date

Dear (Customer Name),

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

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

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

Additional services and programs we can help you with include:

- **Washington's Clean Buildings Law** – energy use benchmarking and compliance
- **Energy Smart Loans** – reduce up-front project costs
- **EV Charging** – incentives, expert advice and resources for workplace, fleet, and more

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

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

For all other inquiries, including construction and capacity needs, contact your Avista Regional Account Executive, Tracie Oergel, at tracie.oergel@avistacorp.com or (509) 495-4078.

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

I look forward to hearing from you.

Sincerely,

Lorri Kirstein - Avista
Business Partner Program, Manager

Performance and Savings Goals

The commercial/industrial sector achieved 35,507 MWh, or 137 percent of the savings goal. The sector demonstrated a strong recovery from the prior year, exceeding the combined Prescriptive and Site-Specific Program paths' electric savings goal of 25,848 MWh, while continuing to maintain a high level of cost-effectiveness for both the TRC and UCT. For natural gas programs, the commercial/industrial sector achieved 137,839 therms, or 22 percent of the sector savings goal of 618,556 therms.

Cost-Effectiveness

Tables 14 and 15 show the commercial/industrial sector cost-effectiveness results by fuel type.

TABLE 14 – COMMERCIAL/INDUSTRIAL COST-EFFECTIVENESS RESULTS – ELECTRIC

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 44,039,335	$ 21,715,969	2.03
UCT	$ 40,035,598	$ 20,195,795	1.98
PCT	$ 56,829,729	$ 18,377,355	3.09
RIM	$ 40,035,598	$ 60,869,227	0.66

TABLE 15 – COMMERCIAL/INDUSTRIAL COST-EFFECTIVENESS RESULTS – NATURAL GAS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 2,294,105	$ 1,460,323	1.57
UCT	$ 1,921,808	$ 815,547	2.36
PCT	$ 448,525	$ 1,093,301	0.41
RIM	$ 1,925,794	$ 815,547	2.36

Program-by-Program Summaries

Clean Buildings Law Programs

Description

The Washington State Clean Buildings Performance Standard, which was signed into law in 2019 and expanded and augmented in 2022 and 2023, sets new energy performance standards for existing commercial buildings over 50,000 square feet and aims to reduce greenhouse gas emissions. Compliance deadlines begin in 2026; achieving compliance requires that energy targets are met and operational plans are in place one year prior to the deadline. The compliance cycle will repeat on a five-year basis. Avista has seized the opportunity to assist customers who are subject to the law, and in doing so identify energy-efficiency opportunities. Also, as directed by the Washington State Department of Commerce, Avista will pay Early Adopter Incentives (EAI) to qualifying customers.

The Clean Buildings Accelerator (CBA) Program teaches participating customers about the Clean Buildings Performance Standard and guides them through many of the steps needed for compliance. This program builds on Strategic Energy Management program fundamentals where participants work through individual and group activities to achieve learning objectives. Process tools, site-specific coaching, scanning, and activity prioritization are tailored to each organization's needs and goals.

Since 2009, Avista has provided commercial customers throughout its service area with technical support and an energy usage data upload service connected to the ENERGY STAR Portfolio Manager (ESPM) services. ESPM use is required for CBA compliance and facilitates benchmarking and weather-normalized energy use intensity tracking.

Program Activities

Early Adopter Incentive Activities:

Since inception of the Law, which includes 2023, the Washington State Department of Commerce has not issued any requests to Avista to reserve or payout any Early Adopter Incentive payments.

ESPM Activities:

In 2023, requests for energy usage data uploads in the ESPM application increased, even though yearly metrics are not tracked. Avista now uploads energy usage data to over 900 properties within its service territory, with each property having one or more meters. This results in more than 4,000 meters receiving monthly usage data uploads. Approximately 75 percent of the properties in the ESPM application are in Washington.

CBA Activities:

Groups of customers who are participating in the CBA Program at the same time are referred to as cohorts. Avista completed its second cohort and began a third in 2023. Evaluation for the first cohort, which ended Q4 2022, was also completed in 2023. These three cohorts include representatives from fifteen organizations, some with multiple locations. At a minimum, participants create an ESPM account, calculate their buildings' Energy Use Intensity (EUI) and their EUI targets, create practice energy management plans and operations and maintenance plans, gain understanding on how to use the state's reporting portal, and learn the proper forms to submit for compliance when ready.

We have had instances where customers initially enrolled in the CBA Program, but determined greater assistance was needed for their buildings than Avista's program could provide, based on their buildings' EUI and EUI targets. These customers hired professional firms to assist them with the investment criteria pathway rather than completing the CBA Program.

Program Changes

As the Washington State Department of Commerce made updates to the Clean Buildings Law throughout 2023, Avista, working with Stillwater Energy to deliver the program, updated program materials, and provided information to current and past cohort participants.

Plans for 2024

In 2024, energy savings for cohort two will be evaluated, cohort three will finish, and at least one more cohort will be offered. As the requirements of the law expand to buildings 20,000 square feet and greater, Avista will consider options to support additional customers in achieving compliance and saving energy.

Commercial/Industrial Site-Specific Program

TABLE 16 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM METRICS

Site-Specific – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		54
Overall kWh Savings		12,272,916
Incentive Spend	$	6,846,285
Non-Incentive Utility Costs	$	1,292,643
Washington Energy-Efficiency Rider Spend	$	8,138,928
Site-Specific – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		9
Overall Therm Savings		91,963
Incentive Spend	$	210,911
Non-Incentive Utility Costs	$	227,395
Washington Energy-Efficiency Rider Spend	$	438,306

Description

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

Program Activities

- ***Electric:*** : Savings of 12,272,916 kWh, or 25 percent of the overall electric savings – an increase of approximately 92 percent from 2022 (6,393,005 kWh). Of the overall savings, 64 percent was derived from site-specific lighting or small business lighting projects.
- ***Natural Gas:*** Savings of 91,963 therms, or 16 percent of the overall natural gas savings. The program achieved 315 percent greater therms than in 2022 (22,142 therms).

Measure type and savings are listed in Figures 20 and 21.

FIGURE 20 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC INCENTIVE DOLLARS BY MEASURE – ELECTRIC

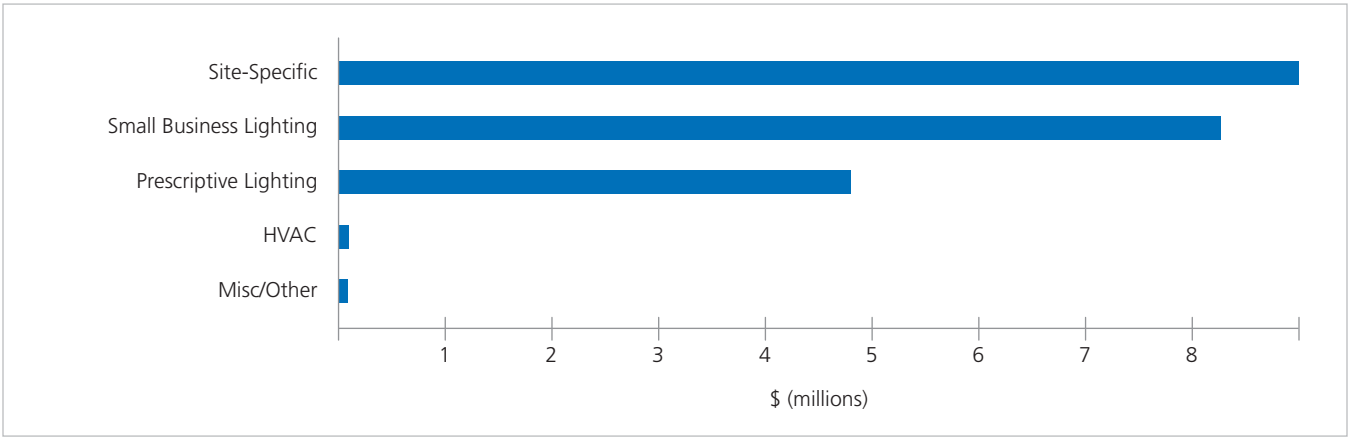
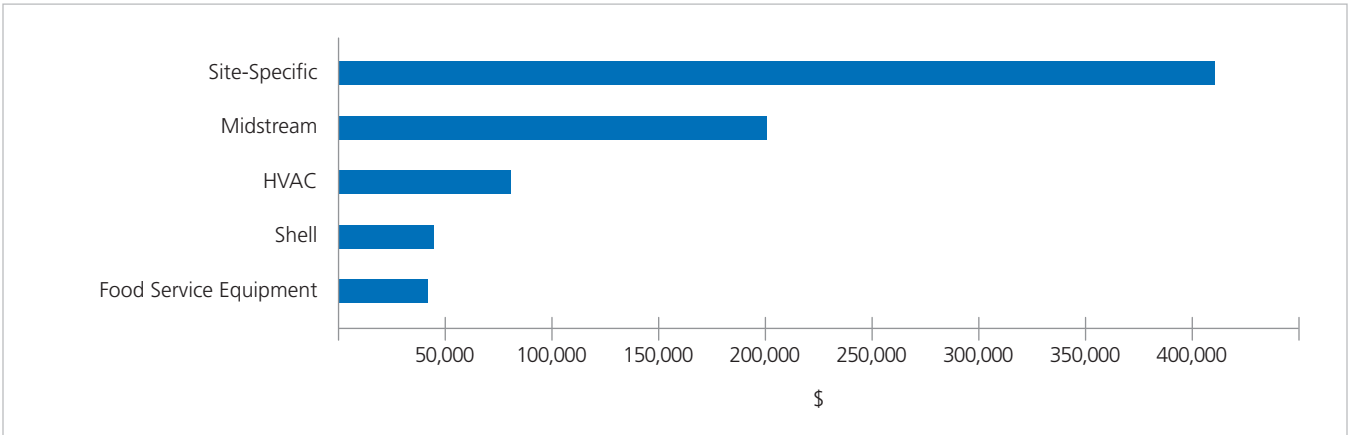


FIGURE 21 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC INCENTIVE DOLLARS BY MEASURE – NATURAL GAS



Program Changes

When the Midstream Program launched in 2023, Avista moved many measures that previously came through the Site-Specific to the new Midstream path. Many lighting projects that formerly came through the Site-Specific Program are now served through the Direct-Install Lighting Program. Projects remaining in the site-specific path continued to be incentivized at $0.26 per kWh and $3.50 per therm savings. As in years past, the company continued to offer an incentive for any qualifying electric or natural gas energy-saving improvements that are cost-effective and have a 15-year or less simple payback. In addition to the customer incentive, Avista introduced a contractor incentive in 2023 to incentivize contractors to pursue and complete site-specific projects. This incentive, $0.05 per kWh, was expected to drive higher program participation. Despite this additional incentive, however, the number of projects participating in the Site-Specific Program remained relatively low in 2023.

Plans for 2024

Avista plans to continue to offer the Site-Specific Program path in Washington for both electric and natural gas customers in 2024. The company also continues to offer the BPP, which is designed to reach a larger percentage of small- to medium-sized business customers in our service territory to remind them about the availability of basic scoping energy audits, budget billing plans, and energy-efficiency rebate programs. As part of the BPP, the Trade Ally Bid Program will also continue in 2024. The Trade Ally Bid Program is a collaboration between Avista and its trade ally partners to offer bid assistance for energy-efficiency upgrades.

Commercial/Industrial Prescriptive Lighting Program

TABLE 17 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM METRICS

Prescriptive Lighting		2023
Participation, Savings, and Costs		
Conservation Projects		1,327
Overall kWh Savings		11,810,424
Incentive Spend	$	3,228,853
Non-Incentive Utility Costs	$	1,032,636
Washington Energy-Efficiency Rider Spend	$	4,261,490

Description

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

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

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

Program Activities

2023 savings for prescriptive lighting was 11,810,424 kWh, or 32 percent of portfolio savings. The level of savings was a 5 percent decrease compared to 2022's 12,470,348 kWh. As a response to the obstacles in implementing energy-efficiency projects that business customers and trade allies are facing, Avista carried over the increased incentive rate structure for this program that was implemented in July 2021. As seen in Figure 22, with the launch of the Small Business Direct-Install Lighting Program in April of 2023, overall project throughput and savings declined in the Prescriptive Program as customers were directed to the enhanced Direct-Install Lighting Program when eligible.

FIGURE 22 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM SAVINGS BY MONTH

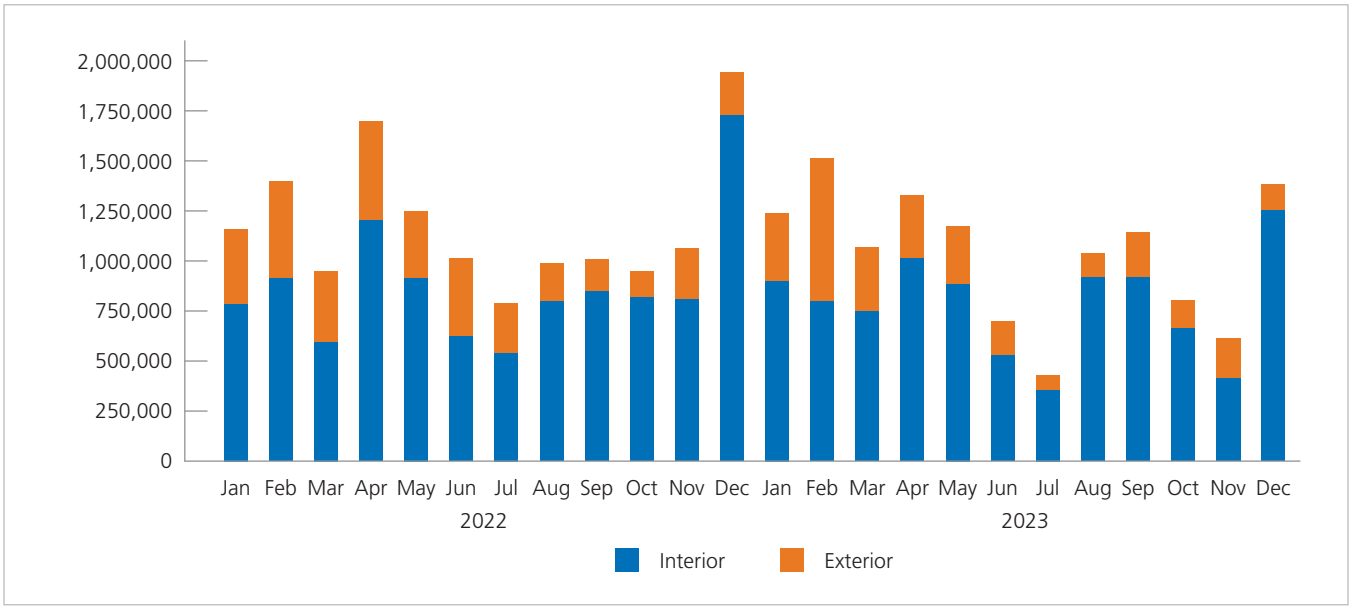


FIGURE 23 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE EXTERIOR LIGHTING KWH SAVINGS BY MEASURE

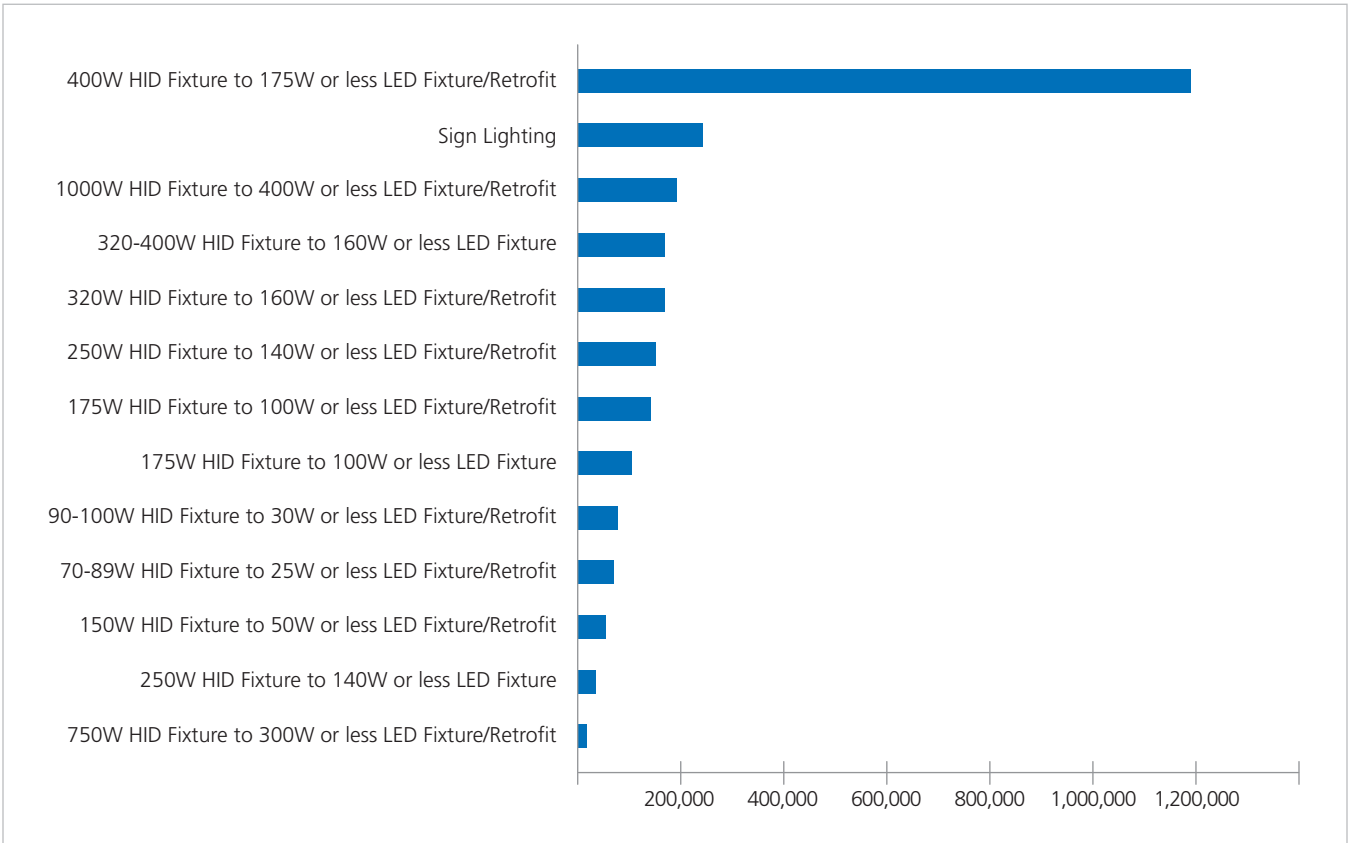
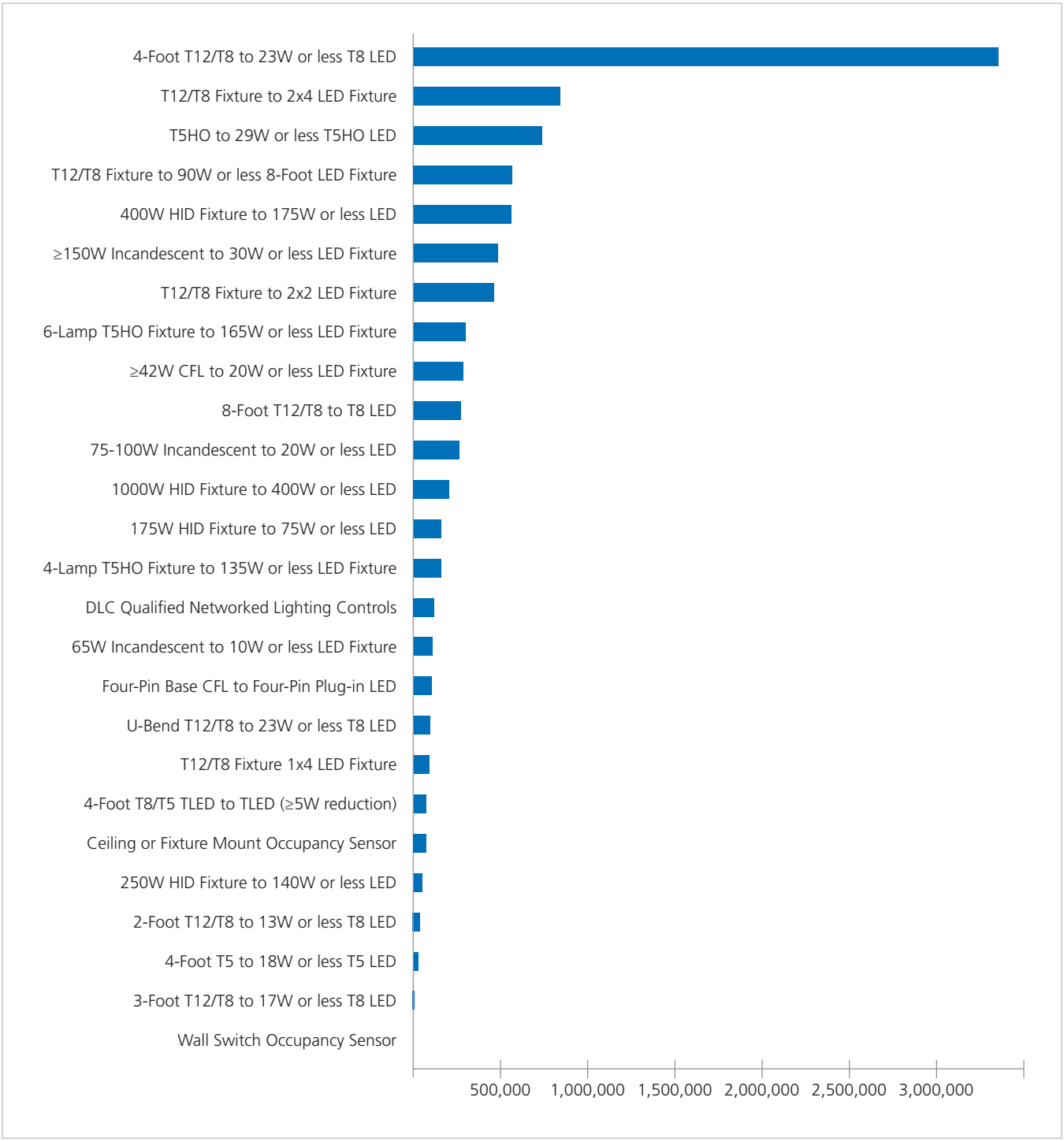


FIGURE 24 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE INTERIOR LIGHTING KWH SAVINGS BY MEASURE



Program Changes

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

TABLE 18 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM CHANGES

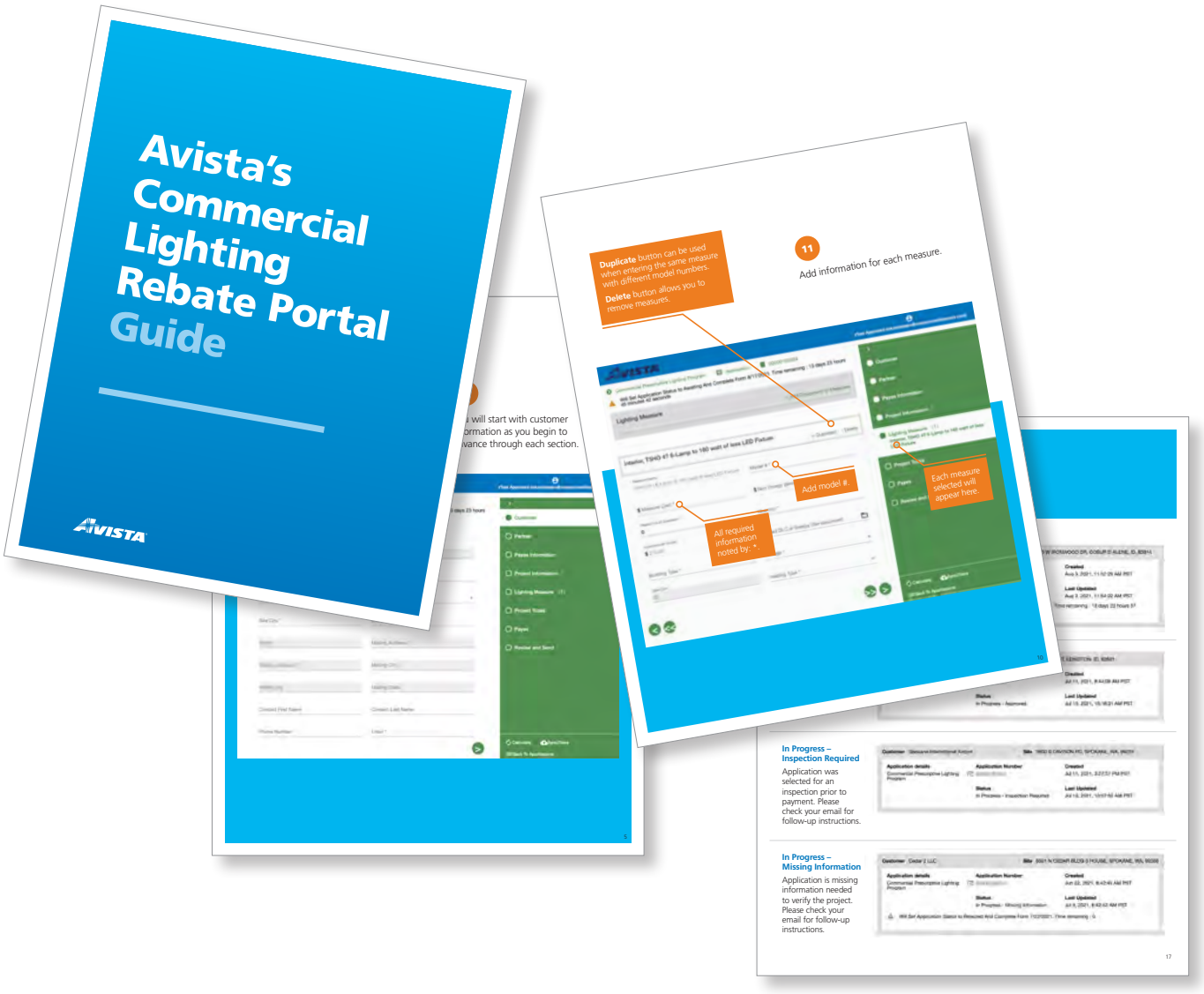
2023 Changes to Commercial/Industrial Lighting Rebates	2022	2023
Exterior Lighting		
Replacement HID Lighting (Pole, Wallpack, or Canopy) Requires at Least 4,288 Hours of Use per Year – Must Be DLC or ENERGY STAR-Rated		
70-89W HID Fixture to ≤ 25W LED Fixture or Lamp	$ 75.00	$ 85.00
90-100W HID Fixture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

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

Program Marketing

Key to the success of the Prescriptive Lighting Program is clear communication to lighting distributors, electricians, and customers regarding incentive requirements and forms. The Avista website communicates program requirements and highlights opportunities for customers. In addition, the company's regionally based account executives play an integral role in delivering the Prescriptive Lighting Program to commercial/industrial customers. Any changes to the program typically include 120 days' advance notice to allow customers to submit applications for incentives under the old requirements or incentive levels if desired. This usually includes – at a minimum – direct email communication to trade allies as well as website updates. Avista also focuses on educating customers about the benefits of energy-efficient lighting in its monthly business customer electronic newsletters and through customer project stories. Available program information is linked to this education. To highlight the benefits of using Avista's Prescriptive Lighting Program, project case studies, digital advertising, direct customer emails, and an in-person trade ally event were all used in 2023.

FIGURE 25 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE LIGHTING PROGRAM REBATE WEB PORTAL



Plans for 2024

With the more sophisticated measure-level detail in iEnergy, Avista has been able to update lighting measures annually to reflect market conditions, adding new measures that were typically paid for through the Site-Specific Program.

Avista will continue to be flexible in making mid-year changes as needed to further encourage program participation and will review the impacts resulting from the launch of the Small Business Direct-Install Lighting Program. Additionally, Avista plans to increase promotion of customer self-service through the web interface that enables customers and contractors to submit and track their incentive applications and payments.

Commercial/Industrial Prescriptive Non-Lighting Program

TABLE 19 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING PROGRAM METRICS

Prescriptive Non-Lighting – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		29
Overall kWh Savings		501,673
Incentive Spend	$	132,977
Non-Incentive Utility Costs	$	41,108
Washington Energy-Efficiency Rider Spend	$	174,084
Prescriptive Non-Lighting – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		80
Overall Therm Savings		45,876
Incentive Spend	$	237,615
Non-Incentive Utility Costs	$	139,626
Washington Energy-Efficiency Rider Spend	$	377,241

Description

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

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

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

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

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

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

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

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

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

Program Activities

- ***Electric:*** Savings of 501,673 kWh, an increase of 71 percent from the 2022 savings achievement of 294,183 kWh. The majority of electric savings came from the Commercial HVAC Program, followed by the Prescriptive Shell Program.
- ***Natural Gas:*** Savings of 45,876 therms in 2023. This is a 25 percent increase in savings relative to the 36,447 therms achieved in 2022. Midstream and Food Service Equipment accounted for the majority of therm savings achieved.

FIGURE 26 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING INCENTIVE DOLLARS BY MEASURE – ELECTRIC

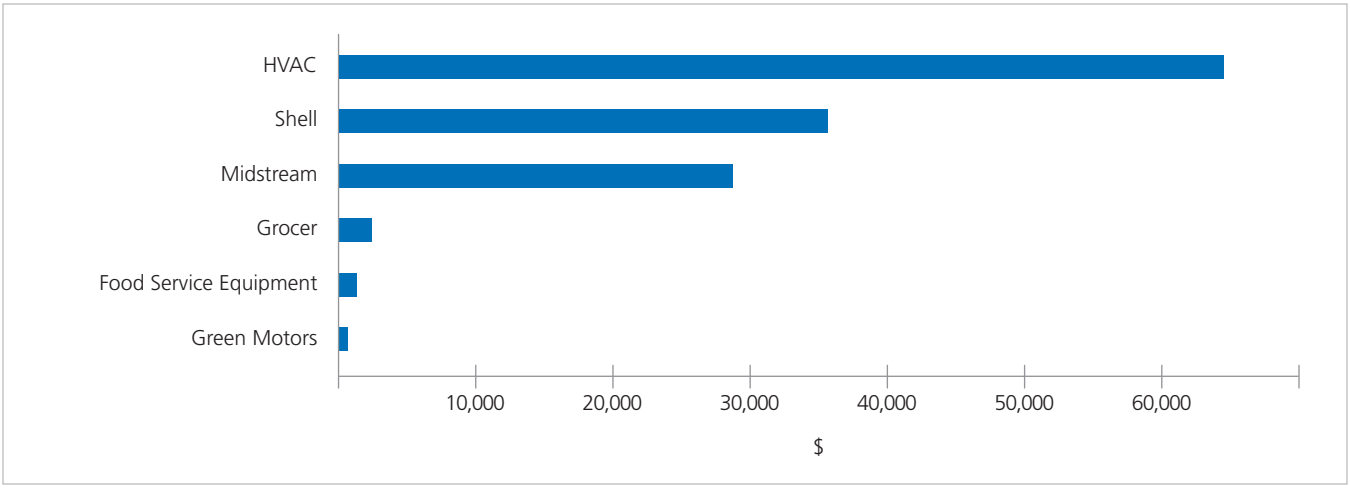
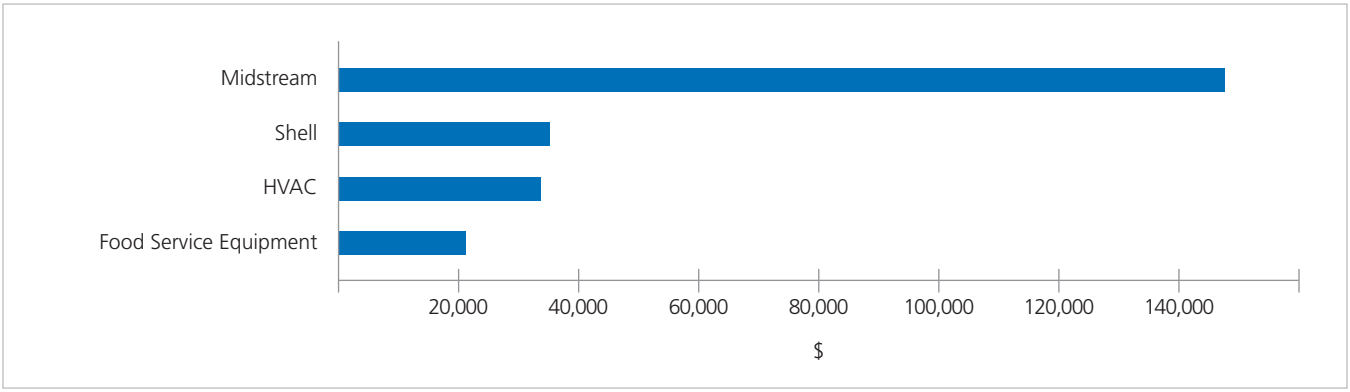


FIGURE 27 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING INCENTIVE DOLLARS BY MEASURE – NATURAL GAS



Program Changes

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

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

In 2023, insulation measures were increased from 2022.

TABLE 20 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE NON-LIGHTING PROGRAM CHANGES

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

The Commercial Grocer Program added three new measures:

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

Program Marketing

Avista account executives market these programs, as do external trade allies. All commercial programs are also featured on Avista's website, where business energy-savings webpages are experiencing increasing traffic. In addition, program-specific flyers, a commercial offerings one-sheet, paid digital advertising, and customer case study campaigns were all used to help build awareness about these opportunities. Account executives also work to educate customers affected by Washington State's Clean Buildings Standard (HB1257) on the programs and services Avista offers that can help them achieve compliance.

Plans for 2024

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

Small Business Direct-Install Lighting Program

TABLE 21 – SMALL BUSINESS DIRECT-INSTALL LIGHTING PROGRAM METRICS

Small Business Direct-Install Lighting		2023
Participation, Savings, and Costs		
Conservation Projects		47,210
Overall kWh Savings		10,922,204
Incentive Spend	$	6,667,744
Non-Incentive Utility Costs	$	953,550
Washington Energy-Efficiency Rider Spend	$	7,621,294

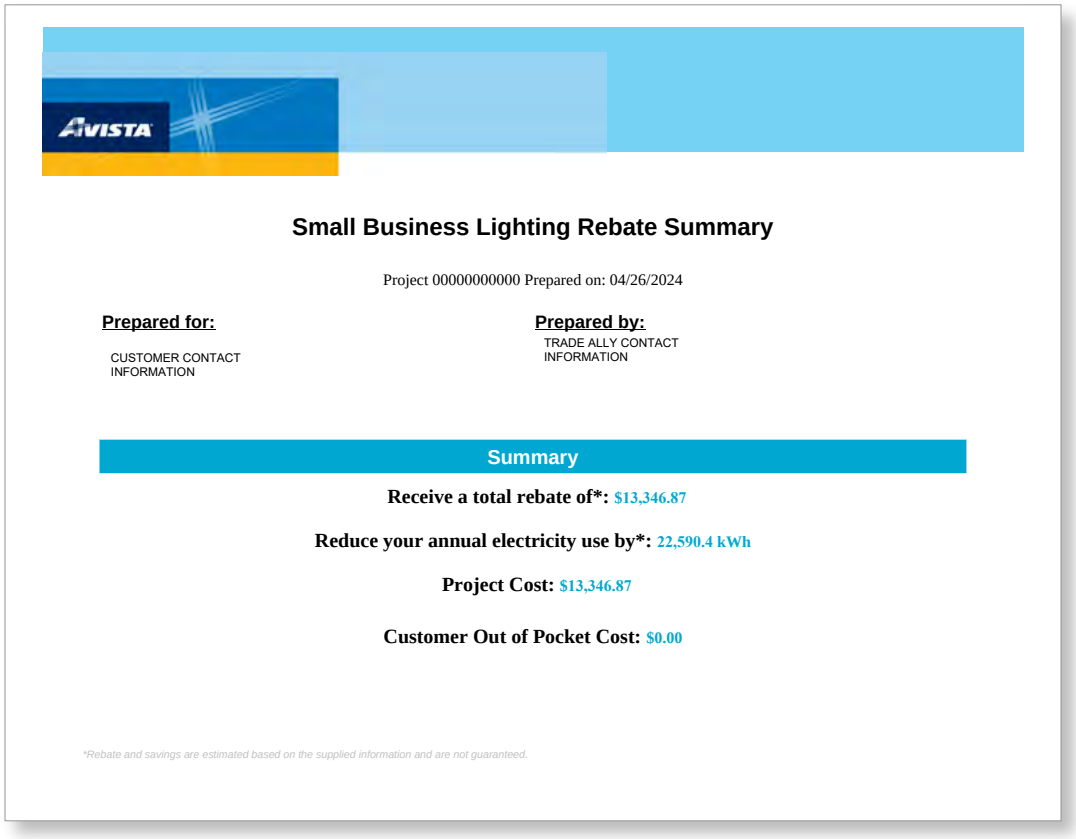
Description

Resource Innovations, a third-party consultant hired to implement the Small Business Direct-Install Lighting Program, established a turnkey lighting program to recruit and train trade allies/installers to engage customers with energy-efficiency opportunities. The program was designed to target hard-to-reach small-business customers within Avista's service territory to supplement and enhance Avista's ongoing customer engagement and energy-efficiency efforts. Customers receive a number of benefits, including a free lighting assessment to identify any potential lighting upgrades needed at their facility; installation of low- to no-cost energy-savings lighting measures (lamps, fixtures, and controls); and leave-behind materials including contact information for customer follow-up questions or feedback.

Program Activities

After completing specialized training, trade allies are approved to conduct door-to-door sales or receive project leads directly from Resource Innovations to complete installations for this program. Resource Innovations uses ZIP Code identifiers to cluster eligible customers and establish routes based on the installer's identified territory. In addition, myavista.com hosts a web form for customers to sign up for the service. Trade allies use the iEnergy Onsite software to conduct customer eligibility checks, facility walkthrough assessments, and project scope creation, as well as to generate customer-facing reports and surveys. All applicable project data is tracked and stored in iEnergy.

FIGURE 28 – SMALL BUSINESS DIRECT-INSTALL LIGHTING PROGRAM CUSTOMER INCENTIVE AND SAVINGS REPORT



Small Business Lighting Rebate Summary

Project 00000000000 Prepared on: 04/26/2024

Prepared for:

CUSTOMER CONTACT INFORMATION

Prepared by:

TRADE ALLY CONTACT INFORMATION

Summary

Receive a total rebate of*: $13,346.87

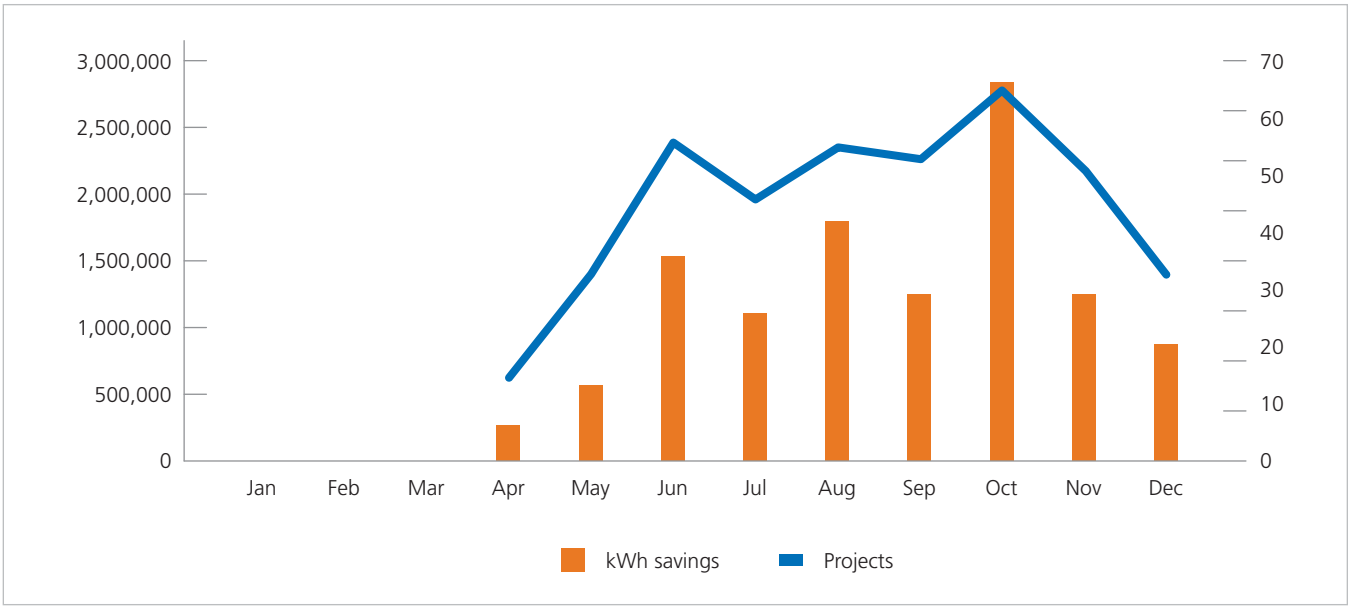
Reduce your annual electricity use by*: 22,590.4 kWh

Project Cost: $13,346.87

Customer Out of Pocket Cost: $0.00

*Rebate and savings are estimated based on the supplied information and are not guaranteed.

FIGURE 29 – SMALL BUSINESS DIRECT-INSTALL LIGHTING PROGRAM KWH SAVINGS AND PROJECT THROUGHPUT



Program Eligibility

Commercial customers who receive electric service in either Washington or Idaho under Schedule 11 or Schedule 12 will be eligible. Customers who have meters on multiple rate schedules in addition to Schedules 11 and 12 will be considered. Hospitals, universities, and national chains are not eligible to participate. This program is available to a large swath of customers. About 16,000 Washington and 6,000 Idaho customers receive electric service under Schedule 11, while about 9,000 Washington and 6,000 Idaho customers receive services under Schedule 12.

Program Marketing

While much of the program participation has come from door-to-door marketing efforts of the participating trade allies, they also rely on co-branded postcards mailed directly to customers to promote the service. The Avista website drives additional customer traffic through highlighting the enhanced incentives and enrollment opportunity. Customer case studies posted on social media channels have proven successful in gaining customer trust and engagement, often leading to word-of-mouth referrals to neighboring businesses. Last, the company's regionally based account executives play an integral role in delivering marketing materials and handouts directly to customers.

FIGURE 30 – SMALL BUSINESS DIRECT-INSTALL LIGHTING PROGRAM CO-BRANDED MARKETING EXAMPLE

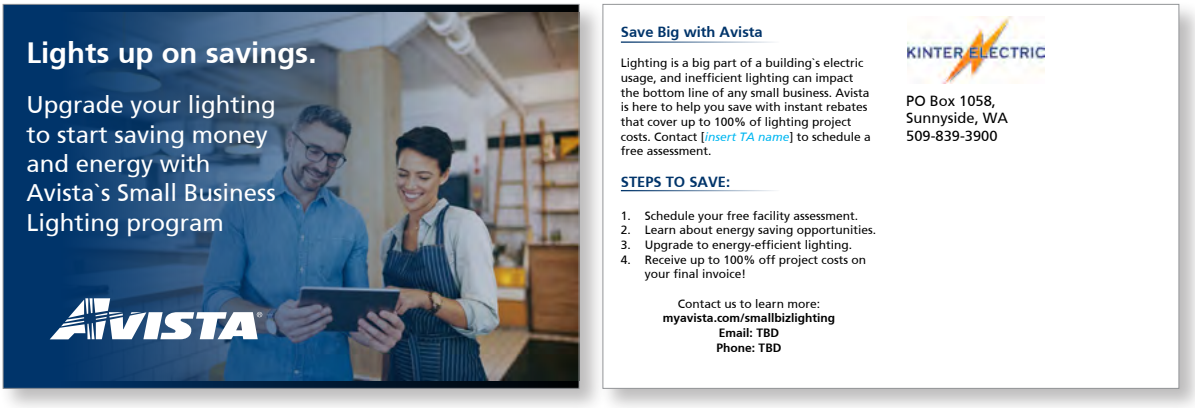


FIGURE 31 – SMALL BUSINESS DIRECT-INSTALL LIGHTING PROGRAM INFORMATIONAL FLYER

Plans for 2024

As the 2023 program year concludes, additional trade allies/installers will be recruited to partner with the program in underserved customer locations. This new group of contractors will receive comprehensive training to ensure proper program adherence and high-quality customer service is provided. Also, customer eligibility will be opened to include Schedule 11 customers previously not able to participate and underserved customer groups within other Avista rate schedules.

Through a partnership with the BPP, small businesses in Avista's service territory will begin receiving direct mail and email communications highlighting the Small Business Direct-Install Lighting Program, which will lead to an increase in awareness and engagement.

This program is contracted to run through the end of 2024, but Avista will likely pursue an extension due to the success seen in energy savings and customer satisfaction.

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Colfax, Washington

RESIDENTIAL SECTOR

Overview

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

Over $5.8 million in rebates and direct benefits were provided in 2023 to Washington residential customers, offsetting costs and enabling customers to make desired upgrades. The combined energy savings achieved for all programs within the residential sector portfolio were 4,100,979 kWh and 435,191 therms.

TABLE 22 – RESIDENTIAL SAVINGS BY PROGRAM

Program	Electric Savings (kWh)	Natural Gas Savings (Therms)
Water Heat	49,543	14,945
HVAC	465,360	208,468
Shell	315,829	87,129
ENERGY STAR Homes	94,037	469
Small Homes & Multifamily Weatherization	385,783	6,443
Multifamily Direct Install	1,030,041	2,586
Appliances	177,085	646
Midstream	1,552,940	114,505
Total Residential	**4,070,618**	**435,191**

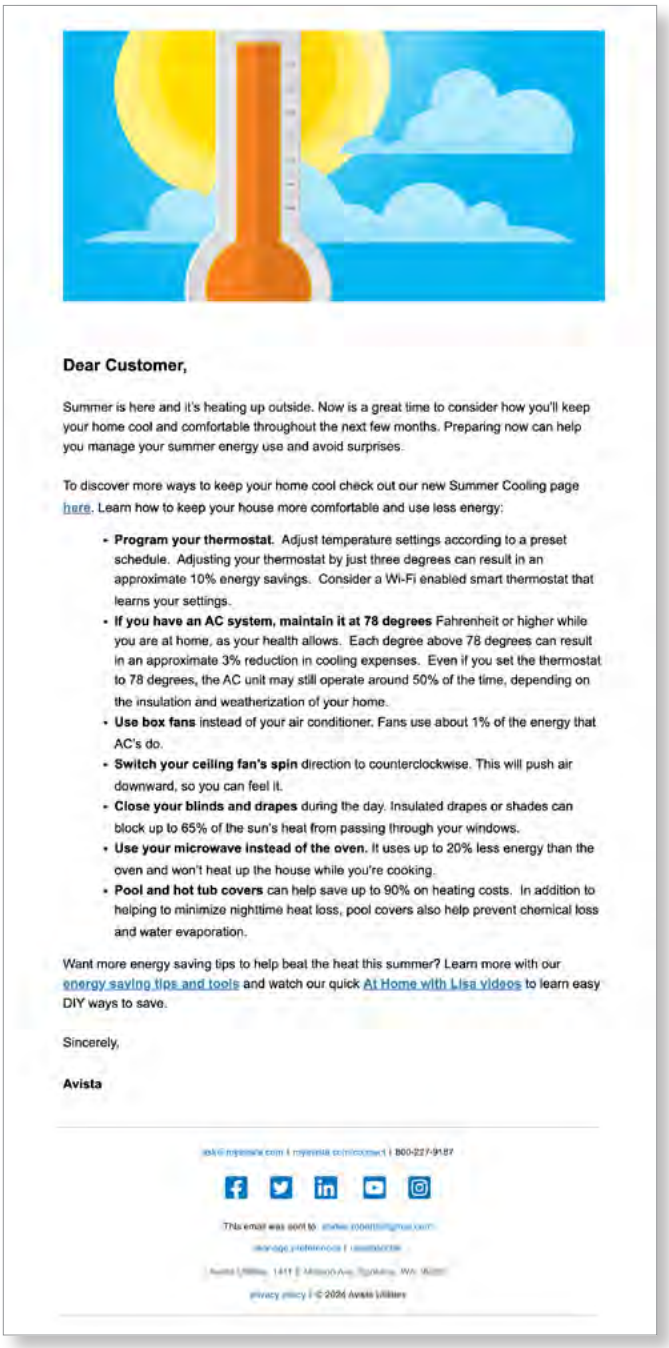
Marketing

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

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

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

FIGURE 32 – RESIDENTIAL REBATES SUMMER COOLING DIRECT EMAIL



Dear Customer,

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

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

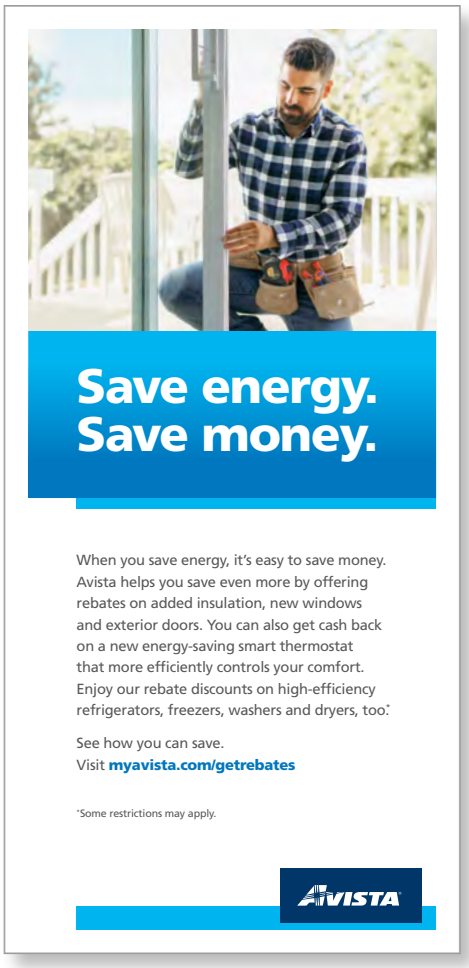
- **Program your thermostat.** Adjust temperature settings according to a preset schedule. Adjusting your thermostat by just three degrees can result in an approximate 10% energy savings. Consider a Wi-Fi enabled smart thermostat that learns your settings.
- **If you have an AC system, maintain it at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

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

Sincerely,

Avista

FIGURE 33 – RESIDENTIAL ENERGY-EFFICIENCY PRINT ADS



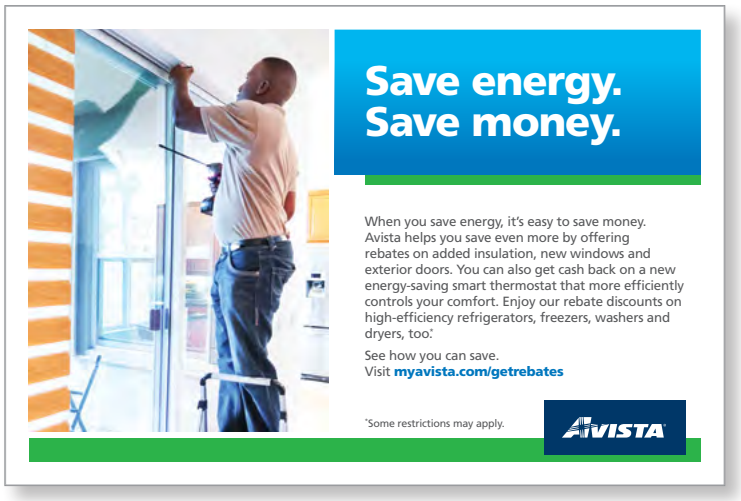


FIGURE 34 – RESIDENTIAL REBATES BILL INSERT

FIGURE 35 – RESIDENTIAL SUMMER BILL FACEBOOK POST

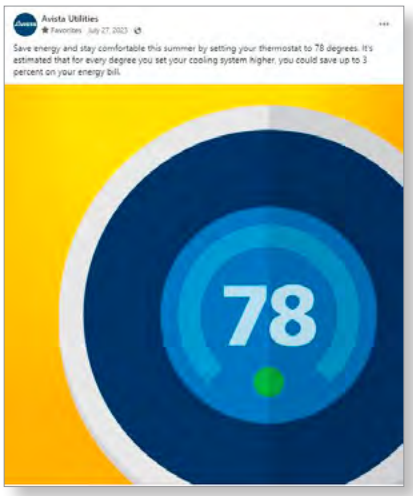


FIGURE 36 – RESIDENTIAL AUGUST 2023 CONNECTIONS NEWSLETTER

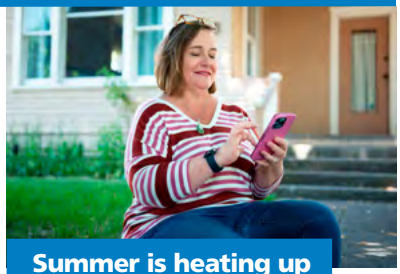
AVISTA

Connections

August 2023 | Washington • Idaho

Get cash back on energy-saving home products

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



Summer is heating up

Lisa explains ways to keep cool indoors

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

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

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

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

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

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

Continued on back

Continued from front

Summer is heating up

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

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

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

Your safety matters

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

Summer is here!

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

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

Need help with your energy bill?

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

Avoid falling victim to a scam

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

Connect with us

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

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FIGURE 37 – RESIDENTIAL NOVEMBER 2023 CONNECTIONS NEWSLETTER

AVISTA

Connections

November 2023 | Washington • Idaho

Holiday Lights

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

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

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

Visit myavista.com/safety for more safety tips.

Energy-saving tips for fall

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

Use this checklist to reduce energy use and improve comfort:

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

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

Know the signs

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

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

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

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

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

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

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

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

Need help with your energy bill?

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

Want to avoid bill related surprises?

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

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

Connect with us

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

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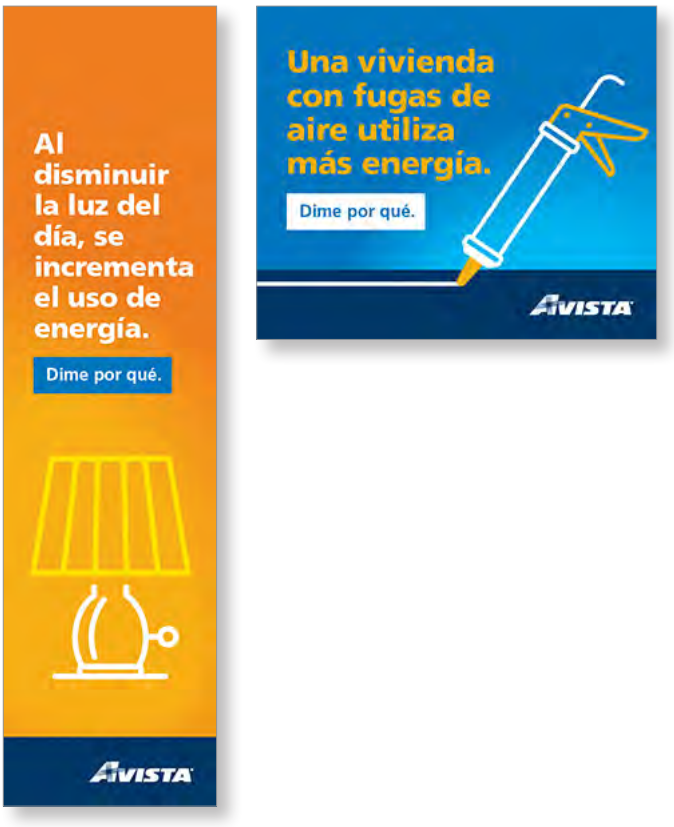
FIGURE 38 – RESIDENTIAL WINTER BILL GOOGLE DISPLAY ADS

FIGURE 39 – RESIDENTIAL WINTER BILL GOOGLE DISPLAY ADS, SPANISH



At Home with Lisa

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

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

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

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

FIGURE 40 – RESIDENTIAL AT HOME WITH LISA GOOGLE DISPLAY ADS

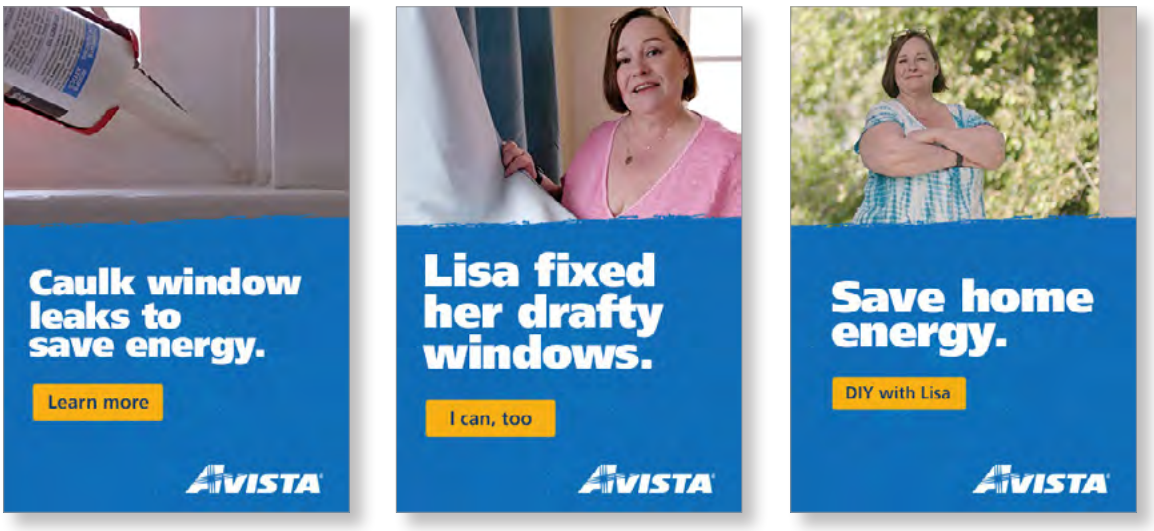


FIGURE 41 – RESIDENTIAL AT HOME WITH LISA FACEBOOK POSTS

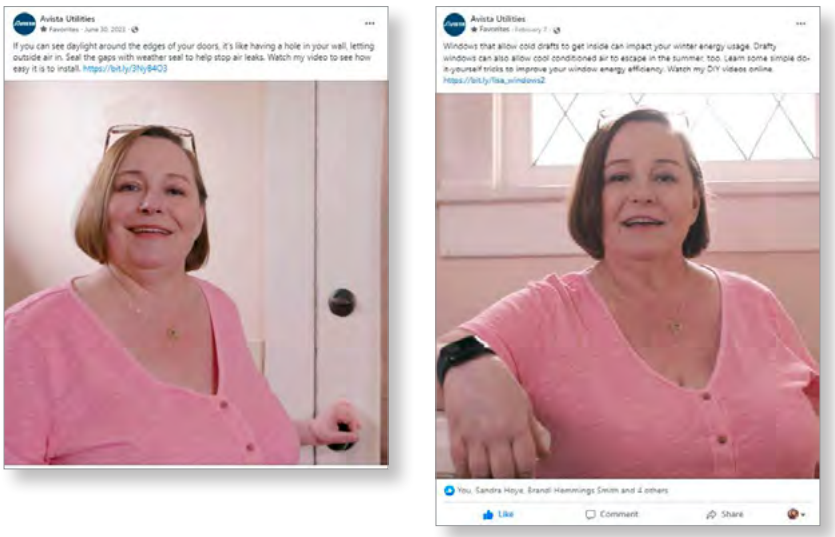
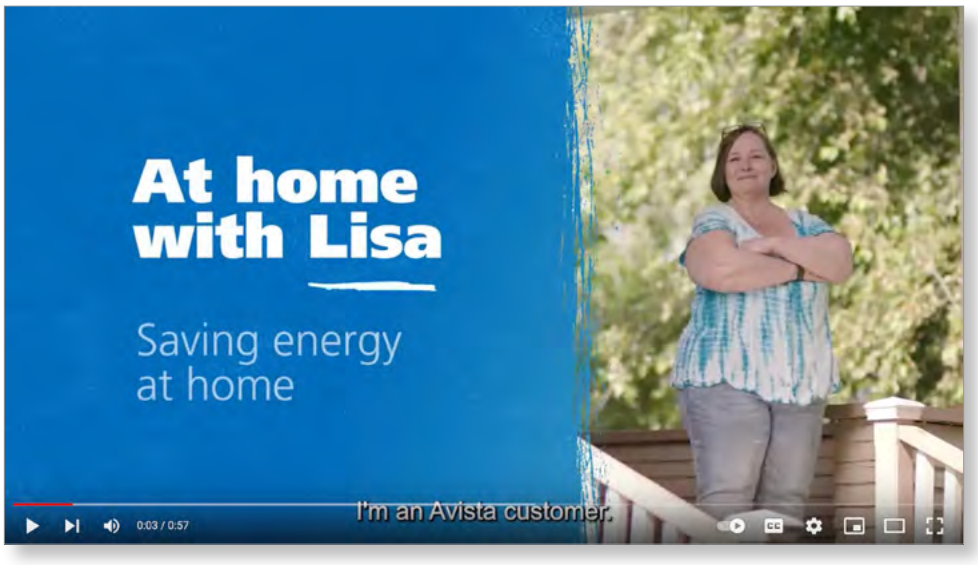


FIGURE 42 – RESIDENTIAL AT HOME WITH LISA VIDEO SERIES



The At Home with Lisa video series now includes more than twenty-five short videos that covered topics such as:

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

Performance and Savings Goals

The electric program achieved 4,065,588 kWh in 2023 – a 231 percent increase from 2022 (1,568,411 kWh). This increase is likely due to the resumption of the Multifamily Direct-Install Program, which was halted in 2020 and for the duration of 2021.

The natural gas program achieved 435,191 therms, a decrease of 8 percent over 2022's savings (475,245 therms).

- HVAC measures formed the largest percentages of savings for natural gas and third largest for electric programs.
- Multifamily direct-install contributed a large proportion of savings for electric programs.
- Midstream contributed the largest proportion of savings for electric programs.

Table 23 shows savings goals assigned to Avista's residential sector programs for 2023, as well as verified savings and the goal portion achieved in 2023.

TABLE 23 – RESIDENTIAL PROGRAMS REPORTED SAVINGS – ELECTRIC

Program	Savings Goals (kWh)	Verified Savings (kWh)	Percentage of Goal
HVAC	2,348,692	465,360	21%
Shell	1,064,000	315,829	30%
Appliances	101,632	177,085	174%
Water Heat	658,775	49,543	8%
ENERGY STAR Homes	151,106	94,037	62%
Midstream	629,132	1,552,940	247%
MultiFamily Direct-Install	862,752	1,030,041	119%
Always-On	1,890,000	–	0%
MultiFamily/Small Home Weatherization	1,108,961	385,783	35%
Residential Total	**8,815,050**	**4,070,617**	**46%**

The natural gas segment of the portfolio achieved 68 percent of the goal for 2023. Table 24 shows savings goals assigned to Avista's residential sector programs for 2023, as well as verified savings and the goal percentage achieved in 2023.

TABLE 24 – RESIDENTIAL PROGRAMS REPORTED SAVINGS – NATURAL GAS

Program	Savings Goals (Therms)	Verified Savings (Therms)	Percentage of Goal
Water Heat	30,853	14,945	17%
HVAC	231,319	208,468	90%
Shell	31,200	87,129	279%
ENERGY STAR Homes	1,340	469	35%
Multifamily/Small Home Weatherization	80,427	6,443	8%
Multifamily Direct Install	–	2,586	–
Appliances	–	646	–
Midstream	253,727	114,505	45%
Residential Total	**628,866**	**435,191**	**69%**

The residential program consists of measures that aim to maximize the inclusion of all customers while remaining cost-effective. For 2023, Avista's residential prescriptive program provided 5,615 rebates to more than 4,323 customers. (A customer can participate in more than one rebate at a time.)

Cost-Effectiveness

Tables 25 and 26 show the residential sector cost-effectiveness results by fuel type.

TABLE 25 – RESIDENTIAL COST-EFFECTIVENESS RESULTS – ELECTRIC

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 9,982,961	$ 7,895,896	1.26
Utility Cost Test (UCT)	$ 7,797,199	$ 4,407,053	1.77
Participant Cost Test (PCT)	$ 7,858,310	$ 5,274,679	1.49
Ratepayer Impact (RIM)	$ 7,797,199	$ 11,433,548	0.68

TABLE 26 – RESIDENTIAL COST-EFFECTIVENESS RESULTS – NATURAL GAS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 17,837,146	$ 8,063,506	2.21
Utility Cost Test (UCT)	$ 8,114,762	$ 6,147,436	1.32
Participant Cost Test (PCT)	$ 56,432,313	$ 6,866,029	8.22
Ratepayer Impact (RIM)	$ 8,146,424	$ 123,024,780	0.07

Midstream Program

TABLE 27 – MIDSTREAM PROGRAM METRICS

Midstream – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		809
Overall kWh Savings		1,552,940
Incentive Spend	$	310,700
Non-Incentive Utility Costs	$	867,749
Washington Energy-Efficiency Rider Spend	$	1,178,449
Midstream – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		1,306
Overall Therm Savings		114,505
Incentive Spend	$	882,475
Non-Incentive Utility Costs	$	192,736
Washington Energy-Efficiency Rider Spend	$	1,075,211

Description

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

The Midstream Program offers a flexible approach by paying the incentive or buy-down of the energy-efficiency equipment to either (a) the distributor to promote more market transformation, or (b) the contractor or customer, so they receive a benefit equivalent to a traditional prescriptive program. Midstream combines several elements that were previously individual programs. This includes commercial and residential HVAC, water heating equipment, and commercial foodservice equipment.

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

Program Activities

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

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

Independent evaluators conducted their first review of the program in early 2024 and, while the program remained cost-effective, realization rates were lower than anticipated. This difference is due in large part to the evaluator's application of RTF values versus minimum code values as the baseline.

Plans for 2024

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

Avista will also incorporate results from the impact evaluation to assess options for baseline determination and make necessary program adjustments in 2024, for evaluation in 2025.

Residential Home Energy Audit Program

Description

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

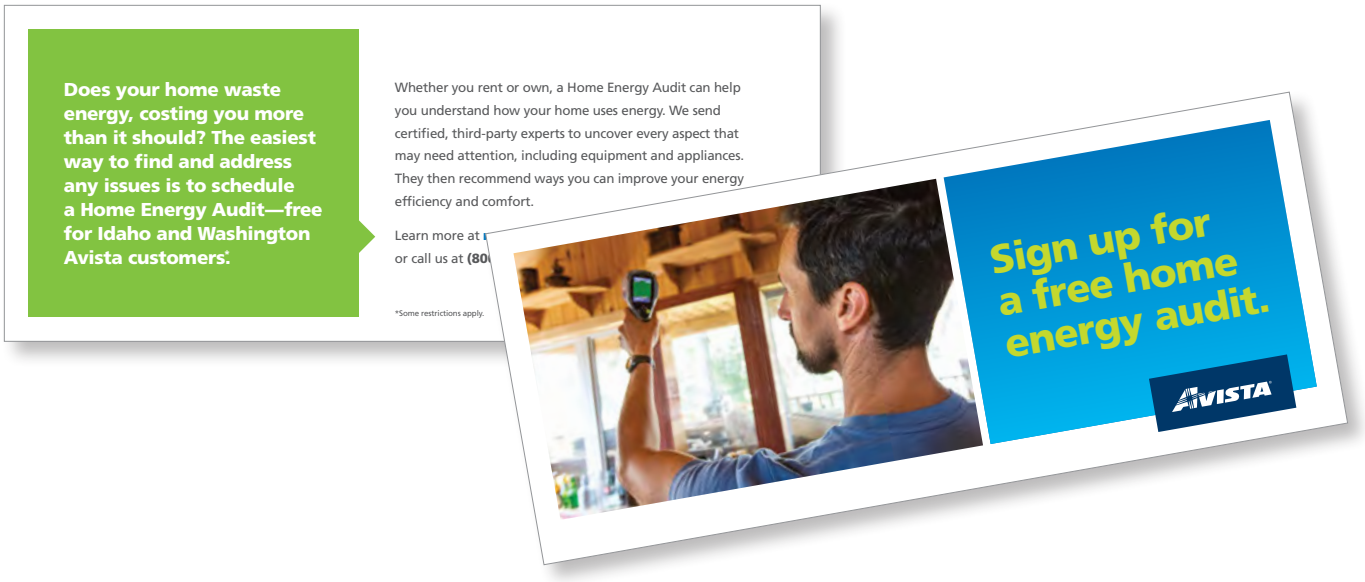
Program Activities

The program is offered across Avista's Washington and Idaho service territory. Avista originally estimated that 500 audits would be conducted between the two states in 2023, and by the end of 2023 a total of 463 audits had been completed. Interest in the program proved to be greater than what Avista anticipated, and applications increased as outside temperatures decreased and exceeded staff's ability to process them. This required more staff to be hired to meet the need. Previously, the program could only conduct about thirty audits per week.

Program Marketing

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

FIGURE 43 – RESIDENTIAL HOME ENERGY AUDIT PROGRAM BILL INSERT



Plans for 2024

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

Customer education about energy efficiency and cross-program awareness are the key focus areas of this program. Avista is working with its third-party evaluator to develop an analysis plan for participating homes and to implement a one-year post-audit process. The purpose of this audit would be to determine whether energy savings can be attributed to the program, either directly or indirectly, through increased participation in other Avista energy-efficiency programs.

Residential Shell Program

TABLE 28 – RESIDENTIAL SHELL PROGRAM METRICS

Shell – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		373
Overall kWh Savings		315,829
Incentive Spend	$	433,008
Non-Incentive Utility Costs	$	365,476
Washington Energy-Efficiency Rider Spend	$	798,484
Shell – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		1,774
Overall Therm Savings		87,129
Incentive Spend	$	2,105,163
Non-Incentive Utility Costs	$	638,852
Washington Energy-Efficiency Rider Spend	$	2,744,016

Description

Avista encourages residential customers to improve their home's building envelope by adding insulation or storm windows or upgrading existing windows or doors. This rebate approach issues payment to the customer following installation. Unlike Avista's other measures that offer do-it-yourself options, insulation must be installed by a licensed contractor.

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

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

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

Program Activities

- ***Electric:*** Savings of 315,829 kWh in 2023 (8 percent of the overall residential savings), a 19 percent increase from the 264,602 kWh achieved in 2022.
- ***Natural Gas:*** Savings of 87,129 therms in 2023, or 15 percent of the overall residential savings. The program had a 40 percent increase in savings relative to the 62,356 therms achieved in 2022.

Savings derived from the Residential Shell Program for both natural gas and electric are primarily attributed to window replacements and attic insulation. For Avista's electric program, the difference in savings as compared to 2022 is due to the variance between expected and verified savings for storm windows, window replacements, and attic insulation. The company anticipated 530,507 kWh of savings for its electric Shell Program as a whole; however, verified savings were 315,829 kWh. For the natural gas program, expected savings were 87,304 therms; verified savings were 87,129 therms. Program evaluators attributed lower-than-expected realization rates for the residential Shell Program to ongoing confusion between square-footage requirements for the Small Home and Multifamily Weatherization Program vs the Shell Program, as well as to granularity in Avista's TRM in comparison to the RTF. Evaluators therefore recommend that Avista incorporate more granularity by climate zone, heating type, u-value and single vs double pane-specific savings into its TRM.

Program Changes

Usage requirements were eliminated for all Washington rebate measures to encourage higher participation and upgrades on existing homes. Window rebates were added for do-it-yourself installation in an effort to bridge a gap seen with rural or remote customers who undertake window replacement projects and are dissatisfied by the lack of rebate options for this category. The program required post-project photos and a customer-signed certification that they have installed the windows according to the manufacturer's instructions.

Avista also changed its incentive structure to include self-installed windows to address high equipment-installation costs. Incentives for windows was $10 per square foot for contractor-installation and $5 per square foot for self-installation. In addition, the incentive for insulation increased from $0.75 a square foot to $1.50 to further promote adequate shell performance in homes. A full description of incentive changes is listed below.

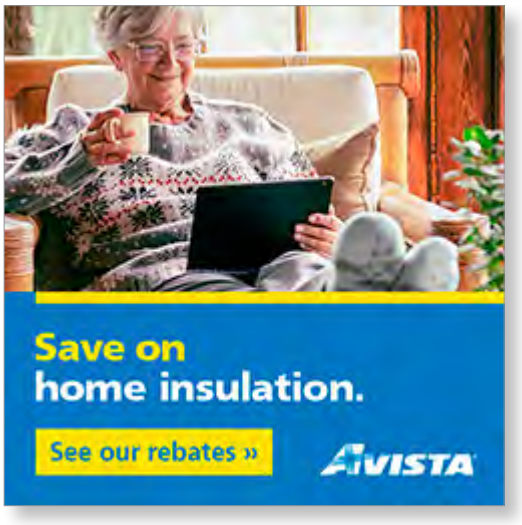
TABLE 29 – RESIDENTIAL SHELL PROGRAM CHANGES

Measure Description	2022	2023
Wall Insulation	$ 0.75 per Sq. Ft.	$ 1.50 per Sq. Ft.
Attic <R11-R49/R38	$ 0.75 per Sq. Ft.	$ 1.50 per Sq. Ft.
Floor <R11-R19	$ 0.75 per Sq. Ft.	$ 1.50 per Sq. Ft.
Floor <R11-R30	$ 0.75 per Sq. Ft.	$ 1.50 per Sq. Ft.
Windows	$ 4.00 per Sq. Ft.	$ 10.00 per Sq. Ft.
Windows – DIY	N/A	$ 5.00 per Sq. Ft.
Storm Windows	$ 4.00 per Sq. Ft.	$ 5.00 per Sq. Ft.
Storm Windows – DIY	N/A	$ 4.00 per Sq. Ft.

Program Marketing

The program was included in the winter bill campaign to increase awareness and drive participation. See pages 50-56. Marketing efforts build awareness of opportunities in the home and drive customers to the website for rebate information. Additional communication methods that encourage program participation include promotion on Avista's website, direct emails, Connections newsletters, bill inserts, and digital ads.

FIGURE 44 – RESIDENTIAL SHELL PROGRAM INSULATION REBATES GOOGLE DISPLAY ADS



Plans for 2024

In April 2024, Avista will shift its approach to window rebates. The company will consider recommendations from its third-party evaluator as it continues to assess program changes for 2024 and will seek to balance accurate savings assumptions with ease of customer experience in program participation. In an effort to enhance and simplify the customer experience, Avista plans to move from a square-footage-based window incentive calculation to rebating based on the number of windows installed. Avista anticipates that this change will reduce confusion and frustration from customers unable to retrieve the correct documentation from contractors, while also minimizing burden on contractors, streamlining rebate processing.

Residential Smart Thermostat Program

Description

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

Program Activities

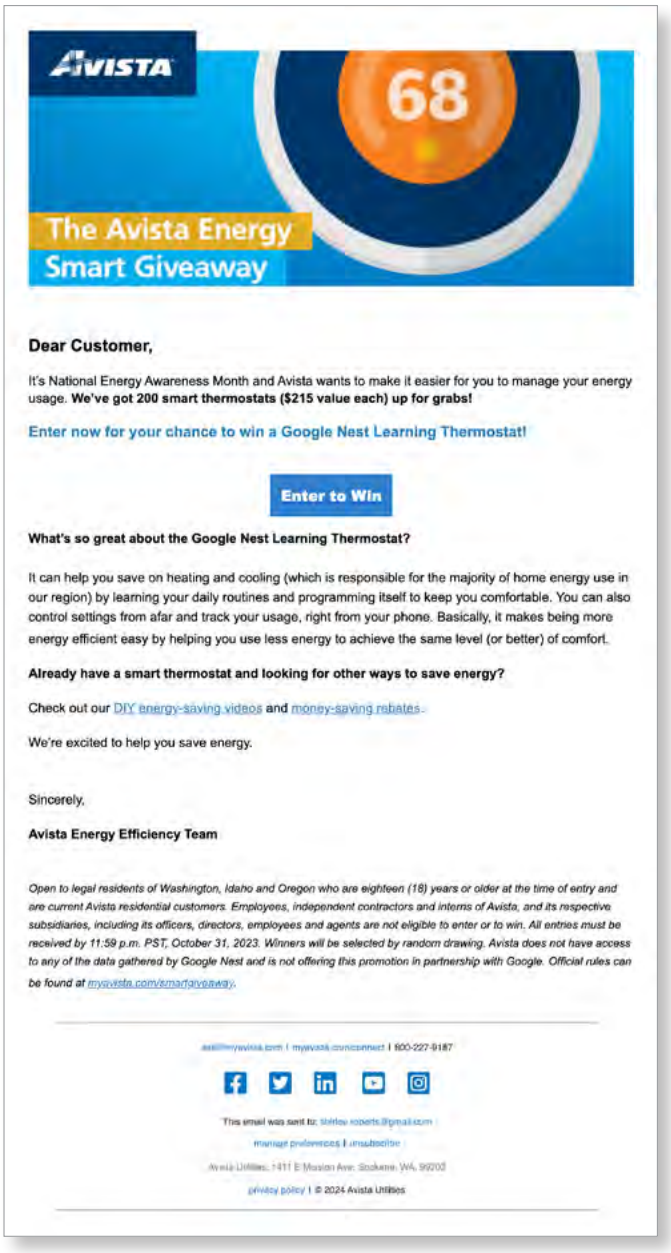
Because of the increase in conservation potential, Avista proposed an increase to the rebates for its Smart Thermostat Program. For 2023, the rebate amount increased from $125 to $150 for self-installed thermostats and $150 to $200 for contractor-installed thermostats.

Program Marketing

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

FIGURE 45 – RESIDENTIAL SMART THERMOSTAT PROGRAM GOOGLE DISPLAY ADS

FIGURE 46 – RESIDENTIAL SMART THERMOSTAT PROGRAM DIRECT EMAIL



AVISTA

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The Avista Energy Smart Giveaway

Dear Customer,

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

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

Enter to Win

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

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

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

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

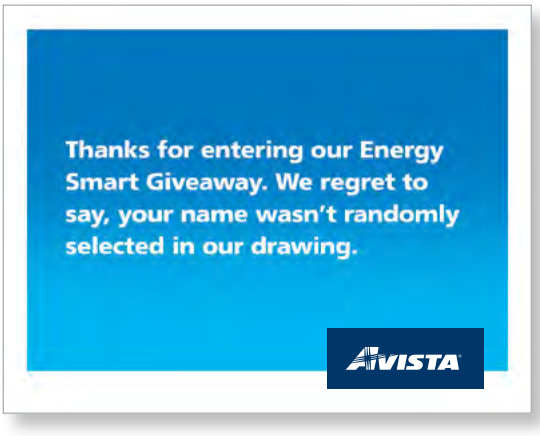
We're excited to help you save energy.

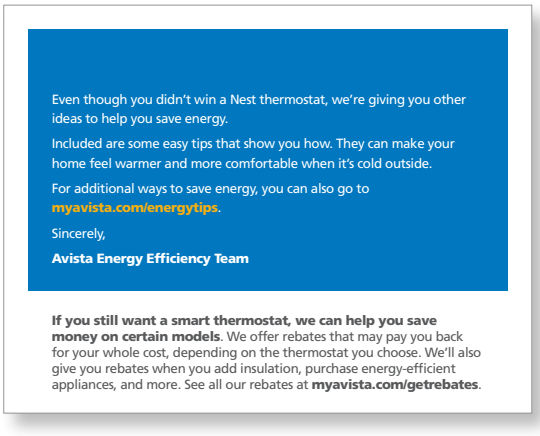
Sincerely,

Avista Energy Efficiency Team

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

FIGURE 47 – RESIDENTIAL ENERGY-SMART GIVEAWAY TIPS CARD





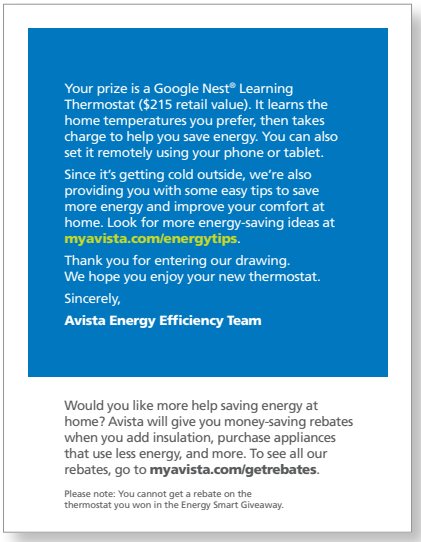
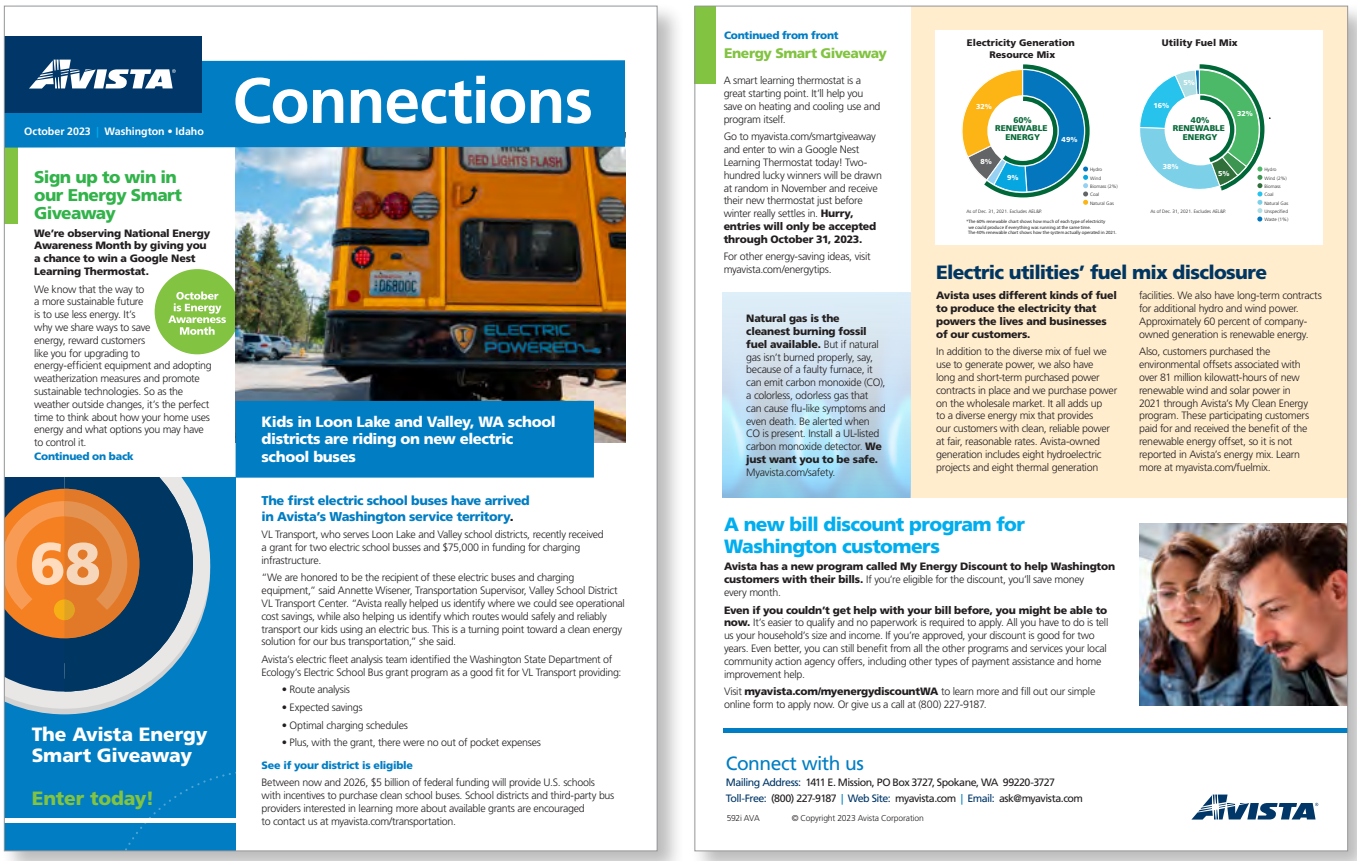


FIGURE 48 – RESIDENTIAL ENERGY-SMART GIVEAWAY, OCTOBER 2023 CONNECTIONS NEWSLETTER



AVISTA

Connections

October 2023 | Washington • Idaho

Sign up to win in our Energy Smart Giveaway

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

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

October is Energy Awareness Month

Continued on back

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

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The Avista Energy Smart Giveaway

Enter today!

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

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

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

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

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

See if your district is eligible

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

Continued from front

Energy Smart Giveaway

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

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

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

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

Electric utilities' fuel mix disclosure

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

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

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

A new bill discount program for Washington customers

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

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

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

Connect with us

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

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Plans for 2024

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

Residential ENERGY STAR/NEEM Manufactured Homes Program

TABLE 30 – RESIDENTIAL ENERGY STAR/NEEM MANUFACTURED HOMES PROGRAM METRICS

ENERGY STAR/NEEM Manufactured Homes – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		32
Overall kWh Savings		94,037
Incentive Spend	$	32,000
Non-Incentive Utility Costs	$	133,072
Washington Energy-Efficiency Rider Spend	$	165,072
ENERGY STAR/NEEM Manufactured Homes – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		7
Overall Therm Savings		469
Incentive Spend	$	7,000
Non-Incentive Utility Costs	$	487
Washington Energy-Efficiency Rider Spend	$	7,487

Description

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

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

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

Program Activities

- ***Electric:*** Savings of 94,037 kWh in 2023 (2 percent of the overall residential savings), a 41 percent increase compared to the savings of 66,555 kWh achieved in 2022.
- ***Natural Gas:*** Savings of 469 therms in 2023. The program had a 13 percent decrease in savings relative to the 536 therms achieved in 2022.

Program Changes

There were no program changes in 2023.

Residential Multifamily Program

TABLE 31 – RESIDENTIAL MULTIFAMILY PROGRAM METRICS

Multifamily – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		231
Overall kWh Savings		385,783
Incentive Spend	$	133,204
Non-Incentive Utility Costs	$	448,650
Washington Energy-Efficiency Rider Spend	$	581,854
Multifamily – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		104
Overall Therm Savings		6,443
Incentive Spend	$	58,123
Non-Incentive Utility Costs	$	11,494
Washington Energy-Efficiency Rider Spend	$	69,617

Description

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

Program Activities

The Residential Multifamily Program accounted for 9 percent of program savings for electric and 1 percent of savings for natural gas programs.

- ***Electric:*** Savings of 385,783 kWh in 2023, an increase of 199 percent compared to 129,232 kWh achieved in 2022.
- ***Natural Gas:*** Savings of 6,443 therms in 2023, an increase of 35 percent over the 4,756 therms achieved in 2022.

Program Changes

The multifamily property measure list includes line-voltage thermostats and all incentives currently obtainable through the residential rebate program. Usage requirements were eliminated to drive throughput and to eliminate a barrier for properties with a lower square footage footprint who have lower energy usage.

Plans for 2024

In 2024, the Multifamily Program will include homes with shared interior walls. Small single-family homes without shared interior walls will be served through the Single-Family Program.

Residential Appliances Program

TABLE 32 – RESIDENTIAL APPLIANCES PROGRAM METRICS

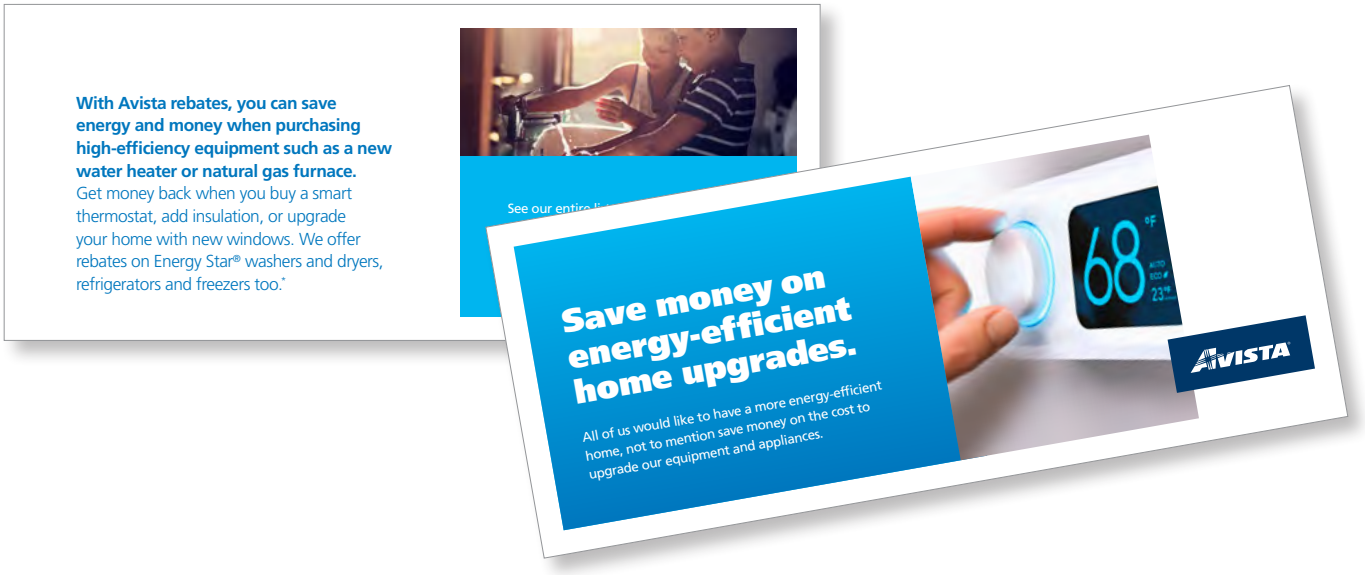
Appliances – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		1,132
Overall kWh Savings		177,085
Incentive Spend	$	80,491
Non-Incentive Utility Costs	$	78,439
Washington Energy-Efficiency Rider Spend	$	158,931
Appliances – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		194
Overall Therm Savings		646
Incentive Spend	$	9,650
Non-Incentive Utility Costs	$	604
Washington Energy-Efficiency Rider Spend	$	10,254

Description

Avista has historically offered incentives for high-efficiency appliances such as residential washers, dryers, and refrigerators through various avenues such as point-of-sale programs and prescriptive paths. The company's prescriptive offerings include rebates for ENERGY STAR-certified appliances, including:

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

FIGURE 49 – RESIDENTIAL APPLIANCE PROGRAM BILL INSERT



Program Activities

- ***Electric:*** Savings of 177,085 kWh in 2023, more than double the 82,327 kWh in 2022. Program participation also nearly doubled, with 1,132 projects in 2023 compared to 627 projects in 2022.
- ***Natural Gas:*** Savings of 646 therms in 2023, a 26 percent increase over 972 therms achieved in 2022. Participation increased slightly at 194 projects compared to 192 projects in 2022.

Program Changes

No program changes were made in 2023.

Plans for 2024

Avista discontinued the top-load washer rebate as of April 1, 2024.

On-Bill Repayment Program

Description

The On-Bill Repayment (OBR) Program is a partnership between Avista and Puget Sound Cooperative Credit Union (PSCCU). The program enables residential and small-business customers in Washington to access Energy-Smart Loans through PSCCU for their energy-efficiency projects. PSCCU's personalized underwriting practices and low interest rates allow participants to reap immediate benefits from energy-efficiency upgrades. The loan payments are convenient: installments are billed monthly as a line item on customers' Avista bills until the term of the loan is completed, or until Avista is otherwise instructed by PSCCU to remove the loan. Extra principal payments or early loan payoffs are made directly to PSCCU.

Program Activities

In 2023, Avista enrolled 108 customers to the OBR Program to obtain Energy-Smart Loans, which exceeded the goal of 100 customers.

Program Changes

As interest rates rose during 2023, PSCCU and Avista also needed to increase interest rates for this program. Interest rates increased from 5 percent in March 2023 and are currently capped at 7.5 percent as of December 2023.

Program Marketing

FIGURE 50 – ON-BILL REPAYMENT PROGRAM ENERGY-SMART LOANS FLYER

Get easy, low-cost financing for energy-efficiency upgrades.

Everyone should be able to afford energy-efficiency improvements for their homes or small businesses. That's why Avista has partnered with Puget Sound Cooperative Credit Union (PSCCU) to bring Energy Smart Loans to our Washington customers.

Energy Smart Loans are an excellent alternative when traditional funding sources fall short. They offer homeowners and small businesses low-interest, zero-down financing* along with the added convenience of having monthly loan payments as part of their Avista bill.

For more information about the Energy Smart Loans, please contact Avista at **(800) 227-9187** or visit **myavista.com/energysmartloans**

Low Rates and Flexible Terms

Energy Smart Loans can be used to purchase and install numerous energy-efficiency measures, including heating and cooling equipment, new windows and doors, insulation, LED lighting and ENERGY STAR certified appliances. Plus, you can enjoy:

- 100% financing of your energy-efficiency upgrades with no equity or down payment required.
- Payments as low as $50 a month automatically added to your monthly Avista bill
- Loan amounts from $1,000 to $30,000 for residential customers and $5,000 to $75,000 for small business customers
- Fixed rate of up to 7.5% APR**
- Terms up to 15 years with no pre-payment penalties

* All loans subject to approval by PSCCU.
** APR = Annual Percentage Rate. Rates, terms, and dollar limits are based on credit.

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Residential

Energy Smart Loans can help finance your project as long as it meets minimum energy-efficiency standards. Visit **myavista.com/energysmartloans** for requirements. Improvements that are eligible for loans include:

Electric space heating: Ductless heat pump, air source heat pump, geothermal heat pump, CO2 heat pump heating system (can include a smart thermostat and duct work upgrades or additions)	**Natural gas space heating:** Furnace or boiler, wall furnace, integrated space and water heat (can include a smart thermostat and duct work upgrades or additions)
Lighting: Lamps, fixtures, ceiling fans	**Appliances:** Clothes washers, clothes dryers, refrigerators, freezers, dishwashers
Electric water heating: Heat pump water heater, storage tank water heater, CO2 heat pump water heater (can include a circulation pump, a water heater blanket, and pipe insulation)	**Natural gas water heating:** Tankless water heater, storage tank water heater (can include a circulation pump, a water heater blanket, and pipe insulation)
Insulation: Attic, wall, floor (can include air sealing)	**Exterior:** Windows, storm windows, skylights, doors
Cooling/central air conditioning: Split system, single package system, whole house fans	

Although it's not necessary for residential projects to qualify for Avista rebates, some may still be eligible. Visit **myavista.com/getrebates** for our current list of rebates.

Small Business

Washington customers who own small businesses can use an Energy Smart Loan for more specific energy-efficiency projects. Projects must qualify for Avista rebates to be eligible, and small businesses must own the building where the energy-efficiency upgrades are made. Improvements that are eligible for loans include:

Grocer: Display case lighting and motors and walk-in cooler strip curtains	**Food service:** Fryers, steam cookers, commercial dishwashers, hot food holding carts, commercial ovens, ice machines, griddles
LED Lighting: Sign lighting, exterior/interior lighting	**Rooftop HVAC units**

The process is easy

Customers can either get pre-approval for a project or get started right away. Here are the steps:

1. Work with a contractor to complete a project bid: your contractor will then send the necessary documents to PSCCU.
2. Apply for your Energy Smart Loan at **psccu.org**.
3. PSCCU will review your application, communicate the decision/funding amount to you and your contractor, send paperwork for your electronic signature, and alert your contractor when work can begin. Paper and postal mail options are available as well.
4. Your contractor will complete the project and submit an invoice, signed by you, to PSCCU.
5. Check with your contractor or Avista to see if your project qualifies for an Avista rebate.
6. PSCCU will distribute the loan balance to your contractor.
7. Your loan payment will appear on your Avista bill within 30 days.

Plans for 2024

Avista's goal is to have 125 customers use the OBR Program and obtain Energy-Smart Loans for energy-efficient upgrades. The Avista trade ally network will spread awareness about the program and engage trade allies to educate customers on available financing options through Avista and PSCCU.

Residential Multifamily Direct-Install Program and Supplemental Lighting Program

TABLE 33 – RESIDENTIAL MULTIFAMILY DIRECT-INSTALL PROGRAM AND SUPPLEMENTAL LIGHTING PROGRAM METRICS

Multifamily Direct-Install – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		15,162
Overall kWh Savings		1,030,041
Incentive Spend	$	579,862
Non-Incentive Utility Costs	$	455,214
Washington Energy-Efficiency Rider Spend	$	1,035,076
Multifamily Direct-Install – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		810
Overall Therm Savings		2,586
Incentive Spend	$	10,008
Non-Incentive Utility Costs	$	2,683
Washington Energy-Efficiency Rider Spend	$	12,691

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

Description

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

Program Activities

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

FIGURE 51 – RESIDENTIAL MULTIFAMILY DIRECT-INSTALL PROGRAM AND SUPPLEMENTAL LIGHTING PROGRAM FLYER

Plans for 2024

This program ended December of 2023.

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Farmington, Washington

LOW-INCOME SECTOR

Program-by-Program Summaries

Low-Income Program

TABLE 34 – LOW-INCOME PROGRAM METRICS

Low-Income – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		397
Overall kWh Savings		451,422
Incentive Spend	$	1,689,991
Non-Incentive Utility Costs	$	1,766,404
Washington Energy-Efficiency Rider Spend	$	3,456,395
Low-Income – Natural Gas		**2023**
Participation, Savings, and Costs		
Conservation Projects		622
Overall Therm Savings		14,749
Incentive Spend	$	1,823,260
Non-Incentive Utility Costs	$	769,857
Washington Energy-Efficiency Rider Spend	$	2,593,117

For 2023, the Low-Income Program served 121 electric and 184 natural gas customers. Program participation for low-income programs is quantified in the number of installed units or square feet of installed insulation or windows.

Description

Avista partners with seven Community Action Agencies (CAA) and one Tribal Housing Authority to deliver low-income energy-efficiency programs throughout the company's service territory. All these organizations have the infrastructure in place to income-qualify customers, as well as provide access to a variety of funding sources to make energy-efficiency improvements to their homes. An annual funding amount of $4 million is allocated across the organizations and is based on meter count in the counties they serve.

The agencies may spend their contract amount at their discretion on either electric or natural gas efficiency measures. The home must demonstrate a minimum level of energy use of either Avista electricity or natural gas for space-heating purposes to be eligible for improvements. Eligible measures include the home's shell (e.g., doors, insulation, or windows) as well as space and water heating systems. The annual funding allocation includes a 30 percent reimbursement for both administrative (10 percent) and program support (20 percent) costs. Agencies may also choose to use up to 30 percent of their annual allocation for home repair as well as other health and safety improvements.

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

A list of acceptable measures allows for partial reimbursement of those efficiency improvements that may not be cost-effective but may be vital for the home's functionality. These measures are compensated with an amount that is equal to the utility's avoided cost of the energy savings associated with the improvement. To allow additional flexibility with their funds, the agencies may use the health, safety, and repair dollars to fully fund the remaining cost of the qualified measure.

Program Activities

In 2023, the program achieved 451,422 kWh of reported electric savings and 14,749 therms of natural gas savings. Tables 35 and 36 show Avista savings goals for the low-income sector for 2023, as well as verified savings and the percentage of goal achieved.

TABLE 35 – LOW-INCOME PROGRAM VERIFIED SAVINGS – ELECTRIC

Program	Savings Goals (kWh)	Verified Savings (kWh)	Percentage of Goal
Low-Income	1,203,682	451,422	38%
Low-Income – Total	**1,203,682**	**451,422**	**38%**

TABLE 36 – LOW-INCOME PROGRAM VERIFIED SAVINGS – NATURAL GAS

Program	Savings Goals (Therms)	Verified Savings (Therms)	Percentage of Goal
Low-Income	24,345	14,749	61%
Low-Income – Total	**24,345**	**14,749**	**61%**

Avista continued to reimburse the agencies for 100 percent of the cost for installing most energy-efficiency measures defined on the approved measure list (see Table 37). The company deemed these measures cost-effective during the development of the *2023 Annual Conservation Plan*.

TABLE 37 – LOW-INCOME PROGRAM APPROVED MEASURE LIST

Electric Measures	Natural Gas Measures
Air infiltration	
Air-source heat pump	Air infiltration
Attic insulation	Attic insulation
Doors (ENERGY STAR-rated)	Boiler (96 percent AFUE)
Door sweep	Doors (ENERGY STAR-rated)
Duct insulation	Duct insulation
Duct sealing	Duct sealing
Floor insulation	Door sweep
LED lamps	Floor insulation
Wall insulation	Furnace (95 percent AFUE)
Windows (ENERGY STAR-rated, U-factor .30))	Smart thermostat
Windows – storm (low e-rated)	Wall insulation
Electric to air-source heat pump	Water heater – storage <55 gallon .65 EF
Electric heat to ductless heat pump	Water heater – tankless .82 EF
Heat Pump Water Heater (Tier 2-3)	Windows (ENERGY STAR-rated)
Refrigerators (ENERGY STAR-rated)	Windows – Storm (low e-rated)
Smart thermostat	

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

TABLE 38 – LOW-INCOME PROGRAM ACCEPTABLE MEASURE LIST

Electric Measures	Natural Gas Measures
Air-source heat pump (9 HSPF) up to $1,388.36	(none currently)

Program Changes

A new program manager was hired in February 2023, replacing the incumbent after more than 28 years in the position.

While the agencies have been actively working with customers, many challenges persist, including finding willing and eligible participants, navigating continued increases in labor and material costs, and delays in receiving products. While a few agencies were able to fully spend their funds, others did not have the same success. Avista will continue to collaborate with partner agencies to develop strategies to overcome these barriers.

Deferred Maintenance Pilot: As part of the Washington Utilities and Transportation Commission order, Avista agreed to develop a pilot program to overcome the inability to weatherize homes because of deferred maintenance or large repairs. This program started in October 2023 and expires December of 2024 with a budget of $1 million distributed to the partner agencies and up to $25k per customer. The goal for this pilot focuses on bringing a customer's home to pre-weatherization status, thereby qualifying them for further weatherization work that otherwise would have disqualified them. Qualified projects include replacing knob and tube wiring, full electrical rewiring or panel upgrade, roof repair or replacement, removal of asbestos or vermiculite, and other major projects required that would enable homes to be weatherization-ready.

In addition to providing the traditional path to serving income-qualified customers with energy efficiency, Avista also continued to partner with a local CAA in Spokane County to provide no-cost weatherization services to all residents of a resident-owned mobile home community, which expired at the end of 2023. This program is described in more detail on page 88. In 2024, Avista will look at other similar opportunities to provide these same services to other local resident-owned mobile home communities.

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

Customer Outreach

Customers who participate in the Low-Income Weatherization Program are often referred through Avista's partner CAAs as recipients of various bill assistance programs. Avista often provides referrals each year from its customer service department and the company's Customer Assistance Referral and Evaluation Services (CARES) Program, which provides support for disabled, elderly, and low-income customers, or customers experiencing hardships related to employment, health, or finances.

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

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

The outreach team dropped off energy-saving items and information at food banks, participated in mobile food bank drive-through events, and partnered with community-based organizations to provide home energy kits to their clients. In addition to receiving a free energy kit, they could also request a free energy use guide (pictured on page 84) as well as the Avista Kids children's energy savings activities book (pictured on page 85).

FIGURE 52 – LOW-INCOME PROGRAM HOME ENERGY SAVINGS KIT BROCHURE

FIGURE 53 – LOW-INCOME PROGRAM ENERGY USE GUIDE

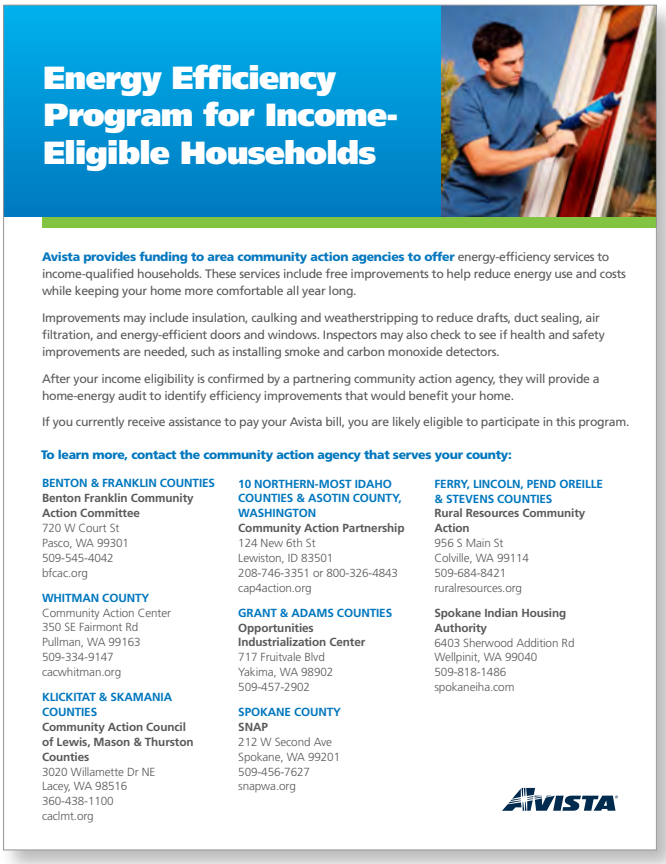
FIGURE 54 – KIDS CAN SAVE ENERGY TOO COLORING AND ACTIVITY BOOK

Avista's outreach coordinator retired in April of 2023; the outreach manager also switched to a new role on the team beginning in early 2023. The company concurrently determined that it was necessary to engage in a post-COVID refresh of the company's outreach strategy. Avista therefore paused outreach activities in April 2023 in order to onboard new staff and to develop a new outreach strategy. A new outreach plan will be launched in 2024. Table 39 shows an overview of the different activities in Washington that were accomplished before the April pause.

TABLE 39 – LOW-INCOME PROGRAM VULNERABLE CUSTOMERS OUTREACH ACTIVITIES AND LED GIVEAWAY SUMMARY

Description	Number of Events/ Activities	Contacts	LEDs
General Outreach	10	558	1,384
Mobile Outreach	–	30	60
Workshops	8	231	422
Total	**18**	**819**	**1,866**

FIGURE 55 – LOW-INCOME PROGRAM WEATHERIZATION FLYER



Energy Efficiency Program for Income-Eligible Households

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

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

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

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

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

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

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

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

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

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

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

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

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

AVISTA

Cost-Effectiveness

Tables 40 and 41 show the low-income sector cost-effectiveness results by fuel type.

TABLE 40 – LOW-INCOME PROGRAM COST-EFFECTIVENESS RESULTS – ELECTRIC

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 2,538,883	$ 3,456,395	0.73
UCT	$ 897,912	$ 3,456,395	0.26
PCT	$ 2,305,173	$ 1,689,991	N/A
RIM	$ 897,912	$ 4,226,478	0.21

TABLE 41 – LOW-INCOME PROGRAM COST-EFFECTIVENESS RESULTS – NATURAL GAS

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$ 413,571	$ 3,140,095	0.13
UCT	$ 365,170	$ 2,593,117	0.14
PCT	$ 1,832,260	$ 2,370,238	N/A
RIM	$ 365,949	$ 2,593,117	0.14

Plans for 2024

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

Workforce Training Pilot: A common struggle many partner agencies experience is access to high quality workforce training. Current weatherization training services require agency staff to travel to Bellingham, WA. Barriers for partner agencies located in eastern Washington include training access, travel expenses, and time away from work to travel to Bellingham for these multi-day trainings. Avista saw a need and developed a workforce training pilot to bring trainers from the Building Performance Center to four different locations in eastern Washington sometime in the spring/summer of 2024. Future conversations with key workforce training stakeholders and partner agencies will need to take place to figure out how to solve this issue on a more permanent basis, including the possibility of a training center located in eastern Washington.

Meanwhile, Avista will continue to revisit UES assumptions for measures as part of its annual business planning process. The company also continues to re-evaluate the units used to set program participation goals for the year. Finally, Avista will ensure that the TRM is updated to reflect any UES adjustments, in accordance with recommendations from its third-party evaluator for low-income programs.

Community Energy-Efficiency Program

TABLE 42 – COMMUNITY ENERGY-EFFICIENCY PROGRAM METRICS

Community Energy-Efficiency – Electric		2023
Participation, Savings, and Costs		
Conservation Projects		16
Overall kWh Savings		94,819
Incentive Spend	$	146,081
Non-Incentive Utility Costs	$	91,668
Washington Energy-Efficiency Rider Spend	$	237,749

Note: CEEP accomplishments have been included within the Low-Income Program.

In addition to the company's Low-Income Program – delivered by CAA partners – Avista partnered with the Community Energy Efficiency Program (CEEP) for four years (2020 through 2023) to deliver energy-efficiency programs for hard-to-reach markets such as rental properties, multifamily buildings, homes with alternative heat, low- to moderate-income households, and small businesses. Created by the Washington State Legislature in 2009, CEEP was initially funded by the American Recovery and Reinvestment Act. Since then, it has developed into a mature program with support from the Washington State Capital Budget. The Washington State University Energy Program executed and managed the program in conjunction with CEEP partners to provide support to homeowners and small businesses that may not benefit from traditional energy-efficiency programs.

Out of Avista's CEEP contract of $1,000,000, which was also matched with energy-efficiency tariff rider funds, Avista was able to spend all but $8,711.86 by the time the contract ended in June 2023. Avista's CEEP projects focused on three components: low-income homes with alternative heat, multifamily energy-efficiency improvements, and an incentive match for energy-efficiency projects completed at rural businesses.

Three of the company's CAA partners administered projects for seventeen income-qualified homes across three counties in Avista's service territory: Asotin, Spokane, and Whitman.

The Avista CEEP program followed the same guidelines the CAA partners used with the same quality assurance procedures related to funding received from federal and state entities.

These customers benefited from CEEP dollars where homes are now heating with either an air-source or ductless heat pump system. In addition, homes have been weatherized and received health and safety improvements where necessary. CEEP made it possible for these customers to be eligible for future utility energy-efficiency programs now that their primary heating source is provided by Avista. Prior to these improvements, heating with an alternative fuel often disqualified the home and its owner from utility energy-efficiency program participation.

As part of the BPP, Avista provided a concierge-type service in which contractors visited the business to either provide a bid if a project was already identified or conducted a walkthrough of the building to highlight opportunities that may result in energy savings. This program used contractors that were available to provide bids to the small businesses for their consideration whereas the customer chose and coordinated their own installation.

Without the CEEP program, one of the main barriers to installing efficiency improvements in rural areas was having contractors visit the business. With Avista providing that resource, this often allowed the customer to move through to installation. The customer coordinated all pieces of the installation process. Those projects that qualified for a utility incentive received a match from CEEP – resulting in lower out-of-pocket costs for the customer.

A total of 121 businesses/organizations in Avista's rural service territory received a utility incentive for their energy efficiency improvement plus a match from CEEP. Projects included lighting retrofits, heating system upgrades, addition of insulation, and window retrofits. These included businesses that provide essential services like grocery stores, post offices, churches, salons, 911 centers, community centers, and pharmacies along with other local businesses.

CLEAN ENERGY TRANSFORMATION ACT (CETA) IMPLEMENTATION

Spokane Valley, Washington

CLEAN ENERGY TRANSFORMATION ACT IMPLEMENTATION

In July 2022, Avista became the first investor-owned utility in the state to gain approval of its CEIP. The plan reflected extensive community input from both the Equity Advisory Group (EAG) and public and stakeholder meetings across the state. Chapter 4 of the plan included innovative energy-efficiency programs designed to help lower customers' energy burdens while ensuring that community benefits, particularly for Named Communities, are recognized, and that progress on Customer Benefit Indicators (CBI) is tracked. These programs and initiatives reflect the significant efforts and resources that Avista has committed to ensure that the benefits of the company's transition to cleaner energy are extended to all, especially those who are members of Named Communities. With that commitment, Avista is investing 1 percent of total electric retail revenues, or approximately $5 million, for the fund annually as shown in the table below. 40 percent of the funds are dedicated toward energy-efficiency programs for Named Communities.

TABLE 43 – NAMED COMMUNITIES INVESTMENT FUND

Named Communities Investment Fund Amount	Named Communities Investment Fund Category
40 percent or up to $2 million	Energy-Efficiency Supplement
20 percent or up to $1 million	Distribution Resiliency
20 percent or up to $1 million	Customer & Third-Party Grants & Incentives
10 percent or up to $0.5 million	Outreach & Engagement
10 percent or up to $0.5 million	Other Projects, Programs, or Initiatives

Most importantly, as specified in Chapter 4 of Avista's CEIP, expenditures of the Named Communities Investment Fund (NCIF) will include guidance from its equity and community-based partners, specifically the EAG. In its founding year, the EAG played a critical role in identifying and helping Avista define CBIs, as required by the new law. The EAG also assisted in defining the "vulnerable populations" component of Avista's Named Communities. The group continues to be a vital partner as members provide guidance around equity considerations for a wide variety of Avista's programs and projects. Avista is enthusiastic about assisting and supporting Named Communities customers in the equitable benefit from the transition to clean energy and looks forward to leveraging the NCIF for investments that support this transition.

Early in 2023 the EAG underwent a Results-Based Accountability (RBA) activity to identify and prioritize energy-efficiency initiatives for Named Communities, as featured in the chart below.

- Improve awareness and energy efficiency for Spokane Tribe, multifamily, and manufactured homes
- Increase tree canopy
- Increase access to energy efficiency products and appliances
- Increase awareness and engagement in energy efficiency programs
- Match funds for energy efficiency grant applications to community-based organizations and tribal partners
- Improve energy efficiency for those without stable housing

The group's identified and prioritized initiatives for NCIF focus closely align with the specific actions identified in Chapter 4 of the company's CEIP (e.g., energy-efficiency programs for multifamily split incentive, manufactured/ mobile homes, single-family weatherization, and community and small business, with the Community Identified Projects being addressed with the EAG RBA). A few distinctions of the EAG's initiatives are callouts for those who are unhoused, tree canopy, and emphasis for tribal partners – the latter of which are a component of Highly Impacted Communities. Avista will continue to engage and update the EAG on the progress of their identified NCIF projects listed in Table 44. The company will also provide updates to other external advisory groups, as well as in the company's public participation meeting series, on NCIF activities such as spending, number of projects implemented, and benefits gained for Named Communities.

In 2023, Avista staff were dedicated to implementing activities supporting the NCIF. During this year, a program manager was hired to implement and manage programs and projects funded through the energy-efficiency portion of the NCIF. Avista's community investment and foundation managers oversee the community components of the NCIF (e.g., distribution resiliency, incentives, and grants for customers or third parties; outreach and engagement; and other programs or initiatives). These two managers worked closely together to establish an application process that allows for receiving community and customer proposals for NCIF utilization, as well as a screening process that assesses all proposals for alignment with the company's CEIP equity considerations, CBIs, specific actions, and the EAG's priority areas. Most important, the process encompasses unique consideration for all proposals to ensure that the process is equitable.

The NCIF administration and governance also includes an internal advisory group with representation from energy efficiency and other interested parties such as regulatory, external communications, and clean energy departments to evaluate all proposed projects and programs.

During the summer of 2023, the company launched an online application for CAA, third parties, community-based organizations, and non-profits to apply for NCIF funding, with an announcement through an email to their network of community partners and advisory groups (approximately 250 recipients). In early 2024, Avista plans to hold a virtual workshop for community partners to learn more about the purpose of the NCIF and the application process with an open forum for questions and discussion. Avista staff are committed to working individually with entities that need support for making a proposal for NCIF.

The synchronization of the energy efficiency and community portions of the NCIF allowed a number of projects to move forward that may not have been able to do so with energy efficiency funding alone. Many projects seeking support from the NCIF have multiple objectives beyond energy efficiency. One such example is the Martin Luther King Community Center, which is undertaking an ambitious and multi-faceted project to enhance the ways the building and its users manage their energy. In addition to planned energy efficiency upgrades, the project also includes plans for rooftop solar and battery storage, as well as electric vehicle charging and resiliency upgrades, including backup power, to support the building's critical needs during extended outage scenarios. The Kettle Falls Food Pantry, as well as the Grid Resiliency Design project at the Spokane Tribal administration building in Wellpinit, WA, are also examples of projects that have leveraged energy efficiency funding with other types of clean energy funding to meet project objectives. In addition to providing funding, Avista also contributed technical assistance, including grant writing support, to the MLK and Spokane Tribal Administrative building projects.

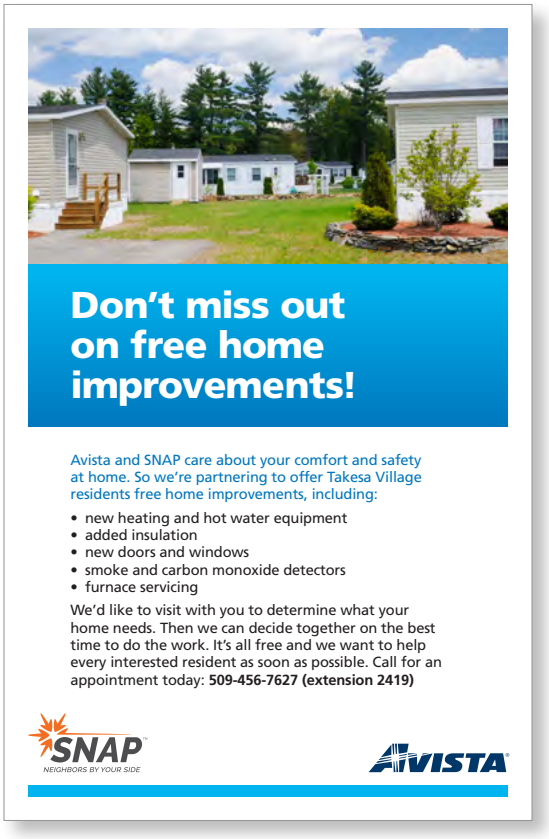
NCIF energy-efficiency spending in 2023 was $1,041,390. This funding supported nine projects, which are listed in the chart below.

TABLE 44 – NAMED COMMUNITIES INVESTMENT FUND ENERGY-EFFICIENCY PROJECTS

Energy-Efficiency Projects	Project Investment	kWh savings
The continuation and expansion of Health & Safety for Manufactured Homes through partnership with CAA – Spokane Neighborhood Action Partners (SNAP)	$ 284,916	Reported in the Low-Income Programs section of this report
Weatherization for Homes in Malden, WA	$ 48,688	TBD
Lincoln County Fairgrounds Lighting Upgrades	$ 9,916	Captured in Direct-Install Lighting
Energy audits for buildings on the Spokane Tribe reservation	$ 58,339	NA
Duct Sealing pilot for manufactured and mobile homes in Stevens, Ferry, and Pend Oreille counties	$ 78,901	TBD
Replacement of Packaged Thermal Air Conditioning units in an affordable housing complex	$ 293,913	TBD
Envelop measures for Phase 1 of an affordable housing complex (i.e., windows, sliders, exterior doors, and insulation for walls and roofs)	$ 175,592	TBD
New refrigerator and freezer for small business	$ 14,429	TBD
Energy-efficiency components for a full building renovation for food pantry	$ 28,046	Site-Specific and Direct-Install Lighting
Energy efficiency for a resiliency project for a community center in Spokane County East Central neighborhood	$ 34,650	Site-Specific and Direct-Install Lighting
Total	**$ 1,041,390**	

Health & Safety for Manufactured/Mobile Homes – Building on a pilot program that launched in 2021 in partnership with SNAP, the Spokane County-based CAA, to provide no-cost weatherization services to selected members of a north Spokane County resident-owned mobile home community, this service offering was expanded to a manufactured home community that had a disproportionate representation of low-income households in 2023. Through the project, participants could receive heating and water heating equipment, added insulation, doors, windows, smoke and carbon monoxide detectors, and furnace servicing. This program served ten homes in 2023. Metrics for these projects are included in the Low-Income Programs' section of this report.

FIGURE 56 – HEALTH & SAFETY FOR MANUFACTURED/MOBILE HOMES FLYER



Energy Efficiency for Homes in Malden, WA – The NCIF was used to make energy-efficiency improvements in two homes of the fire-affected community of Malden, WA. While other homes in the area received these improvements under the traditional weatherization program conducted by the local CAA – Community Action Center of Whitman County – the two homes served through this NCIF program enabled the expanded reach beyond the established qualifications to help these customers with energy-efficiency improvements. Metrics for these projects are included in the Low-Income Programs' section of this report.

Energy Assistance for Community at Lincoln County Fairgrounds Lighting Project – In addition to an annual rodeo and county fair, this facility provides a space for other services and programs, such as Rural Resources' Energy Assistance Outreach. In May 2023, the NCIF was used to pay for the lighting upgrades costs that were not covered by the company's Direct-Install Lighting Program and beyond what the oversight entity could contribute to the project. The cost savings estimates helped to alleviate the organization's financial burden and keep funding for continued community service and development.

Spokane Tribe Building Energy Audits – In January 2023, a distribution circuit load analysis for the grid resiliency design project was conducted and identified high energy use and high peak-loading in the Spokane Tribal Administrative building, which serves as the headquarters for the Spokane Tribe. In January 2023, Avista used NCIF funding to cover the costs of American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Levels I and II energy audits for the administrative building, which identified many opportunities for efficiency upgrades. The NCIF also covered costs for ten additional energy audits of Tribal buildings in Wellpinit that were completed in August 2023. Through the building energy audits conducted in January 2023, efficiency upgrade opportunities for the Spokane Tribal Administrative building were identified. In March 2023, the Tribe used the information provided in the audits to submit a grant application to the Washington Department of Commerce's Clean Energy Fund 5/Rural Clean Energy Innovation Program for the project scope identified in the audit, which includes replacement of all five rooftop HVAC units, a new building HVAC controls system, duct repair and air balancing, building envelope improvements including selected window replacement, and upgrades to selected lighting. Avista supported the Tribe's grant application with technical support and project planning. The total cost of the project is expected to be $1.1 million. On August 10, 2023, the Department of Commerce awarded the project $991,000, with Avista's NCIF contributing a planned estimate of $18,720 in efficiency rebates in 2024 to support the grant's required 10 percent match, with the balance of the match requirement provided by the Spokane Tribe. When the project is complete, the Tribe can expect to save approximately 340,000 kWh per year while saving over $30,000 in annual energy costs. The upgrades are also expected to offset 3,091 pounds of CO2 by replacing aging equipment and decommissioning outdated, high-emitting refrigerant.

Duct Sealing in Rural Communities – In November 2023 a pilot was launched to provide duct sealing, free of charge, to residential electric customers residing in manufactured and mobile homes in Ferry, Stevens, and Pend Oreille counties. The service is conducted by KW Energy, a small business and Aeroseal dealer who was one of the first applicants through the online portal. In 2023, KW Energy serviced twenty-five homes.

FIGURE 57 – DUCT SEALING PRINT ADVERTISING

Energy Efficiency for Multi-Family Housing Complex – A collaboration of Lutheran Churches serving urban poor in their affordable housing complex requested support for the replacement of existing heating and cooling units for each of the seventy-six individual apartments. After being replaced, the original units were properly disposed of by appropriately recycling and fully capturing the refrigerant.

Energy Efficiency for Affordable Housing Complex – With an NCIF award, Avista has committed to improving the energy efficiency of one of SNAP's wholly-owned affordable housing complexes. The project will make energy-efficiency improvements for the complex and its fifty affordable housing units. The work began in 2023 and is expected to conclude in early 2025. An initial NCIF commitment of $449,847 for the first phase of this project was committed with spending to occur in both 2023 and 2024. Additional NCIF commitments will be made in 2024 for subsequent phases that will include replacement of an end-of-life heating system and new hot water tanks.

Efficient Appliances for Small Business – A small startup business serving prepared meals was received through the NCIF online application with a request for assistance in any way possible to help with the business sustainability. In the initial months of operation, the business owner often encountered individuals that were unable to pay for the meals either partially or in full. She made accommodations to those requests and was left trying to balance reduced revenues and business operational costs. Additionally, recognizing the need, she was striving to obtain 501(c)(3) status for the philanthropic portion of her business – serving those with food insecurity. A site visit by Avista staff identified that energy savings and energy burden reduction could be achieved by replacing her outdated and inefficient refrigerator and freezer. The new appliances purchased with the NCIF award were delivered in December.

MLK Center – Avista partnered with the MLK Center and the City of Spokane to submit a Washington Department of Commerce Solar Plus Storage grant application. The grant is designed to help develop a neighborhood resilience center to provide shelter and resources during climate and other emergencies. The total costs are estimated at $2.3 million. In August 2023, the Department of Commerce awarded the project $1.5 million, with a total NCIF planned contribution of $720,000 to the effort across the third quarter of 2023 and into 2024. The NCIF supported energy-efficiency measures for the facility included lighting upgrades, window replacement, and a retro-commission HVAC report.

Administrative costs for the NCIF included the development of an online application. Avista contracted with Cybergrants, an existing third-party provider of online application services for the non-profit Avista Foundation, to develop the NCIF online application for community members and businesses. The application[1] went live July 10, 2023. The total project cost was $28,000. As of August 2023, the NCIF energy-efficiency supplement has paid $6,926 with an additional $7,075 planned for 2024.

Looking forward to 2024, relationships for tree canopy have been established and will be confirmed in the new year, and proposals have been received with a partnership secured for a multifamily program to be launched in the second quarter.

1) The NCIF application can be found at: www.myavista.com/NCIF

PILOT PROGRAMS

Spokane, Washington

PILOT PROGRAMS

Program-by-Program Summaries

Active Energy Management

Description

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

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

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

Goals of the pilot include the following:

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

Program Activities

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

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

Program Changes

No pilot changes are being proposed at this time.

Plans for 2024

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

Residential Always-On Behavioral Program

Description

To increase customer-facing value from the Washington Advanced Metering Infrastructure (AMI) deployment, Avista has launched a targeted load behavioral program using AMI-based non-intrusive load monitoring. By identifying the appliance-level electricity loads within a residence, Avista can offer customers personalized information to better inform them of energy savings opportunities.

The target load selected will be always-on consumption. This target was selected because, on average, 24 percent of an Avista customer's bill can be attributed to always-on loads – and because calculations related to determining them are considered highly 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 or adjusting power settings on computers when not in use.

FIGURE 58 – ENERGY REDUCTION PRINT ADVERTISING

Program Eligibility

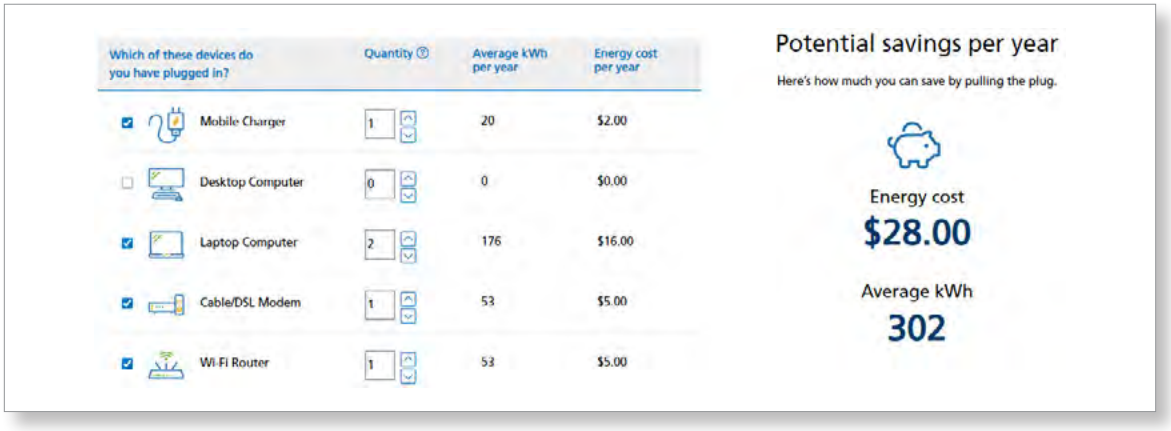
Going into phase two of the pilot, program eligibility remained mostly stable from the previous phase in 2022. Washington residential electric customers with active AMI meters and email addresses are eligible. Additionally, in this phase, historical energy usage at the customer's premises is not required.

Program Implementation

The program launched in July of 2023 with 111,000 customers who were randomly assigned to one of two customer groups: one treatment arm and one control group. The control group consisted of approximately 10 percent of the overall participant count.

Website content and tools were made available to customers on myavista.com, including general information and tips, an always-on device calculator to help customers estimate their potential energy bill savings, and Frequently Asked Questions about the program.

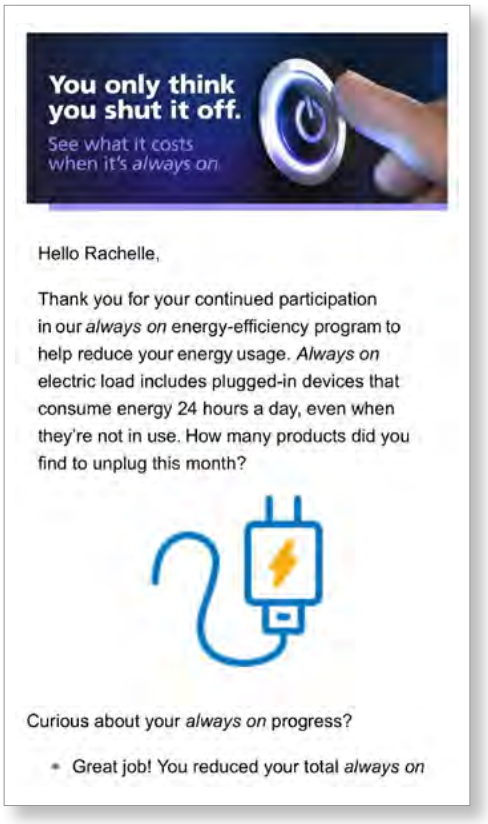
FIGURE 59 – ALWAYS-ON MYAVISTA.COM DEVICE CALCULATOR



Program Activities

Customers in the treatment group received an email each month after receiving their Avista energy bill. The email included information regarding their personalized always-on usage and costs along with a relevant monthly energy savings tip. In addition, customers could navigate on the Avista website through a provided email link where they could explore the online tools including their full energy use profile to explore additional energy savings opportunities.

FIGURE 60 – ALWAYS-ON CUSTOMER CAMPAIGN EMAIL



Plans for 2024

This phase of the pilot will run for a twelve-month term that will end on July 1, 2024. As a result of the pilot, Avista is tracking and reporting on observed energy savings between the treatment arm and the control group.

Avista is exploring the expansion of residential behavioral programs in our Washington electric AMI service territory. By offering a home energy report program, Avista can expand opportunities to more customers and load types as well as increase our energy savings potential.

REGIONAL MARKET TRANSFORMATION

Upper Falls Reservoir, Riverfront Park, Spokane, Washington

REGIONAL MARKET TRANSFORMATION

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

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

Table 45 shows the 2023 NEEA savings and the associated costs for Washington, which exclude internal administrative costs associated with participation in the various NEEA activities and studies.

TABLE 45 – NEEA ENERGY SAVINGS AND PARTICIPATION COSTS

Fuel Type	2023 NEEA Energy Savings	2023 NEEA Participation Costs	Avista 2020-2024 Funding Share
Electric	5,322MWh (0.61 aMW)	$ 1,222,479	3.95%
Natural Gas	63,544 therms	$ 408,550	8.49%

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

Electric Energy Savings Share

Values provided in NEEA's 2023 annual report represent the amounts allocated to Avista's service territory, which is a combination of site-based energy savings data (where available), or an allocation of savings based on funding share. Using the latter approach, the funding share for Avista is split 70 percent for Avista Washington and 30 percent for Avista Idaho. The funding share for Avista varies by funding cycle and within each cycle if the funding composition changes.

Natural Gas Energy Savings Share

NEEA's costs include all expenditures for operations and value delivery; energy savings initiatives; investments in market training and infrastructure; stock assessments, evaluations, data collection, and other regional and program research; emerging technology research and development; and all administrative costs.

Avista's criteria for funding NEEA's market transformation portfolio calls for it to deliver incrementally cost-effective resources beyond what could be acquired through Avista's local portfolio alone. Avista has historically communicated with NEEA the importance of delivering cost-effective resources to the company's service territory and remains confident that NEEA will continue to offer cost-effective electric market transformation in the foreseeable future. The company will continue to be active in the organizational oversight of NEEA, a critical step in ensuring that geographic equity, cost-effectiveness, and resource acquisition goals of market transformation are met.

Brio Eastside Collaborative Market Transformation

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

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

Collectively, the pilot resulted in investment from the market of over $1.5 million across both utility territories, with sales in Avista's service territory increasing by 48 percent from January 2022 to April 2023. Collectively, 222 DHP units were incentivized, sold, and installed through pilot program installation partners during the pilot period. Seventy-two of these were installed within Avista's service territory. Thirty-eight of the seventy-two were installed in phase I of the pilot, which included promotions with Arefco, Carrier, and Bryant. The other thirty-four were installed during phase II, with promotions from Thermal Supply and Daikin.

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

Generation, Transmission, and Distribution

TABLE 46 – CONSERVATION VOLTAGE REDUCTION AND INTEGRATED VOLT/VAR CONTROL

Project	Savings (kWh)
Conservation Voltage Reduction	10,575,230
Integrated Volt/VAR Control	749,197
Total	**11,324,427**

Avista implemented Conservation Voltage Reduction (CVR) and Integrated Volt/VAR Control (IVVC) on thirty-five feeders on its distribution system in 2021 and 2022. In order to determine electric energy savings, a year of post-implementation data is needed; the electric energy savings from these feeders in the 2022/2023 biennium are therefore included.

The distribution engineering team at Avista determines which feeders are suitable for CVR or IVVC and coordinates updating the control settings changes to implement it. CVR reduces the voltage and sets it at the transformer without a closed-loop control. IVVC uses voltage readings from devices along the feeder and an algorithm to update voltage on the transformer every thirty seconds to ensure the voltage is minimized while not dropping below the required threshold.

Avista used a year of pre- and post-data to determine electric energy savings for each feeder. The savings analysis used an adjusted CVR factor for each feeder based on feeder type values from the Navigant study. The company pulled data from its Bidgley Analytics Workbench to determine the breakdown of customer type (industrial, commercial, and residential) for each feeder to develop an adjusted CVR factor. The RTF energy savings equation for CVR used the adjusted CVR factor, voltage reduction was based on feeder data, and energy use based on feeder data. CVR and IVVC implementation resulted in 10,209 MWh of electric energy savings for the 2022/2023 biennium.

GLOSSARY OF TERMS

Historic Oakesdale Flour Mill, Oakesdale, Washington

GLOSSARY OF TERMS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

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

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

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 because of increases in the efficiency of energy use, production, or distribution.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

highly impacted community: designated by the Washington Department of Health, any census tract with an overall ranking of 9 or 10 on the Environmental Health Disparities map, or any census tract with tribal lands.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

measure life: See Effective Useful Life (EUL).

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

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

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

Named Community: Represents areas within Avista's service territory that are considered to be a highly impacted community or vulnerable population.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

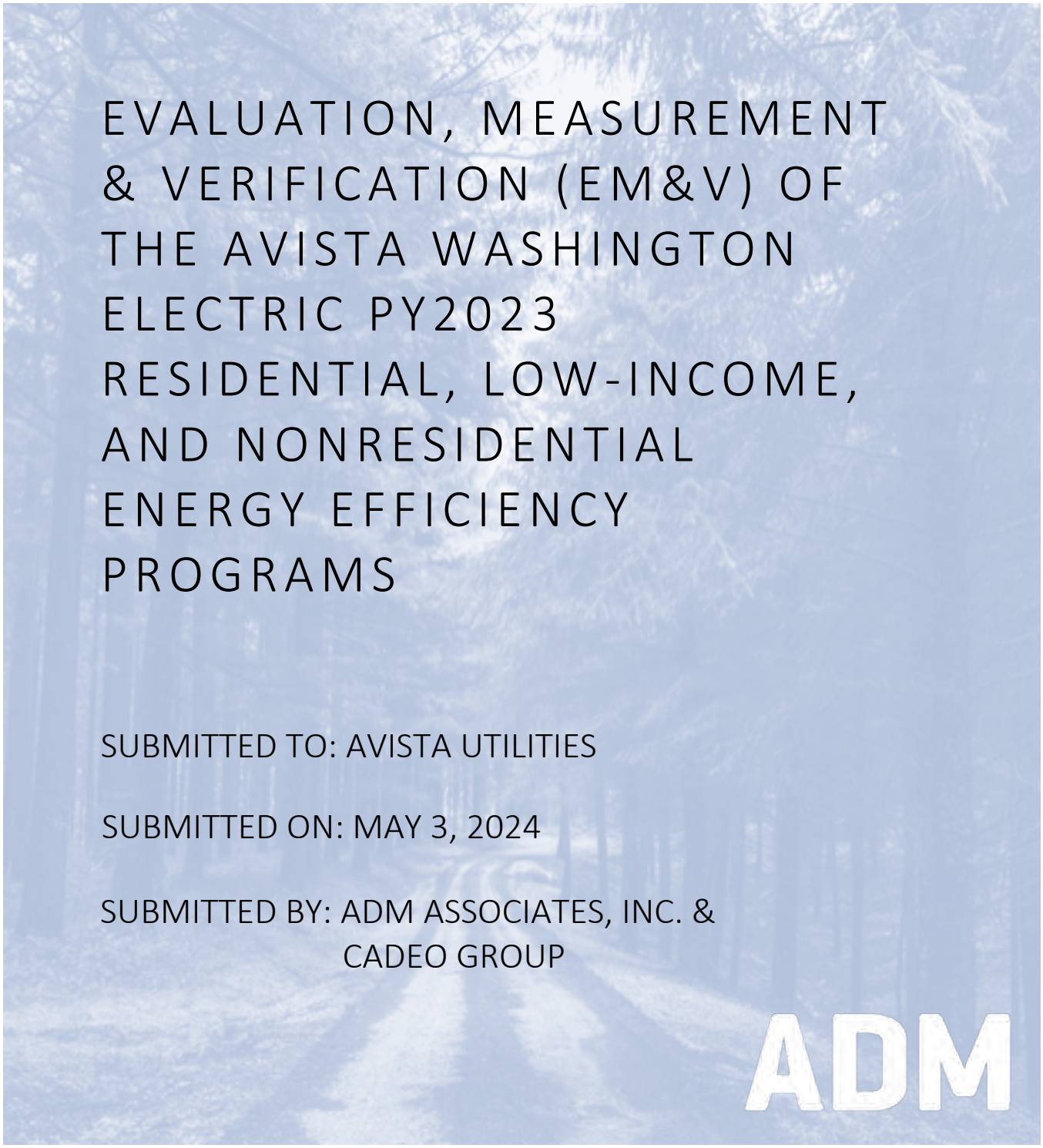
weather normalized: This is an adjustment that is made to actual energy usage, stream-flows, etc., which would have happened if "normal" weather conditions would have taken place.

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.

APPENDICES AND SUPPLEMENTS

Liberty Lake, Washington



EVALUATION, MEASUREMENT & VERIFICATION (EM&V) OF THE AVISTA WASHINGTON ELECTRIC PY2023 RESIDENTIAL, LOW-INCOME, AND NONRESIDENTIAL ENERGY EFFICIENCY PROGRAMS

SUBMITTED TO: AVISTA UTILITIES

SUBMITTED ON: MAY 3, 2024

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1. Executive Summary

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

1.1 Savings & Cost-Effectiveness Results

The Evaluators conducted an impact evaluation for Avista's Residential, Low-Income, and Nonresidential programs for PY2023. The Residential portfolio savings amounted to 4,070,617 kWh with a 75.46% realization rate. The Low-Income portfolio savings amounted to 451,422 with a 85.71% realization rate. The generation, transmission, and distribution efforts led to a total savings of 11,324,427 kWh with a realization rate of 100.02%. The Nonresidential portfolio savings amounted to 35,507,217 kWh with a 100.07% realization rate. The Evaluators summarize the Residential, Low-Income, and Nonresidential portfolio verified savings in Table 1-1 through Table 1-4, respectively.

The Residential portfolio reflects a TRC value of 1.26 and a UCT value of 1.77, which includes the generation, transmission, and distribution efforts. The Low-Income portfolio reflects a TRC value of 0.73 and a UCT value of 0.26. The Nonresidential portfolio reflects a TRC value of 2.03 and a UCT value of 1.98. This leads to a total Portfolio TRC of 1.71 and a UCT of 1.74. Table 1-1 summarizes the evaluated TRC and UCT values with each the Residential, Low-Income, and Nonresidential portfolios.

Table 1-1: Residential Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate	Total Costs
Water Heat	53,598	49,543	92.43%	$41,890.95
HVAC	532,295	465,360	87.43%	$447,297.19
Shell	530,507	315,829	59.53%	$798,483.80
ENERGY STAR Homes	104,029	94,037	90.39%	$165,071.57
Small Home & MF Weatherization	302,793	385,783	127.41%	$581,853.52
Multifamily Direct Install	894,099	1,030,041	115.20%	$1,035,075.86
Appliances	182,476	177,085	97.05%	$158,930.73
Midstream	2,794,904	1,552,940	55.56%	$1,178,449.06
Always on Home Energy Report	N/A	-	-	$0.00
Total	**5,394,701**	**4,070,617**	**75.46%**	**$4,407,052.67**

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

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate	Total Costs
Low-Income	526,675	451,422	85.71%	$3,456,394.75
Total	**526,675**	**451,422**	**85.71%**	**$3,456,394.75**

Table 1-3: Generation, Transmission, and Distribution Verified Savings by Effort

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate	Total Costs
Conservation Voltage Reduction	10,573,411	10,575,230	**100.02%**	$0.00
Integrated Volt Var Controls	749,197	749,197	**100.00%**	$0.00
Total	**11,322,608**	**11,324,427**	**100.02%**	**$0.00**

Table 1-4: Nonresidential Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate	Total Costs
Prescriptive Lighting	12,470,348	11,810,424	94.71%	$4,261,489.28
Small Business Lighting	11,607,579	10,922,204	94.10%	$7,621,294.41
HVAC	329,852	329,852	100.00%	$85,738.06
Food Service Equipment	6,153	5,695	92.55%	$1,654.29
Grocer	16,288	16,288	100.00%	$3,170.06
Shell	51,856	87,012	167.80%	$48,235.73
Green Motors	4,535	4,535	100.00%	$910.29
Midstream	79,419	58,291	73.40%	$34,375.66
Site-Specific	10,914,864	12,272,916	112.44%	$8,138,927.62
Total	**35,480,894**	**35,507,217**	**100.07%**	**$20,195,795.42**

Table 1-5: Cost-Effectiveness Summary

Sector	TRC			UCT		
	Benefits	Costs	B/C Ratio	Benefits	Costs	B/C Ratio
Residential	$9,982,961	$7,895,896	1.26	$7,797,199	$4,407,053	1.77
Residential Low Income	$2,538,883	$3,456,395	0.73	$897,912	$3,456,395	0.26
Nonresidential	$44,039,335	$21,697,292	2.03	$40,035,598	$20,195,795	1.98
Total	**$56,561,179**	**$33,049,582**	**1.71**	**$48,730,709**	**$28,059,243**	**1.74**

Table 1-6 summarizes the electric programs offered to residential and low-income customers in the Washington Avista service territory in PY2023 as well as the Evaluators' evaluation tasks and impact methodology for each program.

Table 1-6: Impact Evaluation Activities by Program and Sector

Sector	Program	Database Review	Survey Verification	Impact Methodology
Residential	Water Heat	✓	✓	RTF UES
Residential	HVAC	✓	✓	RTF UES
Residential	Shell	✓	✓	RTF UES
Residential	ENERGY STAR® Homes	✓		RTF UES

Sector	Program	Database Review	Survey Verification	Impact Methodology
Residential	Small Home & MF Weatherization	✓	✓	RTF UES
Residential	Appliances	✓	✓	RTF UES
Residential	Midstream	✓		RTF UES
Residential	Multifamily Direct Install	✓		RTF UES with adjustments
Residential	Always on Home Energy Report	✓		Billing Analysis
Residential	Conservation Voltage Reduction			RTF UES with adjustments
Residential	Integrated Volt Var Reduction			RTF UES with adjustments
Low-Income	Low-Income	✓		SBW TRM
Nonresidential	Prescriptive Lighting	✓	✓	Prescriptive Engineering Algorithms
Nonresidential	Small Business Lighting	✓		Prescriptive Engineering Algorithms
Nonresidential	HVAC	✓		Avista TRM
Nonresidential	Food Service Equipment	✓		RTF UES, Avista TRM
Nonresidential	Grocer	✓		RTF UES
Nonresidential	Shell	✓		Avista TRM
Nonresidential	Green Motors	✓		RTF UES
Nonresidential	Midstream	✓		RTF, TRM UES
Nonresidential	Site-Specific	✓		IPMVP

1.2 Conclusions and Recommendations

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

1.2.1 Conclusions

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

1.2.1.1 Residential Programs

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

- The Evaluators found the Residential portfolio to demonstrate a total of 4,070,617 kWh with a realization rate of 75.46%. The Evaluators also conducted a cost-benefit analysis in order to estimate the Residential portfolio's cost-effectiveness. The resulting TRC value for this sector is 1.26 while the UCT value is 1.77 In cost effectiveness calculations, the Evaluators referenced Avista's Annual Conservation Report NEI values developed in 2023. Further details on cost-effectiveness methodology can be found in Appendix C.
- The Residential Portfolio impact evaluation resulted in a realization rate of 75.46% due to discrepancy in expected savings for the Midstream Program and due to differences between the implementer-assigned expected savings values using minimum code baseline and the RTF-implemented market practice baseline. The Evaluators utilized engineering algorithms to evaluate this program based on purchased equipment efficiency level. The Evaluators also

applied RTF market practice baseline equivalents to the engineering algorithms in order to maintain consistency with evaluation methods between the downstream and midstream programs, while taking into account the often higher efficiency values of the purchased equipment. Although the Evaluators note insances in which the implementer's engineering algorithm were applied incorrectly in the calculation of the expected savings values, the market practice baseline adjustment led to the largest downward adjustment, leading to a low realization rate for the program.

- The Evaluators conducted verification surveys for a random sample of customers who had participated in the residential prescriptive rebates programs. The Evaluators calculated in-service rates for measures in which in-service rates are not typically 100% (water heaters, furnaces, clothes washers and dryers, smart thermostats, etc). The Evaluators found that all surveyed measures responses indicated in-service rates of between 90 to 100%. These values were applied to impact analysis results to estimate verified savings through the programs.
- The Midstream Program, which contributes 52% of the expected savings, resulted in a realization rate of 55.56% whereas each of the other programs resulted in a combined 96% realization rate. The Midstream Program contributed to a 23% decrease in the overall residential sector, which displayed a realization rate of 75%.
- The Evaluators conducted verification surveys via web survey to collect information from customers who participated in the Water Heat, HVAC, and Appliance Programs. The Evaluators collected information including the functionality of the efficient equipment, and the functionality of the replaced equipment. The Evaluators calculated in-service rates for the measures within these programs in order to apply findings to the verified savings results for each program.
- In the Water Heat Program, the Evaluators found that Avista TRM savings values are slightly lower than the RTF savings assigned for the appropriate water heater tank size and tier efficiency. The Evaluators found a majority of water heaters to be Tier 3 or higher, but the Avista TRM only includes savings for a combination of Tier 2 and Tier 3 savings. The Evaluators recommend that Avista document tier rating of heat pump water heaters to ensure proper validation of savings.
- In the HVAC Program, the E Smart Thermostat DIY with Electric Heat and E Smart Thermostat Paid Install with Electric Heat realization rates are lower than 100% because the Avista TRM uses an average of heating type savings values as well as an average across heating types, while the Evaluators assigned the appropriate RTF UES value for each heating zone. In addition, the E Electric To Air Source Heat Pump verified savings vary largely based on home type (single family vs. multifamily). The appropriate categories in the RTF led to a lower-than-expected savings and higher than expected savings across individual projects within these measures, with an overall upward adjustment for these measures. Additionally, 7 of the 66 smart thermostats rebated were verified to not be qualified for RTF UES due to lack of occupancy sensors and therefore savings were zeroed out for these projects.

- In the Shell Program, the lack of granularity in the Avista TRM data lead to a low realization rate for attic insulation, wall insulation and window measures. The expected savings also appeared to use a value of 2 kWh per square foot for attic and wall savings calculations while Avista's TRM uses 1.86 kWh per square foot. Similarly, the difference between RTF savings and the Avista TRM value for window replacements is drastic, with the RTF indicating much lower savings for the window replacements, based on U-values and double vs. single pane values. The Evaluators recommend that Avista ensure that the correct RTF UES values are used to calculate expected savings and that Avista incorporate more granularity by climate zone, heating type, U-value, and single vs. double pane-specific savings into Avista's TRM. The Evaluators found minimal discrepancy in square footage values between the tracking data and project-level documents provided. These differences, similar to the conclusions in the previous impact evaluation report, led to an overall realization rate of 60% for the Shell Program.
- In the ENERGY STAR Homes Program, the Evaluators found that realization rates differed from 100% due to application of heating zone and cooling zone via the RTF, which the Avista TRM lacks. In addition, the Evaluators found that realization rates differed from 100% due to savings value application. Program application forms commonly lacked information about home primary and secondary space and water heating type. The Evaluators recommend updating the Avista measure savings database to match the primary heating type for duel fuel households. In addition, the Evaluators recommend updating the document data aggregation to provide consistent database values between database and the provided rebate forms (primary heating type) and determine if the customer is an Avista electric and/or gas customer before providing an incentive for dual fuel.
- In the Small Home & MF Weatherization Program, the Evaluators found that many projects (14) exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). Although quantity in the CC&B database were consistent, the Avista TRM savings values differed from verified RTF UES values for each of the projects. The majority of projects displayed realization rates that differ to 100% due to differences in home type. The Evaluators verified home type via Zillow to apply correct RTF workbook savings from the single family, multifamily, and manufactured home RTF workbooks. These adjustments led to high and low realization rates across each measure. The Evaluators recommend Avista verify home type prior to applying Avista TRM values in order to ensure proper categorization of measure savings. The Evaluators also found that 22 of the sampled projects with insulation or window replacement did not track square footage of installed units in the tracking database. Furthermore, 8 of the 10 insulation projects that contained square footage data did not match the project documents for square footage. In addition, U-values for window measures were not consistently tracked, which is an important savings unit assignment requirement. The Evaluators recommend Avista incorporate a u-value field to the tracking database and add additional QA/QC procedures for documenting square footage for these measures in the program.

- In the Multifamily Direct Install Program, the per unit savings value for the lighting measures did not align with the per unit value in SBW's methodology or the RTF UES values. The precise reason for these discrepancies was unclear. The Evaluators applied SBW TRM values to estimate verified savings for each quantity of each measure claimed. These discrepancies led to deviations from 100% realization rate for the lighting measures. The Evaluators evaluated the faucet and kitchen aerator values using RTF UES values and found there was no discrepancy between the savings values in the tracking database and the RTF UES values leading to a realization rate of 100% for these measures. The difference between calculated expected savings and verified savings are due to the application of the SBW TRM to the consistently validated quantity of measures. The lighting measures displayed discrepancies in kWh/unit values used to calculate savings. The reason for the discrepancies was unclear. The Screw-in LED lamp (A-line 60W) makes up 58% of total program savings, yet displayed a realization rate of 116%, leading to inflated savings for this program overall. The Evaluators recommend Avista apply the SBW UES to the tracking database accurately and consistently across all lighting measures. In addition, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data to apply more specific savings values to each project.
- In the Appliance Program, the Evaluators note that Avista TRM defines appropriate unit energy savings for the fridge-freezer and upright freezer measures. The Evaluators found the program verified savings resulted in a 97% realization rate due the attribution of 0 kWh/unit savings to the E Energy Star Rated Top Load Washer. The Evaluators removed savings for this measure because the RTF clothes washer workbook estimates that savings for this measure are negative and therefore there are no proven RTF savings for this measure. All fridge-freezer projects were verified to be ENERGY STAR-qualified. The low realization rate for the fridge-freezer measure is due to the difference in RTF savings values (about 118.83 kWh/year) and the Avista TRM savings values for ENERGY STAR fridge-freezers (about 124 kWh/year).The Evaluators also identified 2 rebates that did not qualify under Energy Star requirements. The Evaluators assigned 0 kWh savings to these measures which brought the realization rate below 100%. The Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions. The Evaluators recommend incorporating cubic volume in the Appliance Program tracking database.
- The Evaluators evaluated the Midstream Program in its launch year of PY2023. The program started in summer 2023. Through this program, Avista effectively converted several water heater and HVAC residential appliances from a downstream measure into a midstream delivery, effectively removing the barriers for end-use customers by removing the requirement to deliver rebate applications to Avista. The program is implemented by Energy Solutions. The implementer defined expected savings for each measure delivered in the program, which displayed savings drastically higher than the Avista TRM and RTF UES documented savings. Therefore, the realization rates for the program are about 50% of expected savings. The Evaluators reviewed program documentation and found that the implementer TRM UES were

inflated due to incorporating code minimum baselines whereas the RTF and Avista TRM incorporate estimated market baseline. In addition, the Evaluators found that the implementer TRM UES were not applied properly, leading to even further inflated savings. The Evaluators note that, had the program utilized the Avista TRM to evaluate expected savings for the program, the realization rate for the program would have been near-100%. The Evaluators recommend that Avista and the implementers update the expected savings calculation methodology to incorporate market practice baseline rather than minimum code baseline values in order to remain consistent with the baseline methods utilized in the downstream measure programs and more accurately estimate expected savings in future iterations of this program.

- The Evaluators evaluated the Always On Home Energy Report Pilot program, which launched in the second quarter of 2022 to target the top third of residential always-on loads, split into two different treatment groups, Group A and Group B. Behavioral programs typically display 1-3% annual household energy savings. Behavioral programs also often display persistence savings due to behavioral energy consumption changes that extend further than the length of program treatment. This behavioral program is highly unique in that messaging targets always-on load and uses high interval meter data to provide personalized tips. The Evaluators calculated verified savings the program through a billing analysis comparing each treatment group to the accompanying control group, which was designed via randomized control trial. The Evaluators conclude that the Always On Pilot efforts did not result in observable, statistically significant savings through customer monthly bills. It is not uncommon for behavioral programs to require two or more years to begin observing behavioral changes in customer energy consumption efforts. In addition, because the pilot focuses on reducing always on, or “vampire” load, this may require additional messaging for customers to begin consistently changing behaviors in their home. The Evaluators note that this behavioral program is highly unique in that messaging targets always-on load and uses high interval meter data to provide personalized tips. For these reasons, the Evaluators recommend integrating non-vampire load energy conservation tips in the monthly home energy report messaging in order to encourage customers to take more impactful efforts to reduce their home energy bills, such as upgrading equipment, cooling and heating the home less often, and reducing the use of home appliances.
- In PY2023, the Evaluators evaluated total kV savings due to conservation voltage reduction efforts by Avista. The Evaluators reviewed previous third party evaluations of these efforts, as well as RTF UES workbooks, in order to quantify verified savings through Avista’s efforts at the feeder level. The Evaluators found that a total of 9,280.01 MWh were reduced due to Avista’s CVR efforts across 26 feeders in PY2023. This resulted in a 99.66% realization rate across all feeders.
- In PY2023, the Evaluators evaluated total kWh savings due to conservation voltage reduction efforts by Avista. IVVC operations are similar to CVR operations. For this reason, the Evaluators evaluated the IVVC efforts using the same methodology as the CVR efforts conducted by Avista. The Evaluators employed the methodology detailed above to estimate kWh reductions at the

feeder level for 3 Avista feeders. This resulted in verified savings estimated by Avista expected savings, with a realization rate of 100.00% across all three feeders.

1.2.1.2 Low-Income Programs

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

- The Evaluators found the Low-Income portfolio to demonstrate a total of 451,422 kWh with a realization rate of 85.71%. The Evaluators also conducted a cost-benefit analysis in order to estimate the Low-Income portfolio's cost-effectiveness. The resulting TRC value for this sector is 0.73 while the UCT value is 0.26. These values are expected, as the Low-Income portfolio is not expected to meet cost-effectiveness but are implemented in order to provide energy efficiency benefits to low-income customers. In cost effectiveness calculations, the Evaluators referenced Avista's Annual Conservation Report NEI values developed in 2023. Further details on cost-effectiveness methodology can be found in Appendix C.
- The Low-Income Portfolio impact evaluation resulted in a 86% realization rate. The Low-Income Program makes up the total of the Low-Income portfolio. The realization rate for this program deviates from 100% due to differences between the Avista TRM values applied to the quantities displayed in the tracking data. The Evaluators note several instances in which the tracking data displayed correct quantity values, but the expected savings calculated for the project did not indicate Avista TRM values were applied properly to the quantities. The Evaluators applied the correct Avista TRM values for the Low-Income Program. Verified savings were estimated using the Avista TRM savings values to each measure along with adjustments found during document verification of the sampled projects. The largest contributor to discrepancy of savings is the application of the 20% annual kWh and Therm usage cap on project-level savings. When implemented, this led to a reduction of savings for a number of projects.
- The Evaluators attempted to estimate measure-level Low-Income Program energy savings through billing analysis regression with a counterfactual group selected via propensity score matching. The Evaluators attempted to isolate each unique measure. However, participation for the Low-Income program resulted in a small number of customers with isolated measures and therefore the Evaluators conducted a whole-home billing analysis for all the electric measures combined. The results of the billing analysis indicated non-statistically significant results. Therefore, the Avista TRM was utilized to estimate verified savings for the Low-Income Program.
- The Evaluators received a lower number of project documents than intended due to the CAP agency having low bandwidth for fulfilling these time consuming paperwork requests. During the review, the Evaluators found there were several projects with missing data. In total, eight projects were unable to be verified due to missing or incomplete data.
- The information required to complete verification activities and proper expected savings calculations are: measure installed square footage for insulation measures, measure quantity for appliance measures, and total building annual energy usage in order to calculate proper building savings cap at 20% annual energy usage. The Evaluators found that 25 of the rebated projects lacked annual kWh and Therms usage values. The Evaluators recommend Avista track each

participant's annual energy usage in the program tracking database in order to accurately apply the 20% cap for savings when necessary.

1.2.1.3 Generation, Transmission, and Distribution Efforts

The Evaluators provide the following conclusion regarding Avista's generation, transmission, and distribution efforts:

- The Evaluators found the generation, transmission, and distribution efforts to demonstrate a total of 11,324,427 kWh savings with a realization rate of 100%.
- The Evaluators included the costs and benefits of these efforts in the residential cost-effectiveness analysis.
- The Evaluators found that the CVR efforts led to 10,575,230 kWh of savings with 100.02% realization rate.
- The Evlauators found that the IVVC efforts lef to 749,197 kWh of savings with 100.00% realization rate.
- The Evaluators do not have any recommendations regarding Avista's generation, transmission, and distribution efforts. The Evaluators reviewed current savings assumptions and found miniscule discrepancies.

1.2.1.4 Nonresidential Programs

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

- The Evaluators found the Non-Residential portfolio to demonstrate a total of 35,507,217 kWh with a realization rate of 100.07%.
- The Evaluators also conducted a cost-benefit analysis in order to estimate the Non-Residential portfolio's cost-effectiveness. The resulting TRC value for this sector is 2.03 while the UCT value is 1.98. In cost effectiveness calculations, the Evaluators referenced Avista's Annual Conservation Report NEI values developed in 2023. Further details on cost-effectiveness methodology can be found in Appendix C.
- The verified savings for the **Prescriptive Lighting Program** is 11,810,424 kWh with a realization rate of 94.71%. Two factors affected the overall realization rate: The first is that annual hours in expected savings calculations were calculated using 365 days/year, which does not account for leap years. Verified savings calculations developed hours using 365.25 days/year, slightly raising realization. However, claimed savings calculations did not include in-service rates. The Evaluators used the RTF Midstream Lighting work books and assigned ISRs according to lamp/fixture type, resulting in slightly lower verified savings than expected.
- The verified savings for the **Small Business Lighting Program** is 10,922,204 kWh with a realization rate of 94.1%. For measures without occupancy sensors, realization is ±1% of expectations, with any differences likely due to rounding. For measures with occupancy sensors, the Evaluators found that expected savings were calculated by applying the occupancy sensor reduction factor

both the operating hours and the connected load of the lighting retrofit , slightly 'double counting' savings. To account for occupancy sensor savings in verified calculations, the Evaluators applied the 32% reduction to the operation of the post-install equipment, then added this value to the retrofit savings, resulting in slightly lower verified savings.

- The verified savings for the **HVAC VFD Program** is 329,852 kWh with a realization rate of 100.0%
- Verified savings for the **Food Service Program** is 5,695 kWh with a realization rate of 92.55%. For one measure, Convection Ovens, the Evaluators found that claimed savings used value of 977 kWh savings per measure from the Avista TRM. The RTF specifies 1,496 kWh for this measure, resulting in slightly higher verified savings. The Evaluators did not find any other deviations from RTF/TRM UES.
- Verified savings for the **Grocer Program** is 16,288 kWh with a realization rate of 100.0%
- Verified savings for the **Shell Program** is 87,012 kWh with a realization rate of 167.80%. Upon analysis, the Evaluators found that UES used to develop claimed savings did not correspond to UES found in the 2022 Avista TRM[1]. For this measure, savings is given by multiplying a savings factor by the square feet of insulation installed. Using correct multipliers resulted in higher verified savings.
- The verified savings for the **Green Motor Rewind Program** is 4,535 kWh with a realization rate of 100.00%.
- The verified savings for the **Midstream Program** is 58,291 kWh with a realization rate of 73.40%.

  Adjusted savings comes from the program planning workbooks used by program implementors. Results show that these values were not applied to tracking data as originally intended.

  Verified savings for food service equipment was taken from RTF workbooks and is specific to the equipment configuration(s). Expected savings came from UES in the program implementation workbook. This workbook did not contain supporting calculations for these measures, precluding determining how these estimates resulted in significantly different estimates from the RTF.

  Savings for Mini/Multi Splits, Package/Unitary Equipment and Water Source Heat Pumps was calculated using standard engineering algorithms, with equipment-specific inputs for capacity and efficiency, and EFLH values from the Midstream planning workbook. Results for Mini Splits and Package HVAC equipment varied considerably from expected savings. Adjusted savings were calculated using unit savings multipliers from the Midstream planning book, which resulted in significantly different estimates than those claimed for these measures and WSHPs, indicating that savings values are not being applied consistently.
- The **Site-Specific Program** in total displays a realization rate of 112.44% with 12,272,916 kWh verified electric energy savings in the Washington service territory. Below are brief explanations of differences between claimed and verified savings for projects with realization rates that are not 100%.

[1] These measures did not having kWh savings entries in the 2023 Avista TRM, so the evaluation was carried out using 2022 Avista TRM.

- **SSLP_113539** Posted hours of operation are Monday through Friday, 8:00am until 4:30pm. Allowing an extra ½ hour per day for lights to operate briefly prior to open/after close, yields 2,348 annual hours of operation, slightly lower than those used in ex ante calculations (2,470). Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 36%, resulting in a lower verified peak kW reduction.
- **SSOP_117689** Models used to access therm savings from the natural gas side of the project did not account for increased burden placed on electrical systems, resulting is less saved kWh than originally expected.
- **SSLP_107183** The lighting operates for 18 hours per day from November 15th through April 15th, which is 2,736 hours annually. Expected savings calculations used 2,745 hours, slightly overestimating savings. Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 42%, resulting in a lower verified peak kW reduction.
- **SSLP_107181** Expected savings calculations used the full potential wattage of the post fixtures (660.7W), but on site the Evaluators found that all fixtures were operated at half wattage, 330.4W. Using the reduced wattage in verified savings calculations yielded higher savings. This adjustment also somewhat lowered the verified peak kW reduction, but this estimate was also affected by a change to the peak CF: By default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 37%. The combination of this adjustment and the lower operating wattage resulted in the lower verified peak kW reduction.
- **SSLP_116835** The lighting operates for 12 hours per day, 4,838 hours annually. This is slightly higher than the estimate used in expected savings calculations (4,303), resulting in slightly higher verified savings. Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 50%, resulting in a lower verified peak kW reduction.
- **SSLP_80606** The lighting operates for 18 hours per day from November 15th through April 15th, which is 2,736 hours annually. Expected savings calculations used 2,745 hours, slightly overestimating savings. Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 42%, resulting in a lower verifie d peak kW reduction.
- **SSOP_77513** Measured savings are lower than expectations.

1.2.2 Recommendations

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

1.2.2.1 Residential Programs

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

- The Evaluators imputed home type and space heating type for a large number of sampled rebates, as the tracking database does not contain values for these characteristics or remain outdated. The mail-in rebates collect this information; however, it does not seem to be required to complete the rebate and therefore many rebates are missing this information. The Evaluators recommend verifying home type and space heating type during rebate application approval in order to apply correct savings values to each project.
- The Evaluators found a handful of instances in which the rebated equipment did not meet the program minimum requirements for efficiency. The Evaluator recommend Avista check the source AHRI documentation and product level documentation to verify efficiency prior to incentivizing installation of the measure. For example, 7 of the 66 smart thermostats did not qualify for RTF savings and two appliances were verified to lack ENERGY STAR qualifications.
- The Evaluators found that many projects claimed under the Small Home & MF Weatherization Program exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). The Evaluators recommend verifying whether a home is qualified for the Small Home & MF Weatherization Program prior to fulfilling the rebate incentive. For projects that are larger than 1,000 SQFT, the incentives shall be claimed from the Shell Program.
- In the Shell Program, the Evaluators recommend Avista update the single and double pane window Avista TRM values to the appropriate RTF UES value. Avista's TRM uses 1.5 kwh per square foot, whereas the RTF displays 1 kWh per square foot for most projects. Similarly, the difference between RTF savings and the Avista TRM value for window replacements is drastic, with the RTF indicating much lower savings for the window replacements, based on U-values and double vs. single pane values. The Evaluators recommend that Avista ensure that the correct RTF UES values are used to calculate expected savings and that Avista incorporate more granularity by climate zone, heating type, U-value, and single vs. double pane-specific savings into Avista's TRM.
- The ENERGY STAR Homes Program, the verified savings applied largely depends on space heating type. The program realization rate differs from 100% due to changes in heating zone/cooling zone savings assignment as well as verified space heating type (electric vs. natural gas). The Evaluators recommend updating the Avista measure savings database to match the primary heating type for duel fuel households. In addition, the Evaluators recommend updating the document data aggregation to provide consistent database values between database and

the provided rebate forms (primary heating type) and determine if the customer is an Avista electric and/or gas customer before providing an incentive for dual fuel.

- A number of smart thermostat rebates included equipment that did not meet RTF measure specifications to receive verified savings through the RTF workbooks, which the Avista TRM values are drawn from. The Evaluators recommend providing a qualified product list for customers to ensure purchased smart thermostat meets program requirements. In addition, the Evaluators recommend Avista verify each program rebate to verify qualifications after rebates are submitted.
- In the Appliances Program, the Evaluators found that the RTF found negative savings for the top loading clothes washers and therefore zero savings are assigned for any rebated top load clothes washers. The Evaluators recommend Avista reassess the inclusion of this measure in its program offerings.
- In the Water Heat Program, the Evaluators found that Avista TRM savings values are slightly lower than the RTF savings assigned for the appropriate water heater tank size and tier efficiency. The Evaluators found a majority of water heaters to be Tier 3 or higher, but the Avista TRM only includes savings for a combination of Tier 2 and Tier 3 savings. The Evaluators recommend that Avista document tier rating of heat pump water heaters to ensure proper validation of savings.
- In the Small Home & MF Weatherization Program, the Evaluators found that many projects (14) exceed the "Small Home" definition from Avista The Evaluators recommend Avista verify home type prior to applying Avista TRM values in order to ensure proper categorization of measure savings. In addition, U-values for window measures were not consistently tracked, which is an important savings unit assignment requirement. The Evaluators recommend Avista incorporate a u-value field to the tracking database and add additional QA/QC procedures for documenting square footage for these measures in the program.
- In the Multifamily Direct Install Program, the per unit savings value for the lighting measures did not align with the per unit value in SBW's methodology or the RTF UES values. The precise reason for these discrepancies was unclear. The Evaluators recommend Avista apply the SBW UES to the tracking database accurately and consistently across all lighting measures. In addition, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data to apply more specific savings values to each project.
- In the Appliance Program, the Evaluators found the program verified savings resulted in a 97% realization rate due the attribution of 0 kWh/unit savings to the E Energy Star Rated Top Load Washer. The Evaluators recommend removing savings for this measure because the RTF clothes washer workbook estimates that savings for this measure are negative and therefore there are no proven RTF savings for this measure. The Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions. The Evaluators recommend incorporating cubic volume in the Appliance Program tracking database.

- The Evaluators evaluated the Midstream Program in its launch year of PY2023. The Evaluators reviewed program documentation and found that the implementer TRM UES were inflated due to incorporating code minimum baselines whereas the RTF and Avista TRM incorporate estimated market baseline. In addition, the Evaluators found that the implementer engineering algorithms were not applied properly, leading to even more inflated savings. The Evaluators note that, had the program utilized the Avista TRM to evaluate expected savings for the program, the realization rate for the program would have been near-100%. The Evaluators recommend Avista work with the implementer of the Midstream Program to update expected savings values in the implementer TRM in order to adjust for market practice baseline and therefore more accurately predict program-level savings in future program cycles.
- The Evaluators evaluated the Always On Home Energy Report Pilot program, which launched in the second quarter of 2022 to target the top third of residential always-on loads, split into two different treatment groups, Group A and Group B. The Evaluators conclude that the Always On Pilot efforts did not result in observable, statistically significant savings through customer monthly bills. The Evaluators recommend integrating non-vampire load energy conservation tips in the monthly home energy report messaging in order to encourage customers to take more impactful efforts to reduce their home energy bills, such as upgrading equipment, cooling and heating the home less often, and reducing the use of home appliances.

1.2.2.2 Low-Income Programs

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

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

1.2.2.3 Generation, Transmission, and Distribution Efforts

The Evaluators do not have any recommendations regarding Avista's generation, transmission, and distribution efforts. The Evaluators reviewed current savings assumptions and found miniscule discrepancies.

1.2.2.4 Non Residential Programs

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

- Within the **Shell Program**, multipliers used in expected savings development should be changed to those in the Avista TRM.
- Within the **Prescriptive Lighting Program,** collect space HVAC configuration information and use interactive HVAC effects factors when calculating prescriptive lighting savings for interior spaces, as well as in-service rates applied to all lamps and fixtures.
- For the **Small Business Lighting Program**:
    - Report savings from lighting retrofits and sensor installation separately.
    - Specify the type of control method employed.
    - In tracking data, denote the wattage controlled by each installed occupancy sensor.
    - If possible, record building type, vintage and HVAC configuration to calculate and include additional savings resulting from HVAC interactive effects.
- For the **Midstream Program**:
    - Administrators should verify that UES and savings multipliers are applied consistently across measures. The Evaluators found that in many cases program planning estimates could not replicate claimed savings.
    - Drivers of differences between implementor and RTF EUS for Food Equipment cannot be assessed, but are likely due to differences in baseline efficiency assumptions.
    - Lastly, the Evaluators suggest that program implementors calculated expected savings for HVAC measures using prescriptive algorithms and measure-specific characteristics. Capacities and efficiency levels very considerably within these measures and current planning materials only produce very general savings estimates.

2. General Methodology

The Evaluators performed an impact evaluation on each of the programs summarized in Table 1-6. The Evaluators used the following approaches to calculate energy impact defined by the International Performance Measurement and Verification Protocols (IPMVP)[2] and the Uniform Methods Project (UMP)[3]:

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

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

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

- Northwest Regional Technical Forum (RTF)[4]
- National Renewable Energy Laboratory (NREL), United States Department of Energy (DOE) The Uniform Methods Project (UMP): Methods for Determining Energy Efficiency Savings for Specific Measures, April 2013[5]
- International Performance Measurement and Verification Protocol (IPMVP) maintained by the Efficiency Valuation Organization (EVO) with sponsorship by the U.S. Department of Energy (DOE)[6]

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

2.1 Glossary of Terminology

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

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

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

2.2 Summary of Approach

This section presents our general cross-cutting approach to accomplishing the impact evaluation of Avista's Residential, Low-Income, and Nonresidential programs listed in Table 1-6. The Evaluators start by presenting our general evaluation approach. This chapter is organized by general task due to several overlap across programs.

The Evaluators outline the approach to verifying, measuring, and reporting the residential portfolio impacts as well as cost-effectiveness and summarizing potential program and portfolio improvements. The primary objective of the impact evaluation is to determine ex-post verified net energy savings. On-site verification and equipment monitoring was not conducted during this impact evaluation due to stay-at-home orders due to the COVID-19 pandemic.

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

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

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

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

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

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

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

The Evaluators analyzed billing data for all electric measure participants in the Water Heat, HVAC, Small Home & MF Weatherization, Appliances, and Low-Income programs. The Evaluators applied billing

analysis results where statistically significant to determine evaluated savings only for measures where savings could be isolated (that is, where a sufficient number of participants could be identified who installed only that measure). Program-level realization rates for the HVAC Program incorporates billing analysis results for some measures.

2.2.1 Database Review

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

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

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

2.2.2 Verification Methodology

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

2.2.2.1 Sampling Methodology

The Evaluators summarize the methods for each verification effort:

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

2.2.2.2 Sampling Methodology for Most Programs

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

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

Equation 2-1: Sample Size for Infinite Sample Size

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

Equation 2-2: Sample Size for Finite Population Size

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

Where,

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

For a sample that provides 90/10 precision, *Z* = 1.645 (the critical value for 90% confidence) and *d* = 0.10 (or 10% precision). The remaining parameter is *CV*, or the expected coefficient of variation of measures for which the claimed savings may be accepted. A *CV* of .5 was assumed for residential programs due to the homogeneity of participation[7], which yields a sample size of 68 for an infinite population. Sample sizes were adjusted for smaller populations via the method detailed in Equation 2-2.

2.2.2.3 Sampling Methodology for the Site-Specific Program

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

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

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

[7] Assumption based off California Evaluation Framework:

https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/EE_and_Energy_Savings_Assist/CAEvaluationFramework.pdf

2.2.2.4 Document-Based Verification

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

- Water Heat Program
- HVAC Program (res)
- Shell Program (res)
- ENERGY STAR® Homes Program
- Small Home & MF Weatherization Program
- Multifamily Direct Install Program
- Appliances Program
- Low-Income Program
- Prescriptive Lighting Program
- HVAC Program (non-res)
- Food Service Equipment Program
- Grocer
- Shell Program (non-res)
- Green Motor Rewind

This sample of documents was used to cross-verify tracking data inputs. In the case the Evaluators found any deviations between the tracking data and application values, the Evaluators reported and summarized those differences in the Database Review sections presented for each program in Section 3.2 and Section 4.

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

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

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

Sector	Program	Electric Population	Sample (With Finite Population Adjustment)*	Precision at 90% CI
Residential	Water Heat	44	27	90% ± 9.95%
Residential	HVAC	440	65	90% ± 9.43%
Residential	Shell	373	61	90% ± 9.64%
Residential	ENERGY STAR® Homes	32	23	90% ± 9.24%
Residential	Small Home & MF Weatherization	231	67	90% ± 8.49%
Residential	Appliances	1,132	68	90% ± 9.67%
Residential	Midstream	3	3	90% ± 0%
Residential	Multifamily Direct Install	9,181	N/A	N/A
Low-Income	Low-Income	399	69	90% ± 9.02%
Nonresidential	Prescriptive Lighting	744	80	90% ± 4.20%
Nonresidential	Small Business Lighting	407	80	90% ± 1.70%
Nonresidential	HVAC	1	1	90% ± 0.40%
Nonresidential	Food Service Equipment	3	3	90% ± 0.00%
Nonresidential	Grocer	2	2	90% ± 0.00%
Nonresidential	Shell	8	8	90% ± 0.00%
Nonresidential	Green Motors	1	1	90% ± 0.00%
Nonresidential	Midstream	39	39	90% ± 0.00%
Nonresidential	Site-Specific	54	17	90% ± 6.00%**

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

** The Site-Specific Program sample is chosen via a random stratified sample and does not include the FPC. However, it is included in this table for illustrative and informative purposes

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

2.2.2.5 Survey-Based Verification

The Evaluators conducted survey-based verification for the Water Heat Program and HVAC Program. The primary purpose of conducting a verification survey is to confirm that the measure was installed and is still currently operational and whether the measure was early retirement or replace-on-burnout.

The Evaluators summarize the final sample sizes shown in Table 2-2 for the Water Heat and HVAC for the Washington Electric Avista projects. The Evaluators developed a sampling plan that achieved a sampling precision of ±3.6% at 90% statistical confidence for residential ISRs estimates at the measure-level during web-based survey verification. The Evaluators developed a sampling plan that achieved a sampling precision of ±2.3% at 90% statistical confidence for non-residential ISRs estimates at the measure-level during web-based survey verification.

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

Sector	Program	Population	Respondents	Precision at 90% CI
Residential	Water Heat*	44	10	90% ± 23.13%
Residential	HVAC	440	78	90% ± 8.46%
Residential	Small Home & MF Weatherization*	231	1	90% ± 82.25%
Residential	Appliances	1,132	186	90% ± 5.52%
Non-Residential	Lighting*	744	80	90% ± 4.20%

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

The Evaluators implemented a web-based survey to complete the verification surveys. The Evaluators to reach the 90/10 precision goal. The findings from these activities served to estimate ISRs for each measure surveyed. These ISRs were applied to verification sample desk review rebates towards verified savings, which were then applied to the population of rebates. The measure-level ISRs resulting from the survey-based verification are summarized in Section 3.

2.2.2.6 On-Site Visits

For sampled projects in the Site-Specific program, the Evaluators conducted onsite visits to the facilities to verify installation, collected facility characteristic and collected any data needed to conducted savings calculations. In WA, a total of 11 visits were conducted to verify electric measures. Further details are available in the Site-Specific chapter.

2.2.3 Impact Evaluation Methodology

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

- Deemed Savings
- Billing Analysis (IPMVP Option C)

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

2.2.3.1 Deemed Savings

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

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

2.2.3.2 Billing Analysis

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

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

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

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

Cohort Creation

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

While it is not possible to guarantee the creation of a sufficiently matched control group, this method is preferred because it is likely to have more meaningful results than a treatment-only analysis. Some

examples of outside variables that a control group can sufficiently control for are changes in economies and markets, large-scale social changes, or impacts from weather-related anomalies such as flooding or hurricanes.

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

- Fixed effect Difference-in-Difference (D-n-D) regression model (recommended in UMP protocols)[8]
- Random effects post-program regression model (PPR) (recommended in UMP protocols)
- Gross billing analysis (treatment only)

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

Data Collected

The following lists the data collected for the billing analysis:

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

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

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

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

Data Preparation

The following steps were taken to prepare the billing data:

1. Gathered billing data for homes that participated in the program.
2. Excluded participant homes that also participated in the other programs, if either program disqualifies the combination of any other rebate or participation.
3. Gathered billing data for similar customers that did not participate in the program in evaluation.
4. Excluded bills missing address information.
5. Removed bills missing fuel type/Unit of Measure (UOM).
6. Removed bills missing usage, billing start date, or billing end date.

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

7. Remove bills with outlier durations (<9 days or >60 days).
8. Excluded bills with consumption indicated to be outliers.
9. Remove duplicate bills and any bills with overlapping billing periods. If two billing periods overlapped, the bill with a start date that matched the previous bill's end date was included and the other bill was excluded. For example, if overlapping bill 1 had a 02/19/2023 start date, overlapping bill 2 had a 02/25/2023 start date, and the previous bill had a 02/19/2023 end date, overlapping bill 2 would be removed. If there was no previous bill, the overlapping bill with the earlier start date was included and the other overlapping bill was removed.
10. Calendarized bills (recalculates billing dates, usage, and total billed days such that bills begin and end at the start and end of each month).
11. Obtained weather data from nearest NOAA weather station using 5-digit zip code per household.
12. Computed Heating Degree Days (HDD) and Cooling Degree Days (CDD) for a range of setpoints. The Evaluators assigned a setpoint of 65°F for both HDD and CDD. The Evaluators tested and selected the optimal temperature base for HDDs and CDDs based on model *R*-squared values.
13. Removed measure cohorts without at least 75 treatment customers.
14. Selected treatment customers with only one type of measure installation during the analysis years and combined customer min/max install dates with billing data (to define pre- and post-periods).
15. Restricted to treatment customers with install dates in specified range (typically January 1, 2023 through June 30, 2023) to allow for sufficient post-period billing data.
16. Restricted to control customers with usage less than or equal to two times the maximum observed treatment group usage. This has the effect of removing control customers with incomparable usage relative to the treatment group.
17. Removed customers with incomplete post-period bills (<6 months).
18. Removed customers with incomplete pre-period bills.
19. Restricted control customers to those with usage that was comparable with the treatment group usage.
20. Created a matched control group using PSM and matching on pre-period seasonal usage and zip code.

Regression Models

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

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

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

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

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

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage reading *t* for household *i* during the post-treatment period
- $Post_{it}$ = A dummy variable indicating pre- or post-period designation during period *t* at home *i*
- $Treatment_i$ = A dummy variable indicating treatment status of home *i*
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*
- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home i *(if electric usage)*
- $Month_t$= A set of dummy variables indicating the month during period *t*
- $Customer\ Dummy_i$ = a customer-specific dummy variable isolating individual household effects
- ε_{it} = The error term
- α_0= The model intercept
- β_{1-10} = Coefficients determined via regression

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

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

Equation 2-4: Savings Extrapolation

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

Model 2: Random Effects Post-Program Regression Model

The following equation displays the second model specification to estimate the average daily savings due to the measure. The post-program regression (PPR) model combines both cross-sectional and time

series data in a panel dataset. This model uses only the post-program data, with lagged energy use for the same calendar month of the pre-program period acting as a control for any small systematic differences between the treatment and control customers; in particular, energy use in calendar month *t* of the post-program period is framed as a function of both the participant variable and energy use in the same calendar month of the pre-program period. The underlying logic is that systematic differences between treatment and control customers will be reflected in the differences in their past energy use, which is highly correlated with their current energy use. These interaction terms allow pre-program usage to have a different effect on post-program usage in each calendar month.

The model specification is as follows:

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

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

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage for reading *t* for household *i* during the post-treatment period
- $Treatment_i$ = A dummy variable indicating treatment status of home *i*
- $Month_t$ = Dummy variable indicating month of month *t*
- $PreUsageSpring_i$ = Average daily usage in the spring months across household *i*'s available pre-treatment billing reads
- $PreUsageSummer_i$ = Average daily usage in the summer months across household *i*'s available pretreatment billing reads
- $PreUsageFall_i$ = Average daily usage in the fall months across household *i*'s available pretreatment billing reads
- $PreUsageWinter_i$ = Average daily usage in the winter months across household *i*'s available pre-treatment billing reads
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*
- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home i *(if electric usage)*
- ε_{it} = Customer-level random error
- α_0= The model intercept for home *i*
- β_{1-14} = Coefficients determined via regression

The coefficient β_1 represents the average change in consumption between the pre-period and post-period for the treatment group and β_{13} and β_{14} represent the change in weather-related daily consumption in the post-period between the groups. Typical monthly and annual savings were

estimated by extrapolating the β_{13} and β_{14} coefficients with Typical Meteorological Year (TMY) HDD and CDD data.

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

Equation 2-6: Savings Extrapolation

$$Annual\ Savings = \beta_1 * 365.25 + \beta_{13} * TMY\ HDD + \beta_{14} * TMY\ CDD$$

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

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

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

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

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

Where,

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

The results of the treatment-only regression models are gross savings estimates. The gross savings estimates are useful to compare against the net savings estimates. However, the treatment-only models

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

2.2.4 Net-To-Gross

The Northwest RTF UES measures do not require NTG adjustments as they are built into the deemed savings estimates. In addition, billing analyses with counterfactual control groups, as proposed in our impact methodology, does not require a NTG adjustment, as the counterfactual represents the efficiency level at current market (i.e. the efficiency level the customer would have installed had they not participated in the program).

2.2.5 Cost-Effectiveness Tests

The Evaluators calculated each program's cost-effectiveness, avoided energy costs, and implementation costs. The Evaluators used our company-developed cost-effectiveness tool to provide cost-effectiveness assessments for the Residential, Low-Income, and Nonresidential Portfolio by program, fuel type, program year, and measure, for each state.

As specified in this solicitation, the Evaluators determined the economic performance with the following cost-effectiveness tests:

- Total Resource Cost (TRC) test;
- Utility Cost Test (UCT);
- Participant Cost Test (PCT); and
- Rate Impact Measure (RIM).

2.2.6 Non-Energy Benefits

The Evaluators used the non-energy impact (NEI) values estimated and filed in Avista's 2022 Annual Conservation Plan. Measures with quantified NEBs include residential insulation, high efficiency windows, air source heat pumps, and ductless heat pumps.

In addition to the residential NEBs, the Evaluators applied the end-use non-energy benefit and health and human safety non-energy benefit to the Low-Income Program. The Evaluators understand that the two major non-energy benefits referenced above are uniquely applicable to the Low-Income Program. The Evaluators applied those benefits to the program impacts as well as additional non-energy benefits associated with individual measures included in the program. The Evaluators incorporated additional NEBs to the impact evaluation, as applicable. Additional details on the non-energy benefits applied can be found in Section 10.2.

3. Residential Impact Evaluation Results

The Evaluators completed an impact evaluation on Avista's Residential portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each electric impact evaluation in the Residential Portfolio in the Washington service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, RTF, and billing analysis of participants and nonparticipants to evaluate savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data. Table 3-1 summarizes the Residential verified impact savings by program. Table 3-2 summarizes the Residential portfolio's cost-effectiveness.

Table 3-1: Residential Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Water Heat	53,598	49,543	92.43%
HVAC	532,295	465,360	87.43%
Shell	530,507	315,829	59.53%
ENERGY STAR Homes	104,029	94,037	90.39%
Small Home & MF Weatherization	302,793	385,783	127.41%
Multifamily Direct Install	894,099	1,030,041	115.20%
Appliances	182,476	177,085	97.05%
Midstream	2,794,904	1,522,940	55.56%
Always on Home Energy Report	N/A	0	N/A
Total Res	**5,394,701**	**4,070,617**	**75.46%**

Table 3-2: Residential Portfolio Cost-Effectiveness Summary

Sector	TRC			UCT		
	Benefits	Costs	B/C Ratio	Benefits	Costs	B/C Ratio
Residential	$9,982,961	$7,895,896	1.26	$7,797,199	$4,407,053	1.77

In PY2023, Avista completed and provided incentives for residential electric measures in Washington and reported total electric energy savings of 4,070,617 kWh. All programs except the Midstream and Shell Programs met at least 87% of savings goals based on reported savings, leading to an overall achievement of 75.46% of the expected savings for the residential programs. The Evaluators estimated the TRC value for the Residential portfolio is 1.26 while the UCT value is 1.77. Further details of the impact evaluation results by program are provided in the sections following.

3.1 Simple Verification Results

The Evaluators surveyed 2,229 unique customers that participated in Avista's residential energy efficiency program from October 2022 and in December 2023 using an email survey approach. The Evaluators surveyed customers that received rebates for HVAC, Water Heater, and Appliance Programs.

Table 3-3: Summary of Survey Response Rate

Population	Respondents
Initial email contact list	8,262
Invalid or bounced	416
Invalid or bounced email (%)	5.0%
Invitations sent (unique valid)	7,846
Completions	2,229
Response rate (%)	28.4%

3.1.1 In-Service Rates

The Evaluators calculated in-service rates of installed measures from simple verification surveys deployed to program participants for the Water Heat, HVAC, Small Home & MF Weatherization, and Appliances Programs. The Evaluators asked participants if the rebated equipment is currently installed and working, in addition to questions about the new equipment fuel type. The Evaluators achieved 4.6% precision across the Washington electric programs surveyed for the electric measures in Avista's service territory, summarized in Table 3-4. When mixing survey-level responses between Idaho and Washington, the Evaluators achieved 3.6% precision (Table 3-5).

Table 3-4: State-Specific Simple Verification Precision by Program

Sector	Program	State-Specific Population	State-Specific Respondents	State-Specific Precision at 90% CI
Residential	Water Heat	44	10	±23.1%*
Residential	HVAC	440	77	±8.5%
Residential	Small Home & MF Weatherization	231	1	±82.3%*
Residential	Appliances	1,132	181	±5.5%
Total		**1,847**	**269**	**±4.6%**

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

Table 3-5: Mixed State-Specific Simple Verification Precision by Program

Sector	Program	Mixed State-Specific Population	Mixed State-Specific Respondents	Mixed State-Specific Precision at 90% CI
Residential	Water Heat	51	12	±21.0%*
Residential	HVAC	706	130	±6.5%
Residential	Small Home & MF Weatherization	294	1	±82.3%*
Residential	Appliances	1,688	298	±4.3%
Total		**2,739**	**441**	**±3.6%**

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

The measure-level ISRs determined from the verification survey for each program in which simple verification was conducted is presented in Table 3-6 through Table 3-9.

Table 3-6: Water Heat Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
E Heat Pump Water Heater	10	100%	12	100%	Assume 100%*

*ISR, not enough responses to meet 90/10 precision

Table 3-7: HVAC Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
E Electric To Air Source Heat Pump	13	100%	27	100%	State-specific ISR
E Electric to Ductless Heat Pump	20	95%	36	97%	State-specific ISR
E Smart Thermostat DIY with Electric Heat	15	100%	18	94%	State-specific ISR
E Smart Thermostat Paid Install with Electric Heat	29	100%	48	100%	State-specific ISR

Table 3-8: Small Home & MF Weatherization Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
E Multifamily Attic Insulation With Electric Heat	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Electric To Air Source Heat Pump	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Electric to Ductless Heat Pump	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Energy Star Certified Insulated Door	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	1	100%	100%	100%	Assume 100%*
E Multifamily Energy Star Rated Clothes Dryer	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Energy Star Rated Front Load Washer	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Energy Star Rated Top Load Washer	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Floor Insulation to R-30	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Heat Pump Water Heater	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Line Voltage Smart Thermostat Electric Baseboard	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Line Voltage Thermostat Electric Baseboard	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Smart Thermostat DIY with Electric Heat	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Smart Thermostat Paid Install with Electric Heat	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Wall Insulation With Electric Heat	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Window Replc from Single Pane W Electric Heat	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Energy Star Certified Upright Freezer	0	N/A	N/A	N/A	Assume 100%*
E Multifamily Window DIY Replc With Electric Heating	0	N/A	N/A	N/A	Assume 100%*

*ISR, not enough responses to meet 90/10 precision

Table 3-9: Appliance Program ISRs by Measure

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
E Energy Star Certified Refrigerator and Refrigerator-Freeze	72	96%	113	97%	State-specific ISR
E Energy Star Certified Upright Freezer	10	100%	22	100%	State-specific ISR
E Energy Star Rated Clothes Dryer	51	100%	81	99%	State-specific ISR
E Energy Star Rated Front Load Washer	31	100%	48	100%	State-specific ISR
E Energy Star Rated Top Load Washer	17	100%	25	100%	State-specific ISR

These ISR values were utilized in the desk reviews for the Water Heat, HVAC, Small Home & MF Weatherization, and Appliances Programs in order to calculate verified savings. Additional insights from the survey responses are summarized in Appendix B.

3.2 Program-Level Impact Evaluation Results

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

3.2.1 Water Heat Program

The Water Heat Program encourages customers to replace their existing electric or natural gas water heater with high efficiency equipment. Customers receive incentives after installation and after submitting a completed rebate form. Table 3-10 summarizes the measures offered under this program.

Table 3-10: Water Heat Program Measures

Measure	Description	Impact Analysis Methodology
E Heat Pump Water Heater	Electric water heater (0.94 EF or higher)	RTF UES

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

Table 3-11: Water Heat Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings	Adjusted Savings	Verified Savings	Realization Rate
E Heat Pump Water Heater	44	53,598	57,992	49,543	92.43%
Total	**44**	**53,598**	**57,992**	**49,543**	**92.43%**

The Water Heat Program displayed verified savings of 49,543 kWh with a realization rate of 92.43% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-12: Water Heat Program Costs by Measure

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
E Heat Pump Water Heater	$20,000.00	$21,890.95	$41,890.95
Total	**$20,000.00**	**$21,890.95**	**$41,890.95**

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

3.2.1.1 Database Review & Verification

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

3.2.1.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Water Heat Program. The Evaluators selected a subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

The Evaluators found all Water Heat Program rebates to have completed rebate applications with the associated water heater model number and efficiency values filled in either the Customer Care & Billing (CC&B) web rebate data or mail-in rebate applications. The Evaluators note that the CC&B web rebate data consistently reflected the same values found in the mail-in rebate applications, invoices, and AHRI certification documents submitted with the rebate application.

All of the sampled projects contained model number data, therefore, the Evaluators were able to calculate verified savings for all of these projects, as model-specific information (such as capacity and tier) are necessary for HPWH savings verification via the RTF Measure Table. The Evaluator's previous recommendations to keep invoices and project applications on file that support model number were properly conducted. The Evaluators were able to easily verify each sampled rebate's equipment due to inclusion of these documents.

While conducting document verification, the Evaluators identified one rebate that was erroneously categorized as "E Heat Pump Water Heater". After further investigation, the Evaluators found that the model number corresponds to an AC unit therefore, the savings for this measure was removed from verified savings.

The Evaluators found all sampled rebate equipment met or exceeded the measure efficiency requirements for the Water Heat Program except two 50 gallon water heaters with a uniform energy factor of 0.65 and 0.82.

The Evaluators also categorized each water heater tier rating using NEEA's HPWH Tier database[9] to correctly identify measure-level savings for the project. The Evaluators recommend that Avista document tier ratin of heat pump water heaters to ensure proper validation of savings.

3.2.1.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure. The Evaluators included questions such as:

- Was this water heater a new construction, or did it replace another water heater?
- Was the previous water heater functional?
- Is the newly installed water heater still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Water Heat Program. The responses to these additional questions can be found in Appendix B. Table 3-13 displays the ISRs for each of the Water Heat measures for Washington territory only.

Table 3-13: Water Heat Verification Survey ISR Results

Measure	Number of Rebates	Number of Survey Completes	Program-Level Precision at 90% Confidence	In-Service Rate
E Heat Pump Water Heater	44	10	90% ± 23.1%	100%

The Evaluators contacted Water Heat participants in the program to calculate in-service rates for the measures. Although 90/10 precision was not achieved through the census of web surveys for this program, the responses received from this measure (10 responses for E Heat Pump Water Heater measure) indicated 100% in-service rates. 100% in-service rates were assumed. The Evaluators applied these ISRs to each rebate to quantify verified savings for each measure.

[9] https://neea.org/img/documents/HPWH-qualified-products-list.pdf

3.2.1.4 Impact Analysis

This section summarizes the verified savings results for the Water Heat Program. The Evaluators calculated verified savings for the E Heat Pump Water Heater measure using the RTF workbook in place at the time the savings goals for the program was finalized. The UES value associated with this measure was applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.1.5 Billing Analysis

The Evaluators did not conduct a billing analysis for the electric measures in the Water Heat Program.

3.2.1.6 Verified Savings

The Evaluators reviewed and applied the current RTF UES values for the E Heat Pump Water Heater measure along with verified tracking data to estimate net program savings for this measure. The verified savings for the program is 49,543 kWh with a realization rate of 92.43%, as displayed in Table 3-11.

The realization rate for the electric savings in the Water Heat Program deviates from 100% due to the lack of additional measure specification and savings details in the Avista TRM prescriptive savings value. The Avista TRM assigns a combination of the values the RTF assigns for Tier 2 and Tier 3 heat pump water heaters. The Evaluators recommend that Avista document tier ratin of heat pump water heaters to ensure proper validation of savings. Among document verification, the Evaluators found a majority of water heaters to be Tier 3 or higher, which the RTF UES assigns a higher savings value.

The Evaluators also found that the kWh savings outlined by Avista for electric HPWHs did not match those oulined in the RTF measure table. Avista outlined its HPWH savings as 1,318 kWh while RTF savings are 1,314 and 1,263 for “0-55 gallons” and “AnySize” HPWHs, respectively.

3.2.2 HVAC Program

The HVAC program encourages installation of high efficiency HVAC equipment and smart thermostats through customer incentives. The program is available to residential electric or natural gas customers with a winter heating season usage of 4,000 or more kWh, or at least 160 Therms of space heating in the prior year. Existing or new construction homes are eligible to participate in the program. Table 3-14 summarizes the measures offered under this program.

Table 3-14: HVAC Program Measures

Measure	Description	Impact Analysis Methodology
E Ductless Heat Pump with Existing Forced Air Furnace	Electric forced air furnace replacement with ductless heat pump	RTF UES
E Electric To Air Source Heat Pump	Electric forced air furnace replacement with air source heat pump	RTF UES
E Electric to Ductless Heat Pump	Electric forced air furnace replacement with ductless heat pump	RTF UES
E Smart Thermostat DIY with Electric Heat	Self-installed connected thermostats in electrically heated home	RTF UES
E Smart Thermostat Paid Install with Electric Heat	Professionally installed connected thermostats in electrically heated home	RTF UES
E Variable Speed Motor	Variable speed motor in electrically heated home	Billing Analysis

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

Table 3-15: HVAC Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
E Electric To Air Source Heat Pump	91	254,178	261,464	275,317	108.32%
E Electric to Ductless Heat Pump	92	82,628	84,444	76,891	93.06%
E Smart Thermostat DIY with Electric Heat	79	60,669	61,418	28,762	47.41%
E Smart Thermostat Paid Install with Electric Heat	178	134,820	137,816	84,390	62.59%
Total	**440**	**532,295**	**545,142**	**465,360**	**87.43%**

The HVAC Program displayed verified savings of 465,360 kWh with a realization rate of 87.43% against the expected savings for the program.

Table 3-16: HVAC Program Costs by Measure

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
E Electric To Air Source Heat Pump	$89,000.00	$185,726.43	$274,726.43
E Electric to Ductless Heat Pump	$62,825.00	$43,896.27	$106,721.27
E Smart Thermostat DIY with Electric Heat	$10,734.44	$5,364.71	$16,099.15
E Smart Thermostat Paid Install with Electric Heat	$34,010.07	$15,740.28	$49,750.35
Total	**$196,569.51**	**$250,727.68**	**$447,297.19**

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

3.2.2.1 Database Review & Verification

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

3.2.2.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the HVAC Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in in Section 2.2.2.4.

The Evaluators found all HVAC Program rebates to have project documentation with the associated HVAC model number and efficiency values in either the CC&B web rebate data or mail-in rebate applications. The majority of project files contained associated AHRI certifications for the installed equipment. This allowed the Evaluators to easily verify equipment specifications to assign savings values to each sampled project.

The Evaluators note that not all rebate applications contained existing/new construction field and single family home/manufactured home fields. This field is an input to apply correct RTF UES values so the Evaluators imputed these values via a search on Zillow. The Evaluators recommend requiring this field be completed in rebate applications, both mail-in and web-based.

The Evaluators verified smart thermostat model specifications through the ENERGY STAR database and to verify if the thermostats met all conditions required from the RTF measure specifications. The Evaluators verified that 7 of the 66 smart thermostats did not meet the RTF measure specifications required by the RTF, specifically, the requirement for occupancy sensing capabilities. Savings were removed for these 7 projects.

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

3.2.2.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.5. The Evaluators included questions such as:

- What type of thermostat did this thermostat replace?
- Is your home heating with electricity, natural gas, or another fuel?
- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the HVAC Program. The responses to these additional questions can be found in Appendix B.

Table 3-17 displays the ISRs for each of the HVAC measures for Washington electric territory alone. The ISRs resulted in 9.12% precision at the 90% confidence interval for the program.

Table 3-17: HVAC Verification Survey ISR Results

Measure	Number of Rebates	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
E Electric To Air Source Heat Pump	91	13	90% ±8.5%	100%
E Electric to Ductless Heat Pump	92	20		95%
E Smart Thermostat DIY with Electric Heat	79	15		100%
E Smart Thermostat Paid Install with Electric Heat	178	29		100%

All survey respondents described equipment to be currently functioning, leading to a 100% ISR for all measures except the ductless heat pumps. The Evaluators applied the ISRs listed in Table 3-17 to each rebate to quantify verified savings for each measure, since responses met the 90/10 precision goal.

3.2.2.4 Impact Analysis

This section summarizes the verified savings results for the HVAC Program. The Evaluators attempted to conduct a billing analysis for the HVAC measures, but participation was insufficient to complete verified savings using this methodology. Therefore, the Evaluators calculated verified savings for the HVAC measures using the RTF workbook in place at the time the savings goals for the program was finalized These UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.2.5 Billing Analysis

The Evaluators did not conduct a billing analysis for the electric measures in the HVAC Program.

3.2.2.6 Verified Savings

The HVAC Program in total displays a realization rate of 87.43% with 465,360 kWh verified electric energy savings in the Washington service territory, as displayed in Table 3-15. The realization rate for the electric savings in the HVAC Program deviates from 100% due to the differences between the applied Avista TRM prescriptive savings value and the true Avista TRM or appropriate RTF UES value and due to lack of requirements met by a subset of smart thermostats.

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net program adjusted savings. In addition, the Evaluators reviewed and applied the current RTF UES values for the electric measures along with verified tracking data to estimate net program verified savings for this measure. For the HVAC measures such as ductless heat pumps and air source heat pumps, RTF savings are dependent on housing type (single family/multifamily/manufactured housing). The Evaluators verified home type and imputed where necessary via a search on Zillow when applying RTF values to each sampled project. This led to higher or lower savings than expected, depending on housing type.

The E Smart Thermostat DIY with Electric Heat realization rate is low because the Avista TRM uses an average of retail and direct install savings values as well as an average across heating types, while the Evaluators assigned the appropriate RTF UES value for each installation type and heating zone. For example, the RTF assigns smart thermostats with electric FAF in heating zones annual savings between 558 and 604 kWh, while the Avista TRM assigns smart thermostats 778 kWh savings per year. In

addition, 7 of the 66 thermostat projects did not qualify for savings due to lack of requirements met for RTF savings. The appropriate categories in the RTF led to a lower-than-expected savings for the direct install and retail rebates for this measure. Measure-level ISRs were applied to these savings values, which did not affect the realization rate, as ISRs displayed were 100% for all measures in the HVAC program.

3.2.3 Shell Program

The Shell Program provides incentives to customers for improving the integrity of the home's envelope with upgrades to windows and storm windows. Rebates are issued after the measure has been installed for insulation and window measures. Participating homes must have electric or natural gas heating and itemized invoices including measure details such as insulation levels, window values, and square footage. In order to be eligible for incentive, the single-family households, including fourplex or less, must demonstrate an annual electricity usage of at least 8,000 kWh or an annual gas usage of at least 340 Therms. Multifamily homes have no usage requirement. This program includes free manufactured home duct sealing implemented by UCONS. Table 3-18 summarizes the measures offered under this program.

Table 3-18: Shell Program Measures

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

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

Table 3-19: Shell Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
E Attic Insulation With Electric Heat	83	172,662	176,733	95,650	55.40%
E Energy Star Certified Insulated Door	21	24,800	16,800	24,800	100.00%
E Floor Insulation With Electric Heat	9	7,911	7,686	12,062	152.48%
E Wall Insulation With Electric Heat	20	28,284	28,284	27,759	98.14%
E Window DIY Replc With Electric Heating	15	13,773	13,773	7,217	52.40%
E Window Replc from Single Pane W Electric Heat	225	283,077	279,719	148,341	52.40%
Total	**373**	**530,507**	**522,995**	**315,829**	**59.53%**

The Shell Program displayed verified savings of 315,829 kWh with a realization rate of 60% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-20: Shell Program Costs by Measure

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
E Attic Insulation With Electric Heat	$136,619.02	$135,355.01	$271,974.03
E Energy Star Certified Insulated Door	$3,100.00	$32,403.40	$35,503.40
E Floor Insulation With Electric Heat	$9,911.75	$17,069.03	$26,980.78
E Wall Insulation With Electric Heat	$30,936.09	$39,281.52	$70,217.61
E Window DIY Replc With Electric Heating	$6,260.65	$6,558.58	$12,819.23
E Window Replc from Single Pane W Electric Heat	$246,180.78	$134,807.97	$380,988.75
Total	**$433,008.29**	**$365,475.51**	**$798,483.80**

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

3.2.3.1 Database Review & Verification

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

3.2.3.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Shell Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

The Evaluators reviewed each measure number of units, square footage, and insulation where available. The Evaluators found that for one sampled measure, the tracking data accounted for 375 square feet of floor insulaiton while the documentation reviewed showed that there was 775 square feet of floor insulation installed. These differences led to a higher than 100% realization rate for the measure mentioned.

The Evaluators used the Avista TRM to determine adjusted savings and RTF UES values for verified savings. The Evaluators found that verified attic insulation, wall insulation, and window measure savings were less than expected savings primarily due to the differences between the categories applied in the Avista TRM prescriptive savings values and the more detailed categories present with unique RTF UES values associated with unique heating type, R-values and climate zone. The lack of granularity in the Avista TRM data lead to a low realization rate for attic insulation and window measures.

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

3.2.3.3 Verification Surveys

The Evaluators conducted a verification survey for the Energy Star door measure and found that the in-service rate was 100%. The Evaluators did not conduct verification surveys for the other measures in the Shell Program since weatherization measures historically have high verification rates.

3.2.3.4 Impact Analysis

This section summarizes the verified savings results for the Shell Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook in place at the time the savings goals for the program was finalized. The Evaluators calculated adjusted savings for each measure using the active Avista TRM values and verified tracking data. These UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.3.5 Billing Analysis

The results of the billing analysis for the Shell program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Table 325 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis. The customers considered for attic insulation and window replacement billing analysis include customers in both Washington and Idaho service territories to gather the maximum number of customers possible for precise savings estimates. Although the table shows that the windows have enough according to our criteria, the regression analysis p-values do not show significant results. To correct for variability in the data, the Evaluators combined all data for gas measures into a single analysis.

Table 325: Measures Considered for Billing Analysis, Shell Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
E Attic Insulation With Electric Heat	✓	22*	
E Window Replc With Electric Heat	✓	78*	✓

*This count includes rebates from Washington and Idaho

The final number of customers in each the treatment and control group are listed in Table 326.

The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 326 provides annual savings per customer for both measures combined. Model 2 (PPR) was selected as the final model for the Shell Program as it provided the highest adjusted R-squared among the regression models. Savings are statistically significant at the 90% level for all measures and the adjusted R-squared shows the model provided an excellent fit for the data (adjusted R-squared > 0.90).

Table 326: Measure Savings, Shell Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (kWh)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
E Attic Insulation and E Window Replc With Electric Heat	100	99	1,284.69	135.61	2,433.76	0.65	Model 2: PPR

The Evaluators found the E Attic Insulation and E Window Replacement measures with Electric Heat together display a statistically significant verified savings value of 1284.69 kWh per year. Although the Evaluators estimated savings for these measures through billing analysis, the verified savings for the measures were calculated via Avista TRM due to a low adjusted R-Squared value indicating poor fit. Further details of the billing analysis for the Shell measures can be found in Appendix A: Billing Analysis Results.

3.2.3.6 Verified Savings

The Shell Program in total displays a realization rate of 60% with 315,829 kWh verified electric energy savings in the Washington service territory, as displayed in Table 3-19. The realization rate for the electric savings in the Shell Program deviate from 100% due primarily to the differences between the categories applied in the Avista TRM prescriptive savings values and the more detailed categories present with unique RTF UES values. The attic insulation measure displays a realization rate of 55% because the RTF rounds the UES values to the nearest whole kWh. The RTF assigns attic insultion annual savings of 1.00 kWh per square foot for homes with zonal heating and 2.00 kWh per square foot for homes in with heat pump heating, while the Avista TRM assigns a value of 1.86 kWh per square foot, regardless of heating type. The realization rate arises because the majority of homes that participated in attic insulation retrofits displayed zonal heating type. Therefore, the average verified kWh saved per square foot among participants is closer to 1.00 than 2.00. The Evaluators recommend Avista update the Avista TRM value to reflect participation home characteristics. The Evaluators found minimal discrepancy in square footage values between the tracking data and project-level documents provided.

3.2.4 ENERGY STAR® Homes Program

The ENERGY STAR® Homes Program provides rebates for homes within Avista's service territory that attain an ENERGY STAR® certification. This program incentivizes for ENERGY STAR® Eco-rated homes. Table 3-21 summarizes the measures offered under this program.

Table 3-21: ENERGY STAR® Homes Program Measures

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

The following table summarizes the verified electric energy savings for the ENERGY STAR® Homes Program impact evaluation.

Table 3-22: ENERGY STAR® Homes Program Verified Electric Savings

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
E Energy Star Home - Manufactured, Electric Only	25	82,875	82,875	72,887	87.95%
E Energy Star Home - Manufactured, Gas & Electric	7	21,154	21,154	21,150	99.98%
Total	**32**	**104,029**	**104,029**	**94,037**	**90.39%**

The ENERGY STAR® Homes Program displayed verified savings of 94,037 kWh with a realization rate of 90.39% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-23: ENERGY STAR® Homes Program Costs by Measure

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
E Energy Star Home - Manufactured, Electric Only	$25,000.00	$103,142.73	$128,142.73
E Energy Star Home - Manufactured, Gas & Electric	$7,000.00	$29,928.84	$36,928.84
Total	**$32,000.00**	**$133,071.57**	**$165,071.57**

*The costs associated with this measure are claimed in the Washington Gas Impact Evaluation Report

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

3.2.4.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the ENERGY STAR® Homes Program.

3.2.4.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the ENERGY STAR® Homes Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

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

3.2.4.3 Verification Surveys

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

3.2.4.4 Impact Analysis

This section summarizes the verified savings results for the ENERGY STAR® Homes Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook in place at the time the savings goals for the program was finalized. These RTF UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.4.5 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate adjusted program savings for each of the ENERGY STAR® Homes measures. In addition, the Evaluators reviewed and applied the current RTF UES values for each measure along with verified tracking data to estimate net program savings.

The ENERGY STAR® Homes Program in total displays a realization rate of 90.39% with 94,037 kWh verified electric energy savings in the Washington service territory, as displayed in Table 3-22. The realization rate for the electric savings in the ENERGY STAR® Homes Program deviate from 100% due to the categorical differences between the applied Avista TRM prescriptive savings value and the more detailed RTF UES categories.

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

Program application forms commonly lacked information about home primary and secondary space and water heating type. The Evaluators also found two all-electric rebates to be dual fuel projects and all dual fuel rebates to be primarily heated through natural gas. Savings were adjusted accordingly for both cases. The Evaluators recommend updating the Avista measure savings database to match the primary heating type for duel fuel households. In addition, the Evaluators recommend updating the document data aggregation to provide consistent database values between database and the provided rebate forms (primary heating type) and determine if the customer is an Avista electric and/or gas customer before providing an incentive for dual fuel.

The Evaluators did not conduct a verification survey for the ENERGY STAR® Homes Program and therefore did not adjust verified savings with an ISR.

3.2.5 Small Home & MF Weatherization Program

The Small Home & MF Weatherization Program is a residential prescriptive program that waives the energy usage requirement that is typically employed for residential prescriptive programs. This benefits small homes (less than 1,000 square feet in size) and multifamily dwellings (specifically customers in condominiums larger than five units in size). While this program is designed for all customers, it could also benefit members of Named Communities who reside in smaller homes.

This program encourages consumer to complete energy efficient home upgrades such as attic, floor, or wall insulation, replacing windows with high efficiency windows, or upgrading thermostats, clothes washers,clothes dryers, refrigerators, and refrigerator freezers to increase energy efficiency in these homes.

This section summarizes the impact results of the evaluation results for the Small Home & MF Weatherization Program. Table 3-24 summarizes the measures offered under this program.

Table 3-24: Small Home & MF Weatherization Program Measures

Measure	Description	Impact Analysis Methodology
E Multifamily Ductless Heat Pump Replac Existing Baseboard	Conversion from electric baseboard with high efficiency ductless heat pump in multifamily home	RTF UES
E Multifamily Window Replc With Electric Heat	Window replacement for multifamily homes with electric heat	RTF UES
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	ENERGY STAR-certified freezer or refrigerator freezer in multifamily units	RTF UES
E Multifamily Ductless Heat Pump Replac Existing Baseboard	Conversion from electric baseboard with high efficiency ductless heat pump in multifamily home	RTF UES
E Multifamily Heat Pump Water Heater	Install high efficiency heat pump water heater in multifamily home	RTF UES
E Multifamily Energy Star Rated Front Load Washer	ENERGY STAR-certified front load washers in multifamily units	RTF UES
E Multifamily Energy Star Rated Clothes Dryer	ENERGY STAR-certified clothes dryers in multifamily units	RTF UES
E Multifamily Attic Insulation With Electric Heat	Attic insulation for multifamily homes with electric heat	RTF UES
E Multifamily Line Voltage Thermostat Electric Baseboard	Line voltage thermostats in multifamily units with electric baseboard heating	RTF UES
E Multifamily Energy Star Rated Top Load Washer	ENERGY STAR-certified top load washers in multifamily units	RTF UES
E Multifamily Smart Thermostat DIY	Connected thermostat for multifamily homes with electric heat, self-installed	RTF UES
E Multifamily Floor Insulation With Electric Heat	Floor insulation for multifamily homes with electric heat	RTF UES
E Multifamily Energy Star Rated Insulated Door With El Heat	Install ENERGY STAR-certified door in multifamily home	RTF UES
E Multifamily Air Source Heat Pump replac existing baseboard	Conversion to air source heat pump from electric baseboard for multifamily home	RTF UES
E Multifamily Wall Insulation With Electric Heat	Wall insulation for multifamily homes with electric heat	RTF UES
E Multifamily Smart Thermostat Paid install	Connected thermostat for multifamily homes with electric heat, contractor-installed	RTF UES
E Multifamily Line Voltage Smart Thermostat Electric Baseboard	WIFI-enabled smart thermostat line voltage thermostats in multifamily units with electric baseboard heating	RTF UES
E Multifamily Window DIY Replc With Electric Heating	Window replacement in multifamily homes with electric heat, self-installed	RTF UES

The following table summarizes the verified electric energy savings for the Small Home & MF Weatherization Program impact evaluation.

Table 3-25: Small Home & MF Weatherization Program Verified Electric Savings

Measure	PY2023 Units	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Multifamily Window Replc from Single Pane W Electric Heat	112	192,616	305	265,744	137.97%
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	12	1,488	804	84	5.65%
E Multifamily Electric to Ductless Heat Pump	22	36,712	66,000	58,168	158.44%
E Multifamily Heat Pump Water Heater	26	34,268	34,268	34,164	99.70%
E Multifamily Energy Star Rated Front Load Washer	9	1,080	1,080	1,080	100.00%
E Multifamily Energy Star Rated Clothes Dryer	16	4,350	4,640	4,958	113.97%
E Multifamily Attic Insulation With Electric Heat	10	13,770	10	4,036	29.31%
E Multifamily Line Voltage Thermostat Electric Baseboard	1	76	76	65	85.53%
E Multifamily Energy Star Rated Top Load Washer	4	104	104	-	0.00%
E Multifamily Smart Thermostat DIY with Electric Heat	3	1,950	1,950	2,817	144.46%
E Multifamily Floor Insulation to R-30	2	3,038	3	3,038	100.00%
E Multifamily Energy Star Certified Insulated Door	5	4,000	4,000	791	19.78%
E Multifamily Electric To Air Source Heat Pump	1	3,663	3,663	2,842	77.59%
E Multifamily Wall Insulation With Electric Heat	1	1,112	3	1,801	162.00%
E Multifamily Smart Thermostat Paid Install with Electric Heat	5	3,349	3,250	4,496	134.24%
E Multifamily Line Voltage Smart Thermostat Electric Baseboard	1	152	76	156	102.63%
E Multifamily Window DIY Replc With Electric Heating	1	1,065	-	1,543	144.91%
Total	**231**	**302,793**	**120,232**	**385,783**	**127.41%**

The Small Home & MF Weatherization Program displayed verified savings of 385,783 kWh with a realization rate of 127.41% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-26: Small Home & MF Weatherization Program Costs by Measure

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
E Multifamily Window Replc from Single Pane W Electric Heat	$78,190.16	$376,055.02	$454,245.18
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	$1,200.00	$39.87	$1,239.87
E Multifamily Electric to Ductless Heat Pump	$12,950.00	$33,527.08	$46,477.08
E Multifamily Heat Pump Water Heater	$13,000.00	$17,211.74	$30,211.74
E Multifamily Energy Star Rated Front Load Washer	$450.00	$511.04	$961.04
E Multifamily Energy Star Rated Clothes Dryer	$750.00	$2,033.31	$2,783.31
E Multifamily Attic Insulation With Electric Heat	$20,250.00	$5,711.11	$25,961.11
E Multifamily Line Voltage Thermostat Electric Baseboard	$20.00	$37.46	$57.46
E Multifamily Energy Star Rated Top Load Washer	$200.00	$0.00	$200.00
E Multifamily Smart Thermostat DIY with Electric Heat	$450.00	$525.42	$975.42

E Multifamily Floor Insulation to R-30	$2,619.00	$4,299.14	$6,918.14
E Multifamily Energy Star Certified Insulated Door	$500.00	$1,119.84	$1,619.84
E Multifamily Electric To Air Source Heat Pump	$1,000.00	$1,917.19	$2,917.19
E Multifamily Wall Insulation With Electric Heat	$417.00	$2,549.22	$2,966.22
E Multifamily Smart Thermostat Paid Install with Electric Heat	$950.00	$838.52	$1,788.52
E Multifamily Line Voltage Smart Thermostat Electric Baseboard	$40.00	$89.92	$129.92
E Multifamily Window DIY Replc With Electric Heating	$217.85	$2,183.62	$2,401.47
Total	**$133,204.01**	**$448,649.51**	**$581,853.52**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for Small Home & MF Weatherization Program in the section below.

3.2.5.1 Database Review & Verification

The following sections describe the Evaluator's database review and document verification findings for the Small Home & MF Weatherization Program.

3.2.5.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for Small Home & MF Weatherization Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

The rebate application form sufficiently collects all required RTF measure specification details. All rebate applications and tracking data contain smart thermostat manufacturer and model number. The Evaluators were able to verify the models for RTF specifications for connected thermostats.

The Evaluators found that many projects exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). The Evaluators recommend claiming projects on single family homes that are larger than 1,000 SQFT into the Shell Program.

The Evaluators reviewed each measure number of units, square footage, and insulation where available. The Evaluators found that 22 of the sampled projects with insulation or window replacement did not track square footage of installed units in the tracking database. Furthermore, 8 of the 10 insulation projects that contained square footage data did not match the project documents for square footage. Therefore, adjustments were made for these projects towards verified savings. In addition, U-values for window measures were not consistently tracked, which is an important savings unit assignment requirement. The Evaluators recommend Avista incorporate a u-value field to the tracking database for the program.

The Evaluators imputed home type (single family home vs. manufactured home vs. multifamily home) and space heating type for a number of sampled rebates, as the tracking database did not contain values for these accounts, and rebate applications were not available to draw values from. This allows the Evaluators to accurately assign RTF values. The mail-in rebates collect this information; however, it does not seem to be required to complete the rebate and therefore many rebates are missing this

information. The Evaluators recommend verifying home type and space heating type during rebate application approval in order to apply correct savings values to each project.

The realization rate for the E Multifamily Smart Thermostat DIY is low because one of the two thermostats were verified to lack RTF qualification due to lack of occupancy sensor or geolocation capabilities. The realization rate for the E Multifamily Energy Star Rated Insulated Door With El Heat is low because the RTF UES is 75% the magnitude of the Avista TRM value. In addition, for the one E Multifamily Energy Star Rated Insulated Door With El Heat project claimed, the Evaluators verified lower square footage than indicated in the tracking data. These two changes together resulted in 19% realization for this measure.

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

3.2.5.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.5. The Evaluators included questions such as:

- What type of thermostat did this thermostat replace?
- Is your home heating with electricity, natural gas, or another fuel?
- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Small Home & MF Weatherization Program. The responses to these additional questions can be found in Appendix B.

Table 3-27 displays the ISRs for each of the Small Home & MF Weatherization measures for Washington electric territory only. The ISRs resulted in 82.6% precision at the 90% confidence interval for the program.

Table 3-27: Small Home & MF Weatherization Verification Survey ISR Results

Measure	Number of Rebates	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
E Multifamily Attic Insulation With Electric Heat	10	0	90% ±82.25%	100%*
E Multifamily Electric To Air Source Heat Pump	1	0		100%*
E Multifamily Electric to Ductless Heat Pump	22	0		100%*
E Multifamily Energy Star Certified Insulated Door	5	0		100%*
E Multifamily Energy Star Certified Refrigerator and Refrigerator-Freeze	12	1		100%*
E Multifamily Energy Star Rated Clothes Dryer	16	0		100%*
E Multifamily Energy Star Rated Front Load Washer	9	0		100%*
E Multifamily Energy Star Rated Top Load Washer	4	0		100%*
E Multifamily Floor Insulation to R-30	2	0		100%*
E Multifamily Heat Pump Water Heater	26	0		100%*
E Multifamily Line Voltage Smart Thermostat Electric Baseboard	1	0		100%*
E Multifamily Line Voltage Thermostat Electric Baseboard	1	0		100%*
E Multifamily Smart Thermostat DIY with Electric Heat	3	0		100%*
E Multifamily Smart Thermostat Paid Install with Electric Heat	5	0		100%*
E Multifamily Wall Insulation With Electric Heat	1	0		100%*
E Multifamily Window Replc from Single Pane W Electric Heat	112	0		100%*
E Multifamily Energy Star Certified Upright Freezer	0	No Participation		N/A
E Multifamily Window DIY Replc With Electric Heating	1	0		100%*

*ISR, assumed 100% due to lack of responses to meet precision goals

The Evaluators contacted all participants in the program to calculate in-service rates for the measures. Although 90/10 precision was not achieved through the census of web surveys for this program, the responses received from these measures also indicated 100% in-service rates. 100% in-service rates were assumed. The Evaluators applied the ISRs listed in Table 3-27 to each rebate to quantify verified savings for each measure.

3.2.5.4 Impact Analysis

This section summarizes the verified savings results for the Small Home & MF Weatherization Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook in place at the time the savings goals for the program was finalized.

3.2.5.5 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net adjusted program savings for those measures. Small Home & MF Weatherization Program displayed 127.41% realization with 385,783 kWh saved, as displayed in Table 3-25.

The program verified savings resulted in a realization rate of 0% for the E Energy Star Rated Top Load Washer largely due to the fact that the Evaluators attributed 0 kWh/unit savings because the RTF clothes washer workbook estimates that savings for this measure are negative and therefore there are no proven RTF savings for this measure.

The Evaluators found the realization rate for Energy Star Certified Refrigerators and Freezers to be low due to the configuration of the measure itself. The expected savings values line up with a side-mounted freezer however, after further investigation via document verification the Evaluators found these measures to be bottom-mounted which caused the RTF savings to reflect a lower value hence the low realization rate.

The Attic Insulation and Door Insulation measures also returned low realization rates due to heating zone discrepancies in the claimed expected savings. The Evaluators assigned electric savings from the RTF associated with the appropriate heating and cooling zones which caused a difference in the verified realization rates. The Evaluators recommend updating Avista measure savings to reflect heating zone-specific RTF measure savings rather than averaging savings from heating zones together.

The Evaluators found that the tracking database does not currently track square footage data consistently for insulation measures. The Evaluators recommend these values are tracked consistently for this program to ensure savings are calculated accurately for ech measure.

The high overall realization rate of 127.54% was primarily due to differences in home type. The Evaluators verified home type via Zillow to apply correct RTF workbook savings from the single family, multifamily, and manufactured home RTF workbooks. These adjustments led to high realization rates for the overall program due to the fact that these overcalculations held a much higher weight in the amount of projects that had differences in home type compared to those with low realization rates. The Evaluators recommend Avista verify home type prior to applying Avista TRM values in order to ensure proper categorization of measure savings.

3.2.6 Multifamily Direct Install Program

The Multifamily Direct Install Program (MFDI) Program is administered by SBW Consulting, Inc (SBW). This program provides direct installation and audits for customers to install direct install measures and identify additional energy efficiency opportunities. This program is available to customers who receive electric service from Avista and have a five-unit or more multifamily property. The program also serves hard-to-reach customer segment as well as Avista's low- and limited-income population. Table 3-28 summarizes the measures offered under this program along with the impact evaluation methods for each measure.

Table 3-28: Multifamily Direct Install Program Measures

Measure	Impact Analysis Methodology
Screw-in LED lamp (3.8)	SBW TRM
Screw-in LED lamp (4.8)	SBW TRM
Screw-in LED lamp (A-line 100W)	SBW TRM
Screw-in LED lamp (A-line 40W)	SBW TRM
Screw-in LED lamp (A-line 60W)	SBW TRM
Screw-in LED lamp (BR30)	SBW TRM
Screw-in LED lamp (BR40)	SBW TRM
Screw-in LED lamp (G25)	SBW TRM
Screw-in LED lamp (PAR30)	SBW TRM
Screw-in LED lamp (PAR38)	SBW TRM
Screw-in LED lamp (R20)	Avista TRM/SBW TRM
Faucet aerator (1 GPM)	RTF UES, Aerators_v1_1/SBW TRM
Kitchen Aerator	RTF UES, Aerators_v1_1/SBW TRM
VendingMiser	SBW TRM

The following table summarizes the verified electric energy savings for the Multifamily Direct Install Program impact evaluation.

Table 3-29: Multifamily Direct Install Program Verified Electric Savings

Measure	PY2023 Units	Expected Savings (kwh)	Verified Savings (kWh)	Realization Rate
Screw-in LED lamp (3.8)	120	16,386	20,721	126.46%
Screw-in LED lamp (4.8)	182	12,848	15,767	122.72%
Screw-in LED lamp (A-line 100W)	37	2,086	2,959	141.88%
Screw-in LED lamp (A-line 40W)	11	665	700	105.35%
Screw-in LED lamp (A-line 60W)	10,129	512,533	598,244	116.72%
Screw-in LED lamp (BR30)	153	12,426	14,914	120.02%
Screw-in LED lamp (BR40)	177	15,273	20,781	136.06%
Screw-in LED lamp (G25)	654	80,512	109,196	135.63%
Screw-in LED lamp (PAR30)	55	4,907	6,832	139.25%
Screw-in LED lamp (PAR38)	13	6,945	6,602	95.06%
Screw-in LED lamp (R20)	105	9,089	12,895	141.88%
Faucet aerator (1 GPM)	2,447	177,198	177,198	100.00%
Kitchen Aerator	1,077	42,003	42,003	100.00%
Vending Miser	2	1,228	1,228	100.00%
Total	**15,162**	**894,099**	**1,030,041***	**115.20%**

*Total may differ by 1 kWh due to rounding

The Multifamily Direct Install Program displayed verified savings of 1,030,041 kWh with a realization rate of 115.20% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-30: Multifamily Direct Install Program Costs by Measure

Measure	Incentive Costs	Non-Incentive Costs	Total Cost
Screw-in LED lamp (3.8)	$9,135.00	$8,948.09	$18,083.09
Screw-in LED lamp (4.8)	$8,232.00	$6,808.77	$15,040.77
Screw-in LED lamp (A-line 100W)	$1,147.00	$1,277.87	$2,424.87
Screw-in LED lamp (A-line 40W)	$408.00	$302.49	$710.49
Screw-in LED lamp (A-line 60W)	$426,292.00	$258,343.90	$684,635.90
Screw-in LED lamp (BR30)	$4,796.00	$6,440.34	$11,236.34
Screw-in LED lamp (BR40)	$6,132.00	$8,974.21	$15,106.21
Screw-in LED lamp (G25)	$69,632.00	$47,154.68	$116,786.68
Screw-in LED lamp (PAR30)	$3,976.00	$2,950.46	$6,926.46
Screw-in LED lamp (PAR38)	$1,376.00	$2,851.09	$4,227.09
Screw-in LED lamp (R20)	$5,918.00	$5,568.59	$11,486.59
Faucet aerator (1 GPM)	$33,752.00	$85,198.61	$118,950.61
Kitchen Aerator	$8,616.00	$20,195.47	$28,811.47
Vending Miser	$450.00	$199.30	$649.30
Total	**$579,862.00**	**$455,213.86**	**$1,035,075.86**

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

3.2.6.1 Database Review & Verification

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

3.2.6.2 Database Review & Document Verification

The program administrators do not track data separately from the tracking data. Therefore, there were no documents for the Evaluators to cross-verify for the Multifamily Direct Install Program.

To verify savings, the Evaluators reviewed the tracking data and verified savings using Avista TRM values, RTF UES values, and SBW saving methodology.

The Evaluators found that in many cases, the per unit savings value for the lighting measures did not align with the per unit value in SBW's methodology or the RTF UES values. The tracking data contained multiple savings baselines for savings including one value for savings above code (EISA) and another value for savings above existing installed lighting. These kWh energy saved per unit item did not always align with the SBW TRM pre-defined values. The precise reason for these discrepancies was unclear. These discrepancies led to deviations from 100% realization rate for the lighting measures.

The Evaluators evaluated the faucet and kitchen aerator values using RTF UES values. The Evaluators found no discrepancy between the savings values in the tracking database and the RTF UES values leading to a realization rate of 100% for these measures. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The

Evaluators recommend verifying space heating type in the tracking data in order to apply more specific savings values to each project.

The Evaluators did not conduct survey verification for the Multifamily Direct Install Program since customers are typically unaware of the measures installed and since the MFDI measure savings values have in-service rates embedded in the savings values.

3.2.6.3 Impact Analysis

This section summarizes the verified savings results for the Multifamily Direct Install Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook, Avista TRM, and SBW methodology in place at the time the savings goals for the program were finalized.

3.2.6.4 Verified Savings

The Evaluators reviewed the Avista TRM values along with tracking data to estimate net verified program savings for those measures. The Multifamily Direct Install Program displayed 115.20% realization with 1,030,041 kWh saved, as displayed in Table 3-29.

The difference between calculated expected savings and verified savings are due to the application of the SBW TRM to the consistently validated quantity of measures. The lighting measures displayed discrepancies in kWh/unit values used to calculate savings. The reason for the discrepancies was unclear. The Screw-in LED lamp (A-line 60W) makes up 58% of total program savings, yet displayed a realization rate of 116%, leading to inflated savings for this program overall. The Evaluators recommend Avista apply the SBW UES to the tracking database accurately and consistently across all lighting measures.

The Evaluators evaluated the faucet and kitchen aerator values using RTF UES values and found there was discrepancy between the savings values in the tracking database and the RTF UES values leading to a realization rate of 100% for these measures. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data to apply more specific savings values to each project.

3.2.7 Appliances Program

The Appliances Program is residential prescriptive program that offers incentives for customers to upgrade their existing clothes washers and dryers to ENERGY STAR-rated clothes dryers and washers.

This section summarizes the impact results of the evaluation results for the Appliances Program. Table 3-31 summarizes the measures offered under this program.

Table 3-31: Appliances Program Measures

Measure	Description	Impact Analysis Methodology
E Energy Star Certified Refrigerator and Refrigerator-Freeze	ENERGY STAR-certified refrigerator or refrigerator with freezer for residential homes	RTF UES
E Energy Star Certified Upright Freezer	ENERGY STAR-certified standard or compact freezers for residential homes	RTF UES
E Energy Star Rated Clothes Dryer	ENERGY STAR-certified clothes dryer for residential homes	RTF UES
E Energy Star Rated Front Load Washer	ENERGY STAR-certified front loading clothes washer for residential homes	RTF UES
E Energy Star Rated Top Load Washer	ENERGY STAR-certified top loading clothes washer for residential homes	RTF UES

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

Table 3-32: Appliances Program Verified Electric Savings

Measure	PY2023 Units	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Energy Star Certified Refrigerator and Refrigerator-Freeze	483	65,472	59,892	62,744	95.83%
E Energy Star Certified Upright Freezer	58	3,484	3,886	3,484	100.00%
E Energy Star Rated Clothes Dryer	320	89,616	93,760	91,111	101.67%
E Energy Star Rated Top Load Washer	85	2,184	2,210	-	0.00%
E Energy Star Rated Front Load Washer	186	21,720	22,320	19,745	90.91%
Total	**1,132**	**182,476**	**182,068**	**177,085**	**97.05%**

The Appliances Program displayed verified savings of 177,085 kWh with a realization rate of 97.05% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-33: Appliances Program Costs by Measure

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
E Energy Star Certified Refrigerator and Refrigerator-Freeze	$49,441.82	$29,780.72	$79,222.54
E Energy Star Certified Upright Freezer	$2,600.00	$1,945.94	$4,545.94
E Energy Star Rated Clothes Dryer	$15,300.00	$37,369.03	$52,669.03
E Energy Star Rated Top Load Washer	$4,150.00	$0.00	$4,150.00
E Energy Star Rated Front Load Washer	$9,000.00	$9,343.23	$18,343.23
Total	**$80,491.82**	**$78,438.91**	**$158,930.73**

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

3.2.7.1 Database Review & Verification

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

3.2.7.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Appliance Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

The rebate application form sufficiently collects all required RTF measure specification details. All rebate applications and tracking data contain AHRI documentation or model numbers to verify model specifications. The Evaluators were able to verify the models for RTF specifications for the majority of projects. The Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which are useful tohelp verify model numbers are accurate,. Cubic volume is also important because it is an RTF requirement with minimum restrictions.

While conducting document verification, the Evaluators identified 2 rebates that did not qualify under Energy Star requirements. One was listed as an Energy Star Front Load Washer and the other an Energy Star Rated Clothes Dryer.

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

3.2.7.3 Verification Surveys

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.5. The Evaluators included questions such as:

- What type of clothes washer/dryer did this clothes washer/dryer replace?
- Is your home space heating with electricity or natural gas?
- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Appliances Program. The responses to these additional questions can be found in Appendix B.

Table 3-34 displays the ISRs for each of the Appliances measures for the Washington electric territory alone. The ISRs resulted in 85.5% precision at the 90% confidence interval for the program.

Table 3-34: Appliances Verification Survey ISR Results

Measure	Number of Rebates	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
E Energy Star Certified Refrigerator and Refrigerator-Freeze	483	72	90% 5.52%	96%
E Energy Star Certified Upright Freezer	58	10		100%
E Energy Star Rated Clothes Dryer	320	51		100%
E Energy Star Rated Front Load Washer	186	31		100%
E Energy Star Rated Top Load Washer	85	17		100%

The Evaluators applied the ISRs listed in Table 3-34 to each rebate to quantify verified savings for each measure.

3.2.7.4 Impact Analysis

This section summarizes the verified savings results for the Appliances Program. The Evaluators calculated verified savings for the electric measures using the RTF workbook in place at the time the savings goals for the program was finalized.

3.2.7.5 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net adjusted program savings for those measures. The Appliances Program displayed 97.05% realization with 177,085 kWh saved, as displayed in Table 3-32.

The program verified savings resulted in a realization rate of less than 100% largely due to low savings attributed to the fact that the Evaluators attributed 0 kWh/unit savings to the E Energy Star Rated Top Load Washer because the RTF clothes washer workbook estimates that savings for this measure are negative and therefore there are no proven RTF savings for this measure.

While conducting document verification, the Evaluators identified 2 rebates that did not qualify under Energy Star requirements. One was listed as an Energy Star Front Load Washer and the other an Energy Star Rated Clothes Drye; however, one project did not claim any expected savings. The Evaluators assigned 0 kWh savings to these measures which brought the realization rate below 100%. There were a total of 6 measures that did not claim any expected savings in the data so the Evaluators assigned 0 verified savings accordingly.

The Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions. The Evaluators recommend incorporating cubic volume in the Appliance Program tracking database.

All fridge-freezer projects were verified to be ENERGY STAR-qualified. The low realization rate for the fridge-freezer measure is due to the difference in RTF savings values (about 118.83 kWh/year) and the Avista TRM savings values for ENERGY STAR fridge-freezers (about 124 kWh/year).

Similarly, for the Electric Dryer measure, all projects were verified to be ENERGY STAR-qualified. The deviation from the 100% realization rate is due to the difference in Avista TRM and RTF savings values. The RTF assigns ENERGY STAR Dryers 271.63 & 281 kWh/unit depending on the state, while the Avista TRM assigns 293 kWh/unit.

3.2.8 Midstream Program (Residential)

Avista converted several residential and nonresidential measures from a downstream delivery channel to a midstream delivery channel via local distributors. As Avista notes, midstream approaches have proven successful in other parts of the Pacific Northwest, as well as nationally.

The Midstream Program currently offers midstream incentives to residential customers for measures such as:

- Residential heat pump water heaters
- Residential split unitary equipment
- Residential high efficiency natural gas furnaces
- Residential tankless water heaters

The nonresidential midstream measures and impact evaluation results are presented in Section 6.3.8. This change in delivery channel are seen to expand the benefits gained from the consumer with respect to the midstream incentive design rather than the downstream incentive design, as well as how customers use this offering.

This section summarizes the estimated savings Avista has calculated for the Midstream Program. The Evaluators conducted the first impact evaluation for the measures in this program for PY2023. Table 3-35 summarizes the measures offered under this program.

Table 3-35: Midstream Program Measures

Measure	Description	Impact Analysis Methodology
E Heat Pump Water Heater	High efficiency heat pump water heater installation	RTF with adjustments
E Split Unitary Equipment	Conversion to Air Source Heat Pump installation	RTF with adjustments

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

Table 3-36: Midstream Program Verified Electric Savings

Measure	PY2023 Units	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Heat Pump Water Heater	126	277,042	331,168	203,239	73.36%
E Split Unitary Equipment	667	2,517,863	2,512,608	1,349,700	53.60%
Total	**793**	**2,794,904**	**2,843,775**	**1,552,940**	**55.56%**

The Midstream Program displayed estimated savings of 1,522,940 kWh with a realization rate of 56%. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-37: Midstream Program Costs by Measure

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
E Heat Pump Water Heater	$26,750.00	$89,803.61	$116,553.61
E Split Unitary Equipment	$283,950.00	$777,945.45	$1,061,895.45
Total	**$310,700.00**	**$867,749.06**	**$1,178,449.06**

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

3.2.8.1 Database Review & Verification

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

3.2.8.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Midstream Pilot. The Evaluators selected a subset of rebates to cross-verify tracking data inputs, summarized in in Section 2.2.2.4.

The Evaluators found all 46 selected rebates documented the information necessary to accurately characterize savings for the program within the Washington electric service territory. The Evaluators verified the model number, efficiency, quantity, and RTF UES values necessary to calculate verified savings. The Midstream tracking data is tracked and delivered separately from the remaining residential portfolio, often demonstrating extensive detail on product characteristics.

During review, the Evaluators found that the implementer's engineering algorithms, in which expected savings are calculated, differed greatly from the UES previously defined for each measure in the Avista TRM and RTF UES values. That is, the implementer's engineering equations resulted in savings double or triple the amount for the average air source heat pump and heat pump water heater. In addition, the Evaluators found that the engineering algorithms applied to the tracking database equipment were not applied properly to the tracking data inputs. The reasoning for this discrepancy is unclear. The tracking database displays measure-level savings about 40% inflated compared to measure-level savings had the designated baseline and annual operating hours aligned with those values defined in the implementer TRM. This discrepancy is separate from the adjustment for market practice baseline defined by the RTF.

3.2.8.3 Verification Surveys

The Evaluators did not conduct verification surveys for the Midstream Program in PY2023 due to the nature of the midstream delivery channel; customers are not aware that they are participating in the program because thy are not required to fill our a downstream rebate application.

3.2.8.4 Impact Analysis

This section summarizes the verified savings results for the Midstream Program. The Evaluators attempted to conduct a billing analysis for each measure with sufficient participation. For measures in which billing analysis was not feasible or displayed inconclusive results, the Evaluators evaluated verified

savings for the measure through the Regional Technical Forum workbooks in place at the time of the biennium plan for the Midstream Program.

The Evaluators reviewed the expected savings workbook from the program implementer, Energy Solutions. The implementer defined expected kWh savings for each measure prior to the rollout of the program. The Evaluators note that the expected savings workbook values from the implementer vary from the Avista TRM for the previous prescriptive measure savings expectations as well as the RTF UES for each of the measures. For this reason, it is expected that the realization rate will portray discrepancies between the expected and verified savings.

The Evaluators estimated verified savings using RTF UES workbooks in the RTF's residential sector.

3.2.8.5 Billing Analysis

The Evaluators did not conduct a billing analysis for the electric measures in the Midstream Program because of limited participation for each measure due to mid-year implementation of the program.

3.2.8.6 Verified Savings

The Evaluators reviewed the Energy Solutions implementer expected savings values along with verified tracking data to estimate net adjusted program savings for those measures. In order to calculate verified savings, the Evaluators utilized industry-standard engineering algorithms using purchased equipment efficiency values and RTF-defined market practice baseline values, where appropriate. The Midstream Program displayed 55.56% realization with 1,522,940 kWh saved, as displayed in Table 3-25.

The program verified savings resulted in low realization rate largely due to the fact that the expected savings were inflated due to incorporation of baselines that did not represent market baseline, as the Regional Technical Forum does. Additionally, the implementer-given expected savings differ from the Avista TRM values. The Evaluators compared the implementer-provided expected savings to the previously defined measure-level expected savings defined in the TRM and concluded that, had the Avista TRM been used to define program expected savings, the realization rate would have been 97% realization rather than 55.56% realization. This difference is seen in the discrepancy between the expected savings value and the adjusted savings value presented in Table 3-25.

The Evaluators did not make any additional adjustments to the purchased equipment efficiency level of the equipment nor the quantity, as the verification efforts confirmed the details were properly tracked. Therefore, the difference between the established values in the implementer minimum code baseline and the RTF market practice baseline, as well as incorrectly applied engineering algorithmswere the driving factors for the low realization rate. The Evaluators recommend that Avista and the implementers update the expected savings calculation methodology to incorporate market practice baseline rather than minimum code baseline values in order to remain consistent with the baseline methods utilized in the downstream measure programs and more accurately estimate expected savings in future iterations of this program.

3.2.9 Always on Home Energy Report

The Residential Always-On Load Behavioral Pilot Program encourages residential households to reduce energy usage contributing to the "always-on" load. This "always-on" load, or "idle" load is the portion of daily household energy usage consumed from household devices that have been turned off or are in standby mode, but still drawing power. Desktop and laptop computers, cable modems, video game consoles, and microwaves are some examples of equipment contributing to always-on load. This portion of household load can amount to 20 to 30 percent of a customer's bill. This portion of household energy usage can easily be reduced with low- or no-cost behavioral changes, such as turning off computers when not in use.

The Residential Always-On Load Behavioral Pilot Program makes use of territory-wide AMI deployment by integrating AMI data with machine learning algorithms to identify the always-on load in each household. Avista has identified the top third of residential customers with always-on load and has created three potential groups: two treatment arms and one control group. For the first treatment group, Avista uses this AMI and algorithm information to send communications to customers including personalized information regarding always-on usage, associated costs, tips to reduce the load, and anticipated cost savings each month. For the second treatment group, Avista also delivered an incentive for reducing their always-on load compared to their baseline, however, starting in PY2023, this incentive was removed from the program design. This variation in treatment within similar groups of households will allow cost effectiveness for each treatment type as well as incremental energy savings.

This pilot program was implemented in the second quarter of 2022 and targeted the top third (nearly 25,000 customers) of residential always-on loads. The program has identified two treatment groups and one control group, with a target reduction of 5 percent a month relative to each treatment customer's baseline. Table *3-38* summarizes the cohorts treated under this program.

Table 3-38: Residential Always-On Load Behavioral Pilot Program Summary

Cohort	Households	Description
Group A	25,030	Treatment Group A, customers were sent monthly messages to encourage reduction of always-on load
Group B	25,030	Treatment Group B, , customers were sent monthly messages to encourage reduction of always-on load. Previously, incentives were sent to this group of customers; however, in 2023, incentives were removed
Group C	25,030	Control Group C, no monthly home energy reports are sent to these customers. These customers act as a control or counterfactual group

The Evaluators employed IPMVP-recommended standards for estimating verified net savings for this behavioral program. This includes validating each cohort's control group remain a statistically significant match after accounting for attrition, conducting separate linear regression for each cohort including variables for weather normalization, extrapolating model estimates using typical meteorological year (TMY) weather data, removing double counted savings claimed in other residential programs, and summing each cohort's validated savings to estimate total program energy savings.

Behavioral programs typically display 1-3% annual household energy savings. Behavioral programs also often display persistence savings due to behavioral energy consumption changes that extend further

than the length of program treatment. This behavioral program is highly unique in that messaging targets always-on load and uses high interval meter data to provide personalized tips.

The following table summarizes the estimated electric energy savings for the Always On Pilot Program impact evaluation.

Table 3-39: Always On Pilot Verified Electric Savings

Cohort	Weighted PY2023 Customers	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Group A	24,899	N/A	0	0	N/A
Group B	24,912	N/A	0	0	N/A
Total	49,810	N/A	0	0	N/A

The Always On Pilot did not display observable, statistically significant savings in PY2023. Further detail is summarized below. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 3-40: Always On Pilot Costs by Cohort

Cohort	Incentive Costs	Non-Incentive Costs	Total Costs
Group A	$0.00	$0.00	$0.00
Group B	$0.00	$0.00	$0.00
Total	**$0.00**	**$0.00**	**$0.00**

The Evaluators summarize the program-specific impact analysis activities and requirements for the Residential Always-On Load Behavioral Pilot Program in the sections below.

3.2.9.1 Database Review & Verification

The following sections describe the Evaluator's database review findings for the Always On Pilot. The Evaluators did not conduct any sampled document-based verification or sampled survey-based verification activities for the evaluation of this pilot program.

3.2.9.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted reviewed participation tracking data for each of the treatment groups and the control group. The database contained all the required information necessary to continue with the impact evaluation, such as customer information, intervention date (date in which customer first started receiving messaging through the pilot), and applicable hourly-level interval data with relevant identifiers.

3.2.9.3 Verification Surveys

The Evaluators did not conduct any verification survey efforts for this pilot.

3.2.9.4 Impact Analysis

This section summarizes the verified savings results for the Always On Pilot. The Evaluators calculated verified savings the program through a billing analysis comparing each treatment group to the accompanying control group.

The Evaluators collected the following data to conduct this impact evaluation task:

- For each treatment and control customer, identifiers for treatment or control assignment and cohort assignment, unique customer identifiers, household zip code, and date of intervention
- Tracking data from Avista downstream programs for the previous three to five program years
- A sample of communication materials sent to customers
- Monthly billed consumption data for treatment and control customers
- AMI meter data for treatment and control customers

3.2.9.5 Billing Analysis

The results of the billing analysis for the Always On Pilot are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Using the randomized control trials (RCT) groups designated within this program, the Evaluators compared treatment consumption with control consumption for each cohort in the program using AMI meter data or monthly billed consumption data. We explored the following types of linear fixed effects regression (LFER) models during the evaluation of this program: Difference in Difference (D-in-D) and Post-Program Regression (PPR). Each model specification is detailed in Section 2.2.3.2. The Evaluators included heating season and cooling season controls to estimate the relationship between energy consumption and weather during the pre- and post-periods, for each fuel type.

Prior to running regression models, the Evaluators tested the validity of each RCT by completing t-tests for the average daily usage of each of the pre-period months between the remaining treatment group and remaining control. After groups are confirmed to remain valid and comparable, the Evaluators completed a regression model ad estimated and remove double count savings found in other Avista residential energy efficiency programs from the customers in both the treatment group and control groups.

The final number of customers in each the treatment and control group customers 66emainning after cleaning steps are listed in Table 3-41.

Table 3-41: Always On Pilot Data Cleaning Steps

Restriction Detail	Treatment Group A	Treatment Group B	Control Group C
Raw dataset	25,030	25,030	25,030
After removing removed customers. Left if opt-outs	22,758	22,731	23,995
After merging with intervention and incentive data	25,030	25,030	25,030
After merging with billing data	24,899	24,913	24,862
After merging weather data	24,899	24,913	24,862
After calendarizing	24,899	24,913	24,862
After merging weather data	24,899	24,913	24,862
After calendarizing	24,899	24,913	24,862
After removing bills that occur before pre-period	24,899	24,913	24,862
Remove outliers (anything over 200kWh/day)	24,898	24,912	24,862
Remove bills with less than 10 or more than 90 days duration	24,898	24,912	24,862

Only keep pre-period and post-period in program year	24,898	24,912	24,862
Only keep customer with at least 9 months pre and 4 months post	22,366	22,460	22,709
Raw dataset	25,030	25,030	25,030
After removing removed customers. Left if opt-outs	22,758	22,731	23,995
After merging with intervention and incentive data	25,030	25,030	25,030
After merging with billing data	24,899	24,913	24,862
After merging weather data	24,899	24,913	24,862

The Evaluators performed three tests to determine the viability of the control group:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that the treatment and control groups for both group A and group B performed well for each measure and the Evaluators conducted a linear regression using the participant and control group hourly interval data.

The tables below indicate that the pre-intervention energy usage between the treatment and control groups are similar, as indicated by the rejection of the null hypothesis, and the p-value of greater than 0.05 for each pre-period month. Based on a simple power analysis, a cohort may reject up to 3 pre-period months until it is no longer considered a valid comparison group. Group A rejected one month out of the 12 pre-period months, and Group B rejected 0 of the pre-period months.

Table 3-42: Always On Pilot T-Test Results, Group A

Restriction Detail	Treatment Average Daily Consumption (kWh/Day)	Control Average Daily Consumption (kWh/Day)	P-value	Reject Null Hypothesis
July 2021	30.5393	30.44522	0.563075	
August 2021	25.54052	25.44049	0.483992	
September 2021	20.44731	20.47005	0.858556	
October 2021	21.66038	21.90345	0.126928	
November2021	26.31058	26.64974	0.11865	
December 2021	32.40245	33.01428	0.035013	*
January 2022	33.40224	33.99466	0.053986	
February 2022	30.91972	31.44257	0.065714	
March 2022	26.86433	27.17677	0.179128	
April 2022	23.91835	24.20916	0.134604	
May 2022	21.0192	21.20253	0.226548	
June 2022	20.1773	20.29019	0.380253	

Table 3-43: Always On Pilot T-Test Results, Group B

Restriction Detail	Treatment Average Daily Consumption (kWh/Day)	Control Average Daily Consumption (kWh/Day)	P-value	Reject Null Hypothesis
July 2021	30.68445	30.44522	0.14509	
August 2021	25.61929	25.44049	0.213978	
September 2021	20.47492	20.47005	0.969502	
October 2021	21.78495	21.90345	0.45785	
November2021	26.56446	26.64974	0.69589	
December 2021	32.91703	33.01428	0.739588	
January 2022	33.91732	33.99466	0.802424	
February 2022	31.38868	31.44257	0.850459	
March 2022	27.15151	27.17677	0.913755	
April 2022	24.17897	24.20916	0.877534	
May 2022	21.1666	21.20253	0.813423	
June 2022	20.30259	20.29019	0.923494	

Table 3-44 provides annual savings per customer for each treatment group. Model 2 (PPR) was selected as the final model for the Always On Pilot as it provided the highest adjusted R-squared among the regression models. The Evaluators found that savings for the Always On Pilot are not statistically significant at the 90% level for either treatment group, however, the adjusted R-squared shows the model provided an excellent fit for the data (adjusted R-squared > 0.80).

Table 3-44: Cohort Savings, Always On Pilot

Measure	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	P-value	Adjusted R-Squared	Model
Group A	-8.76990*	-26.32573	8.78593	0.32754	0.84230	Model 2: PPR
Group B	0.19087*	-17.56523	17.94697	0.98319	0.84049	Model 2: PPR

*Not statistically significant

The Evaluators conclude that the Always On Pilot efforts did not result in observable, statistically significant savings through customer monthly bills. However, this pilot has been in implementation for just over 1.5 years.; it is not uncommon for behavioral programs to require two or more years to begin observing behavioral changes in customer energy consumption efforts. In addition, because the pilot focuses on reducing always on, or “vampire” load, this may require additional messaging for customers to begin consistently changing behaviors in their home. For these reasons, the Evaluators believe that the Always On Pilot may begin realizing savings in future program years. However, the Evaluators recommend integrating non-vampire load energy conservation tips in the monthly home energy report messaging in order to encourage customers to take more impactful efforts to reduce their home energy bills, such as upgrading equipment, cooling and heating the home less often, and reducing the use of home appliances.

3.2.9.6 Verified Savings

The Always On Pilot in total displays a verified electric savings of 0 kWh in the Washington service territory, as displayed in Table 3-39. The Evaluators note that this behavioral program is highly unique in that messaging targets always-on load and uses high interval meter data to provide personalized tips. The Evaluators recommend that Avista incorporate additional energy saving tips, not relevant to always-on load, in order to encourage more impactful savings behaviors.

4. Low-Income Impact Evaluation Results

The Low-Income Program delivers energy efficiency measures to low-income residential customers in its Washington service territory with a partnership with five network Community Action Agencies ("Agencies") and one tribal weatherization organization. The Agencies qualify income to prioritize and treat households based on several characteristics. In-house or contract crews install approved program measures. In addition, the Agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures.

The Evaluators completed an impact evaluation on Avista's Low-Income portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each electric impact evaluation in the Low-Income Portfolio in the Washington service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, and RTF values to evaluate verified savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data. Table 4-1 summarizes the Low-Income verified impact savings by program. Table 4-2 summarizes the Low-Income portfolio cost-effectiveness results.

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

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Low-Income	526,675	451,422	85.71%
Total Low-Income	**526,675**	**451,422**	**85.71%**

Table 4-2: Low-Income Portfolio Cost-Effectiveness Summary

Sector	TRC			UCT		
	Benefits	Costs	B/C Ratio	Benefits	Costs	B/C Ratio
Low Income	$2,538,883	$3,456,395	0.73	$897,912	$3,456,395	0.26

In PY2023, Avista completed and provided incentives for low-income electric measures in Washington and achieved total electric energy savings of 451,422 kWh. The Low-Income Program exceeded savings expectations based on reported savings while the Community Energy Efficiency Program (CEEP) did not meet savings expectations. However, the low-income sector had achieved 85.71% of the savings expectations. The Evaluators estimated the TRC value for the Low-Income portfolio is 0.73 while the UCT value is 0.26. Further details of the impact evaluation results by program are provided in the sections following.

4.1 Program-Level Impact Evaluation Results

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

The Low-Income Program delivers energy efficiency measures to low-income residential customers in its Washington service territory with a partnership with five network Community Action Agencies ("Agencies") and one tribal weatherization organization. The Agencies qualify income to prioritize and treat households based on several characteristics. In-house or contract crews install approved program measures. In addition, the Agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures.

Avista provides CAP agencies with the following approved measure list, which are reimbursed in full by Avista. Avista also provides a rebate list of additional energy saving measures the CAP agencies are able to utilize which are partially reimbursed. Weatherization measures under this program may also be funded by CEEP. Table 4-3 summarizes the measures offered under this program.

Table 4-3: Low-Income Program Measures

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

Table 4-4 summarizes the verified electric energy savings for the Low-Income Program impact evaluation.

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

Measure	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
E Air Infiltration	43	34,524	34,524	30,005	86.91%
E Air Source Heat Pump	3	2,635	2,635	2,635	100.00%
E Attic Insulation With Electric Heat	23	13,155	13,155	10,222	77.71%
E Conversion to Air Source Heat Pump	40	289,372	289,372	231,245	79.91%
E Conversion to Ductless Heat Pump	26	87,471	87,471	80,037	91.50%
E Deferred Maintenance Pilot	4	0	0	0	N/A
E Door Sweep	2	58	57.52	42	72.30%
E Duct Insulation	10	6,716	6,716	6,716	100.00%
E Duct Sealing	10	7,099	7,099	7,099	100.00%
E Energy Star Certified Refrigerator and Refrigerator-Freeze	4	156	156	156	100.00%
E Exterior Doors	41	13,441	13,441	11,919	88.68%
E Floor Insulation With Electric Heat	30	37,155	37,155	35,045	94.32%
E Health Safety and Repair	65	0	0	0	N/A
E Lighting	30	251	251	251	100.00%
E Smart Thermostat Paid Install with Electric Heat	1	749	749	749	100.00%
E Wall Insulation With Electric Heat	6	11,252	11,252	11,252	100.00%
E Window Replc from Single Pane W Electric Heat	59	22,642	24,991	24,048	106.21%
Total	**397**	**526,675**	**529,025**	**451,422**	**85.71%**

The Low-Income Program displayed verified savings of 451,422 kWh with a realization rate of 85.71% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

Table 4-5: Low-Income Program Costs by Measure

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
E Air Infiltration	$68,968.77	$88,993.04	$157,961.81
E Air Source Heat Pump	$5,414.61	$7,816.10	$13,230.71
E Attic Insulation With Electric Heat	$81,052.17	$74,435.47	$155,487.64
E Conversion to Air Source Heat Pump	$391,338.48	$685,849.34	$1,077,187.82
E Conversion to Ductless Heat Pump	$205,583.20	$237,381.44	$442,964.64
E Deferred Maintenance Pilot	$46,350.55	$0.00	$46,350.55
E Door Sweep	$336.32	$6.80	$343.12
E Duct Insulation	$11,108.71	$48,904.50	$60,013.21
E Duct Sealing	$11,651.23	$27,333.40	$38,984.63
E Energy Star Certified Refrigerator and Refrigerator-Freeze	$5,462.29	$491.68	$5,953.97
E Exterior Doors	$84,551.83	$80,137.85	$164,689.68
E Floor Insulation With Electric Heat	$168,560.75	$255,190.03	$423,750.78
E Health Safety and Repair	$348,351.08	$0.00	$348,351.08
E Lighting	$2,034.29	$601.38	$2,635.67
E Smart Thermostat Paid Install with Electric Heat	$1,343.11	$2,221.46	$3,564.57
E Wall Insulation With Electric Heat	$22,747.74	$81,933.80	$104,681.54

E Window Replc from Single Pane W Electric Heat	$235,136.07	$175,107.26	$410,243.33
Total	**$1,689,991.20**	**$1,766,403.55**	**$3,456,394.75**

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

4.1.1 Database Review & Verification

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

4.1.2 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Low-Income Program. The Evaluators selected a subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

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

The required information necessary to complete verification activities and proper expected savings calculations are: measure installed square footage for insulation measures, measure quantity for appliance measures, and total building annual energy usage in order to calculate proper building savings cap at 20% annual energy usage. The Evaluators found that 25 of the rebated projects lacked annual kWh and Therms usage values. The Evaluators recommend Avista track each participant's annual energy usage in the program tracking database in order to accurately apply the 20% cap for savings when necessary.

4.1.3 Verification Surveys

The Evaluators did not conduct verification surveys for the Low-Income Program.

4.1.4 Impact Analysis

This section summarizes the verified savings results for the Low-Income Program. The Evaluators calculated verified savings for Low-Income Program measures using the Avista TRM. However, a whole building billing analysis was completed to supplement the findings from the desk review.

4.1.5 Billing Analysis

The results of the billing analysis for the Low-Income Program are provided below.

The Evaluators attempted to estimate measure-level Low-Income Program energy savings through billing analysis regression with a counterfactual group selected via propensity score matching. The Evaluators attempted to isolate each unique measure. In doing so, the Evaluators also isolate the measure effects using the customer's consumption billing data. However, participation for the Low-

Income program resulted in a small number of customers with isolated measures and therefore the Evaluators were unable to estimate measure-level savings through billing analysis.

The Evaluators instead conducted a whole-home billing analysis for all the electric measures combined in order to estimate savings for the average household participating in the program, across all measures. The Evaluators successfully created a matched cohort for the electric measure households. Customers were matched based on average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household.

Table 4-6 provides annual savings per customer for each measure. Model 2 (PPR) was selected as the final model for the Low-Income Program as it provided the highest adjusted R-squared among the regression models. However, savings for this model are not statistically significant at the 90% level, indicated by the lower 90% confidence bound at 0 Therms saved per year. The customers considered for billing analysis include customers in both Washington and Idaho service territories to gather the maximum number of customers possible for precise savings estimates.

Table 4-6: Measure Savings, Low-Income Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (kWh)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
All Electric Measures	215	283	442.26*	94.09	791.90	0.80	Model 2: PPR

*Not statistically significant

Due to lack of statistical significance from the billing analysis results, The Evaluators did not apply these regression savings estimates to the program. Instead, the Evaluators estimated savings through the program by applying Avista TRM values to verified quantities. Further details of the billing analysis can be found in Appendix A.

4.1.6 Verified Savings

Due to lack of statistically significant estimates from the billing analyses, the Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net program savings for those measures. Adjusted savings were estimated using the Avista TRM. Verified savings were estimated using the Avista TRM savings values to each measure along with adjustments found during document verification of the sampled projects.

The largest contributor to discrepancy of savings is the application of the 20% annual kWh and Therm usage cap on project-level savings. When implemented, this led to a reduction of savings for a number of projects. The Low-Income Program in total displays a realization rate of 85.71% with 451,422 kWh verified electric energy savings in the Washington service territory, as displayed in Table 4-4.

5. Generation, Transmission, and Distribution Impact Evaluation Results

The Evaluators completed an impact evaluation on Avista's generation, transmission, and distribution efforts to verify energy savings for PY2023. The following sections summarize findings for each electric impact evaluation in the Conservation Voltage Reduction and Integrated Volt Var Controls efforts in the Washington service territory. Table 5-1 summarizes the verified impact savings by program. Table 5-2 summarizes the Residential portfolio's cost-effectiveness, in which these programs are incorporated.

Table 5-1: Generation, Transmission, and Distribution Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Conservation Voltage Reduction	10,573,411	10,575,230	**100.02%**
Integrated Volt Var Conservation	749,197	749,197	**100.00%**
Total	**11,322,608**	**11,324,427**	**100.02%**

Table 5-2: Residential Portfolio Cost-Effectiveness Summary

Sector	TRC			UCT		
	Benefits	Costs	B/C Ratio	Benefits	Costs	B/C Ratio
Residential	$9,982,961	$7,895,896	1.26	$7,797,199	$4,407,053	1.77

In PY2023, Avista's generation, transmission, and distribution impacts in Washington amount to electric energy savings of 11,324,427 kWh. The Conservation Voltage Reduction efforts resulted in a 100.02% realization rate while the Integrated Volt Var Conservation efforts resulted in a 100.00% realization rate, leading to an overall achievement of 100.02% of the expected savings for the these efforts. The Evaluators included these efforts in the Residetial portfolio cost-effectiveness calculations, with an estimated TRC value for the Residential portfolio of 1.26 and a UCT value of 1.77. Further details of the impact evaluation results by effort are provided in the sections following.

5.1 Program-Level Impact Evaluation Results

The Evaluators summarize the impact analysis activities, results, conclusions, and recommendations for the generation, generation, distribution efforts in the section below.

5.1.1 Conservation Voltage Reduction

Avista implemented a conservation voltage reduction (CVR) program in 2013 as part of larger Smart Grid projects. In PY2023, Avista once again implemented conservation voltage reduction activities in ortder to reduce strain on the electric grid. CVR is a type of distribution efficiency. It is a long-term practice of controlling distribution voltage levels in the lower range of acceptable levels to reduce load by lowering the distribution line voltage.

In 2014, a third party evaluator, Navigant, conducted an impact evaluation of Avista's CVR efforts. This evaluation included a thorough measurement and verification effort to characterize Avista's feeder distribution as well as potential savings due to CVR. The UTC required that Avista have distribution

efficiency savings evaluated using the RTF Automated CVR Protocol No.1, but allowed Avista to develop additional methodology. In this evaluation report, the Evaluators referenc voltage reduction observations evaluated in 2014 to characterize verified savings for CVR efforts in PY2023. Because the feeder types and customer base have not largely altered sinc this evaluation report, the Evaluators recommend continuing to reference the M&V results from this independent study.

The Navigant impact evaluation report resulted in the following key values necessary to calculate verified savings for each feeder:

Table 5-3: CVRf by Feeder Type

Feeder Type	CVRf
Mostly Residential	0.87
Commercial/mixed	0.793
Rural/agricultural	0.407
Predominantly Industrial	1.201
Washington State University (Express feeder)	1.179
RTF Automated CVR Protocol No. 1	**0.881**
Navigant Sample	**0.883**

In the table above, the RTF Automated CVR Protocol No. 1 and the Navigant EM&V sample produce statisticall identical results. Therefore, the Evaluators continue with the RTF protocol using the weighted CVRf of the feeder type. For example, for a feeder with 20% residential, 20% commercial, and 60% industrial customers, the adjusted CVRf would equal 20%*0.87+20%*0.793+60%*1.201, or 1.0532.

Once the adjusted CVRf is calculated for each feeder based on the customer breakdown data provided by Avista, feeder-level savings are estimated by using the following equation:

Equation 8: CVR Feeder-Level Savings

$$E_{saved} = E_{used}\left(\frac{CVR_f * Vr\%}{1 - CVR_f \& V_r\%}\right)$$

Where,

E_{saved} = Energy Conserved for period in kWh, MWh, or GWh

E_{used}= Measured Energy used for period in kWh, MWh, or GWh

CVR_f= Period conservation voltage reduction factor as computed using time series analysis and roust statistical methods with temperature compensation for specific seasons

Vr=Average period end of line voltage reduction

$V_r\%$ = Average period end of line voltage reduction in percent

5.1.1.1 Database Review & Verification

The following sections describe the Evaluator's database review findings for Avista's CVR efforts. The Evaluators did not conduct any sampled document-based verification or sampled survey-based verification activities for the evaluation of this effort. However, the Evaluators reviewed Navigant's

impact evaluation report conducted in 2014 as well as RTF CVR Protocol and additional CVR impact reports relevant to the Pacific Northwest..

5.1.1.2 Verification Surveys

The Evaluators did not conduct any verification survey efforts for this effort.

5.1.1.3 Impact Analysis

This section summarizes the verified savings results for the CVR effort. The Evaluators calculated verified savings the program through a the equation detailed in the sections above. For each feeder, Avista provided:

- Estimated customer type consumption breakdown
- Calculated MWs for each hour in the 2023 program year
- Regulator voltage in kV for each hour in the 2023 program year
- Equivalent 120 volts for each hour in the 2023 program year

The Evaluators employed the methodology detailed above to estimate kV reductions at the feeder level for 26 Avista feeders. The following table summarizes the estimated savings for Avista's CVR efforts.

Table 5-4: CVR Verified Electric Savings

Anonymized Feeder Name	Expected Savings (kWh)	Verified Savings (kWh)	Realization Rate
92	628,615	628,865	100.04%
93	566,524	566,524	100.00%
94	284,692	284,692	100.00%
A2	326,271	326,271	100.00%
B1	298,331	298,331	100.00%
B2	94,744	94,744	100.00%
C1	108,439	108,457	100.02%
C2	429,017	429,170	100.04%
E1	199,376	199,411	100.02%
G1	504,960	505,047	100.02%
H1	65,490	65,490	100.00%
H2	42,742	42,731	99.97%
I1	615,300	615,300	100.00%
I2	225,635	225,635	100.00%
L1	384,789	384,789	100.00%
L2	326,330	327,109	100.24%
L3	21,036	21,011	99.88%
L4	120,038	120,038	100.00%
M1	602,880	602,508	99.94%
M3	338,800	338,800	100.00%
M2	212,345	212,381	100.02%
N1	186,182	186,214	100.02%
N3	83,694	83,708	100.02%
O1	866,604	866,604	100.00%
O2	575,985	576,582	100.10%
S2	394,869	394,724	99.96%

S3	297,761	298,022	100.09%
S5	279,663	279,663	100.00%
S2	373,673	373,603	99.98%
W1	440,098	440,098	100.00%
W2	388,908	388,908	100.00%
W4	289,618	289,798	100.06%
Total	**10,573,411**	**10,575,230**	**100.02%**

5.1.1.4 Verified Savings

The CVR effort in total displays a verified electric savings of 10,575,230 kWh in the Washington service territory, as displayed in Table 3-39. This results in verified savings estimated by Avista expected savings, with a realization rate of 100.02% across all feeders.

5.1.2 Integrated Volt Var Controls

Avista implemented an integrated volt var controls (IVVC) effort in PY2023 in which Avista can regulate voltage levels and reactive power flow. CVR is a type of distribution efficiency. This leads to enhanved system reliability by regulating voltage levels and preventing voltage fluctuations that can result in equipment failure. IVVC also results in reduced energy consumption. IVVC operations are similar to CVR operations. For this reason, the Evaluators evaluated the IVVC efforts using the same methodology as the CVR efforts conducted by Avista.

As defined in Section 5.1.1, the Navigant impact evaluation report resulted in the following key values necessary to calculate verified savings for each feeder:

Table 5-5: CVRf by Feeder Type

Feeder Type	CVRf
Mostly Residential	0.87
Commercial/mixed	0.793
Rural/agricultural	0.407
Predominantly Industrial	1.201
Washington State University (Express feeder)	1.179
RTF Automated CVR Protocol No. 1	**0.881**
Navigant Sample	**0.883**

5.1.2.1 Database Review & Verification

The following sections describe the Evaluator's database review findings for Avista's IVVC efforts. The Evaluators did not conduct any sampled document-based verification or sampled survey-based verification activities for the evaluation of this effort. However, the Evaluators reviewed Navigant's impact evaluation report conducted in 2014 as well as RTF CVR Protocol and additional CVR impact reports relevant to the Pacific Northwest.

5.1.2.2 Verification Surveys

The Evaluators did not conduct any verification survey efforts for this effort.

5.1.2.3 Impact Analysis

This section summarizes the verified savings results for the IVVC effort. The Evaluators calculated verified savings the program through a the equation detailed in the sections above. For each feeder, Avista provided:

- Estimated customer type consumption breakdown
- Calculated MWs for each hour in the 2023 program year
- Regulator voltage in kV for each hour in the 2023 program year
- Equivalent 120 volts for each hour in the 2023 program year

The Evaluators employed the methodology detailed above to estimate kWh reductions at the feeder level for 3 Avista feeders. The following table summarizes the estimated savings for Avista's IVVC efforts.

Table 5-6: IVVC Verified Electric Savings

Anonymized Feeder Name	Expected Savings (kWh)	Verified Savings (kWh)	Realization Rate
1	145,413.34	145,413.34	100.00%
2	255,404.40	255,404.40	100.00%
3	348,379.36	348,379.36	100.00%
Total	**749,197.10**	**749,197.10**	**100.00%**

5.1.2.4 Verified Savings

The CVR effort in total displays a verified electric savings of 749,197.10 kWh in the Washington service territory, as displayed in Table 3-39. This results in verified savings estimated by Avista expected savings, with a realization rate of 100.00% across all feeders.

6. Nonresidential Impact Evaluation Results

The Evaluators completed an impact evaluation on Avista's Non-Residential portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each electric impact evaluation in the Non-Residential Portfolio in the Washington service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, RTF, IPMVP, supplemental sources and billing analysis of participants to evaluate savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data. Table 6-1 summarizes the Non-Residential verified impact savings by program. Table 6-2 summarizes the Non-Residential portfolio's cost-effectiveness.

Table 6-1:Non-Residential Verified Impact Savings by Program

Program	Expected Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Prescriptive Lighting	12,470,348	11,810,424	94.71%
Small Business Lighting	11,607,579	10,922,204	94.10%
HVAC VFD	329,852	329,852	100.00%
Food Service Equipment	6,153	5,695	92.55%
Grocer	16,288	16,288	100.00%
Shell	51,856	87,012	167.80%
Green Motors	4,535	4,535	100.00%
Midstream	79,419	58,291	73.40%
Site-Specific	10,914,864	12,272,916	112.44%
Totals:	**35,480,894**	**35,507,217**	**100.07%**

Table 6-2:Non-Residential Portfolio Cost-Effectiveness Summary

Program	TRC			UCT		
	Benefits	Costs	B/C Ratio	Benefits	Costs	B/C Ratio
Nonresidential	$44,039,335	$21,697,292	2.03	$40,035,598	$20,195,795	1.98

In PY2023, Avista completed and provided incentives for non-residential electric measures in Washington and reported total electric energy savings of 35,507,217 kWh. All programs except the Prescriptive Lighting Program and Midstream Program exceeded savings claims based on reported savings, leading to an overall achievement of 100.07% of the expected savings for the non-residential programs. The Evaluators estimated the TRC value for the Non-Residential portfolio is 2.03 while the UCT value is 1.98. Further details of the impact evaluation results by program are provided in the sections following.

6.1 Database & Document Verification

Before conducting the impact analyses, the Evaluators conducted a database review for all prescriptive programs. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4

The Evaluators requested rebate documentation for a subset of participating customers. These documents included invoices, rebate applications, pictures, AHRI certificates and DLC screenshots and similar types of documents for the following programs:

- Lighting
- HVAC (VFD) Program
- Food Service Equipment Program
- Grocer Program
- Shell Program
- Green Motors Program
- Midstream Program

This sample of documents was used to cross-verify tracking data inputs. In the case the Evaluators found any deviations between the tracking data and application values, the Evaluators reported and summarized those differences in the appropriate report chapters.

The Evaluators developed a sampling plan that achieves a sampling precision of ±10% at 90% statistical confidence – or "90/10 precision" – for document verification. Table 6-3 displays program populations, sample sizes for document verification and resulting precision.

Table 6-3: Prescriptive Program Verification Precision

Program	Population	Sampled	Precision
Prescriptive Lighting	106,521	80	90% ± 2.30%
Small Business Lighting	407	80	90% ± 1.70%
HVAC	14	12	90% ± 0.40%
Food Service Equipment	17	17	90% ± 0.00%
Grocer	2	2	90% ± 0.00%
Shell	22	22	90% ± 0.00%
Green Motors	1	1	90% ± 0.00%
Midstream	39	39	90% ± 0.00%
Site-Specific	54	16	90% ± 6.01%

6.2 Survey and On-Site Verification

Unlike Residential measures, non-residential measures typically have a 100% installation rate or a deemed in-service rate (ISR) included in RTF and Avista TRM UES. The two exceptions to this are Prescriptive Lighting measures and customs projects, such as those in the Site-Specific programs. Verification for these programs was addressed in two ways:

6.2.1 Prescriptive Lighting Verification

To access Prescriptive Lighting ISRs the Evaluators conducted a survey of program participants. A total of 744 projects included a contact email, of which 80 were unique. Customers with a valid email were sent the survey via an email invitation, followed a week later by a follow-up reminder to those who had not responded.

The Evaluators asked participants if the rebated equipment is currently installed and working, in addition to questions about HVAC configurations. The Evaluators achieved ±4.20% precision across the Prescriptive Lighting Program in Avista's Washington service territory, summarized in Table 6-4.

Table 6-4: Survey Verification

Program	Population	Respondents	Precision at 90% CI
Prescriptive Lighting	744	80	90% ± 4.20%

All respondents reported that their rebated equipment was currently installed and operating.

6.2.2 Site-Specific Verification

For the Site-Specific program, the Evaluators conducted 10 on-site visits to verify full installation and equipment operation as described in the project scope, as well as collect any data necessary for analyses. This is discussed further in the Site-Specific chapter.

Table 6-5: On-Site Verification

Program	Population	Sampled	On-Site Visits	Precision at 90% CI (by claimed savings)
Site-Specific	54	16	10	90% ± 6.01%

6.3 Program-Level Impact Evaluation Results

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

6.3.1 Prescriptive Lighting Program

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

In an effort to streamline the process and make it easier for customers and vendors to participate in the program, Avista developed a prescriptive approach for commercial/industrial customers in 2004. This program provides for many common retrofits to receive a pre-determined incentive amount. The Prescriptive Lighting program makes it easier for customers – especially smaller customers and vendors – to participate in the program.

The measures included in the Prescriptive Lighting program include retrofits from fluorescent lamps and fixtures, HID, directional, and incandescent can fixtures to more energy-efficient LED light sources and controls.

The Prescriptive Lighting Program accounts for the largest share of non-residential expected savings, or roughly 51% of the expected non-residential portfolio.

Table 6-6 summarizes the measures offered under this program.

Table 6-6: Prescriptive Lighting Program Measures

Location	Measure	Savings Source
Interior	LED tubes	Prescriptive Calculations with RTF and Custom Inputs
	LED U-Bend	
	LED W reduction	
	LED Downlamps/Directional	
	Linear LED Fixtures	
	HID LED fixtures/lamps	
	Occupancy Sensors	
	LLLC Fixtures	
Exterior	HID LED fixtures/lamps	
	Sign Lighting	
New Construction	HID LED fixtures	

Prescriptive Lighting Program impact evaluation by measure, and then are summarized in Table 6-7.

Table 6-7: Prescriptive Lighting Program Verified Electric Savings

Measure	Projects	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
1000 watt HID Fixture to 400 watt or less LED Fixture or Retrofit (Ext)	11	216,210	216,952	216,952	100.3%
150 watt HID Fixture to 50 watt or less LED Fixture or Retrofit (Ext)	16	57,180	57,377	57,377	100.3%
175 watt HID Fixture to 100 watt or less LED Fixture (Ext, NC)	17	115,504	115,900	115,900	100.3%
175 watt HID Fixture to 100 watt or less LED Fixture or Retrofit (Ext)	40	159,948	160,497	160,497	100.3%

250 watt HID Fixture to 140 watt or less LED Fixture (Ext, NC)	4	33,542	33,657	33,657	100.3%
250 watt HID Fixture to 140 watt or less LED Fixture or Retrofit (Ext)	37	168,190	168,767	168,767	100.3%
320 and 400 watt HID Fixture to 160 or less watt LED Fixture (Ext, NC)	29	187,935	188,581	188,581	100.3%
320 watt HID Fixture to 160 watt or less LED Fixture or Retrofit (Ext)	9	188,229	188,875	188,875	100.3%
400 watt HID Fixture to 175 watt or less LED Fixture or Retrofit (Ext)	123	1,359,579	1,364,248	1,364,248	100.3%
70-89 watt HID Fixture to 25 watt or less LED Fixture or Retrofit (Ext)	23	77,155	77,420	77,420	100.3%
750 watt HID Fixture to 300 watt or less LED Fixture or Retrofit (Ext)	2	15,846	15,901	15,901	100.3%
90-100 watt HID Fixture to 30 watt or less LED Fixture or Retrofit (Ext)	25	83,963	84,251	84,251	100.3%
>= 150W Incandescent to <= 30W LED Fixture	15	483,466	485,126	485,126	100.3%
>= 42W CFL to <= 20W LED Fixture	18	285,727	286,708	286,708	100.3%
1000 watt HID Fixture to 400 watt or less LED Fixture	3	205,274	205,979	205,979	100.3%
175-watt HID Fixture to 75-watt or less LED Fixture	8	158,348	158,892	158,892	100.3%
2, 3, 4-Lamp T12/T8 Fixture to LED Qualified 2x4 Fixture	78	844,115	762,313	762,313	90.3%
250-watt HID Fixture to 140-watt or less LED Fixture	4	52,321	47,251	47,251	90.3%
2-Lamp T12/T8 Fixture to LED Qualified 1x4 Fixture	33	95,250	86,019	86,019	90.3%
2-Lamp T12/T8 Fixture to LED Qualified 2x2 Fixture	28	460,577	415,942	415,942	90.3%
400 watt HID Fixture to 175 watt or less LED Fixture	30	565,233	567,174	567,174	100.3%
65W Incadescent to <= 10 watt LED Fixture	7	106,468	106,834	106,834	100.3%
75-100 watt Incandescent Can to less than 20 watt LED Fixture Retrofit	48	262,689	263,591	263,591	100.3%
Four Pin Base CFL to 17 watt or less Plug in LED	11	100,860	101,207	101,207	100.3%
DLC Qualified LLLC Fixture	27	119,737	120,153	120,153	100.3%
T12/T8 (2') Lamp to 1-Lamp less than 13 watt T8 TLED	22	36,556	33,013	33,013	90.3%
T12/T8 (3') Lamp to 1-Lamp less than 17 watt T8 TLED	8	9,393	8,483	8,483	90.3%
T12/T8 (4') Lamp to 1-Lamp less than 23 watt T8 TLED	321	3,360,365	3,034,714	3,034,714	90.3%
T12/T8 8' Fixture to 90 watt or less 8' LED fixture	31	565,689	510,869	510,869	90.3%
T12/T8 Eight-Foot to LED	62	267,546	241,618	241,618	90.3%
T12/T8 U-Bend to less than 23 watt T8 LED	27	99,071	89,470	89,470	90.3%

T5 Lamp to 1-Lamp less than 18 watt T5 TLED	4	29,108	26,287	26,287	90.3%
T5HO (4') 4-Lamp to 135 watt of less LED Fixture	11	156,234	141,094	141,094	90.3%
T5HO (4') 6-Lamp to 165 watt of less LED Fixture	18	293,986	265,496	265,496	90.3%
T5HO Lamp to 1-Lamp less than 29 watt T5HO TLED	60	739,054	667,433	667,433	90.3%
TLED (4') Lamp to TLED (4') Lamp with 5 watt or more reduction	4	79,675	71,954	71,954	90.3%
Ceiling or Fixture Occupancy sensor with built-in relays	20	80,141	81,201	81,201	101.3%
Sign Lighting	93	350,183	359,178	359,178	102.6%
Totals	**1,327**	**12,470,348**	**11,810,424**	**11,810,424**	**94.7%**

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

Table 6-8: Lighting Prescriptive Lighting Program Costs by Measure

Measure	Measure Count (Savings Units)	Total Electric Incentives	Measure Costs	Total Costs
1000 watt HID Fixture to 400 watt or less LED Fixture or Retrofit (Ext)	11	$52,080.00	$19,258.39	$71,338.39
150 watt HID Fixture to 50 watt or less LED Fixture or Retrofit (Ext)	16	$14,845.32	$5,093.23	$19,938.55
175 watt HID Fixture to 100 watt or less LED Fixture (Ext, NC)	17	$26,180.00	$10,288.22	$36,468.22
175 watt HID Fixture to 100 watt or less LED Fixture or Retrofit (Ext)	40	$26,648.01	$14,247.00	$40,895.01
250 watt HID Fixture to 140 watt or less LED Fixture (Ext, NC)	4	$9,000.00	$2,987.67	$11,987.67
250 watt HID Fixture to 140 watt or less LED Fixture or Retrofit (Ext)	37	$40,154.29	$14,635.81	$54,790.10
320 and 400 watt HID Fixture to 160 or less watt LED Fixture (Ext, NC)	29	$49,500.00	$16,354.05	$65,854.05
320 watt HID Fixture to 160 watt or less LED Fixture or Retrofit (Ext)	9	$43,356.49	$16,766.07	$60,122.56
400 watt HID Fixture to 175 watt or less LED Fixture or Retrofit (Ext)	123	$331,257.95	$121,101.50	$452,359.45
70-89 watt HID Fixture to 25 watt or less LED Fixture or Retrofit (Ext)	23	$19,380.00	$6,714.03	$26,094.03
750 watt HID Fixture to 300 watt or less LED Fixture or Retrofit (Ext)	2	$3,750.00	$1,378.96	$5,128.96
90-100 watt HID Fixture to 30 watt or less LED Fixture or Retrofit (Ext)	25	$21,718.00	$7,306.43	$29,024.43
>= 150W Incandescent to <= 30W LED Fixture	15	$62,325.00	$43,063.64	$105,388.64
>= 42W CFL to <= 20W LED Fixture	18	$41,180.45	$25,450.48	$66,630.93
1000 watt HID Fixture to 400 watt or less LED Fixture	3	$37,520.00	$17,862.88	$55,382.88

175-watt HID Fixture to 75-watt or less LED Fixture	8	$38,135.00	$14,104.51	$52,239.51
2, 3, 4-Lamp T12/T8 Fixture to LED Qualified 2x4 Fixture	78	$212,772.44	$67,669.02	$280,441.46
250-watt HID Fixture to 140-watt or less LED Fixture	4	$17,465.29	$4,194.36	$21,659.65
2-Lamp T12/T8 Fixture to LED Qualified 1x4 Fixture	33	$23,920.00	$7,635.75	$31,555.75
2-Lamp T12/T8 Fixture to LED Qualified 2x2 Fixture	28	$106,482.00	$36,071.27	$142,553.27
400 watt HID Fixture to 175 watt or less LED Fixture	30	$164,643.40	$50,346.87	$214,990.27
65W Incadescent to <= 10 watt LED Fixture	7	$11,847.00	$9,264.84	$21,111.84
75-100 watt Incandescent Can to less than 20 watt LED Fixture Retrofit	48	$50,438.40	$22,859.07	$73,297.47
Four Pin Base CFL to 17 watt or less Plug in LED	11	$28,026.00	$8,776.83	$36,802.83
DLC Qualified LLLC Fixture	27	$176,287.84	$10,419.86	$186,707.70
T12/T8 (2') Lamp to 1-Lamp less than 13 watt T8 TLED	22	$13,265.07	$2,862.97	$16,128.04
T12/T8 (3') Lamp to 1-Lamp less than 17 watt T8 TLED	8	$1,567.07	$735.67	$2,302.74
T12/T8 (4') Lamp to 1-Lamp less than 23 watt T8 TLED	321	$859,723.50	$263,175.97	$1,122,899.47
T12/T8 8' Fixture to 90 watt or less 8' LED fixture	31	$87,833.34	$44,303.46	$132,136.80
T12/T8 Eight-Foot to LED	62	$65,182.60	$20,953.56	$86,136.16
T12/T8 U-Bend to less than 23 watt T8 LED	27	$25,845.00	$7,758.97	$33,603.97
T5 Lamp to 1-Lamp less than 18 watt T5 TLED	4	$4,774.40	$2,279.67	$7,054.07
T5HO (4') 4-Lamp to 135 watt of less LED Fixture	11	$32,600.00	$12,235.90	$44,835.90
T5HO (4') 6-Lamp to 165 watt of less LED Fixture	18	$103,594.82	$23,024.32	$126,619.14
T5HO Lamp to 1-Lamp less than 29 watt T5HO TLED	60	$238,988.74	$57,881.01	$296,869.75
TLED (4') Lamp to TLED (4') Lamp with 5 watt or more reduction	4	$11,015.00	$6,240.00	$17,255.00
Ceiling or Fixture Occupancy sensor with built-in relays	20	$75,999.00	$11,125.61	$87,124.61
Sign Lighting	93	$99,552.05	$26,207.98	$125,760.03
Totals:	**1,327**	**$3,228,853.47**	**$1,032,635.81**	**$4,261,489.28**

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

6.3.1.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Lighting Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 6. Data points checked between project applications and program tacking including quantity, pre/post wattages, model qualification, cost, facility type and hours. Below, Table 6-9 shows the project population, the number of projects checked and the overall precision.

Table 6-9: Prescriptive Lighting Program Verification Precision

Population	Sampled	Precision
744	80	90% ± 4.20%

Below, Table 6-10 shows the count of discrepancies found between program tracking and project-level data.

Table 6-10: Prescriptive Lighting Program Verification Findings

Count Correction	Location Correction	Hours Correction	Wattage Correction
0	0	0	6

Six sign lighting projects had 'existing' and 'proposed' wattage reversed entries reversed.

6.3.1.2 Impact Analysis

The Evaluators calculated verified savings by using a standard engineering algorithm:

$$kWh_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times AOH \times ISR$$

Where:

Nfixt(i), pre = Pre-retrofit number of fixtures of type i
Nfixt(i), post = Post-retrofit number of fixtures of type i
Wfixt(i), pre = Rated wattage of pre-retrofit fixtures of type i (Standard Wattage Table developed from RTF materials)
Wfixt(i), post = Rated wattage of post-retrofit fixtures of type i (Varies). Self-reported, verified.
AOH = Annual operating hours for specified space type (Varies). Self-reported. Reported weekly hours were divided by seven, then multiplied by 365.25.
ISR = The In-Service Rate, based on type. RTF estimates. See Table 6-11 below.

Table 6-11: Lighting In-Service Rates

Type	ISR
Fixture	96.4%
Linear	98.3%
Pin-based	90.0%
Fixture	100.0%[10]

[10] Unlike lamps, the RTF does not provide ISRs for dedicated fixtures. Due to the lower likelihood of integral fixture being stored, comined with survey responses from program participants, the ISR for efficient fixtures is 100%.

The Evaluators conducted surveys of 208 program participants and asked participants if the rebated equipment was installed and operating. The response rate was too low to otain statistically significant results, but corroborated RTF estimates.

6.3.1.3 Verified Savings

The verified savings for the program is 11,810,424 kWh with a realization rate of 94.7%, as displayed in Table 6-7. Two factors affected the overall realization rate: The first is that annual hours in expected savings calculations were calculated using 365 days/year, which does not account for leap years. Verified savings calculations developed hours using 365.25 days/year, slightly raising realization. However, claimed savings calculations did not include in-service rates. The Evaluators used the RTF Mistream Lighting work books and assigned ISRs according to the rates shown above in Table 6-11, resulting in slightly lower verified savings than expected.

6.3.2 Small Business Lighting Program

New in 2024, the Small Business Lighting Program is a non-residential direct install lighting program implemented by Resource Innovations. The program offers lighting and controls assessments, equipment and installation for commercial customers on rate schedules 11 or 12.

To participate, businesses fill out a request in the Avista website and then are contacted by a program partner. An on-site assessment is scheduled to identify potential lighting and sensor upgrades needed and elligibiity is verified. Measures are then installed at low/no cost to the participant and incentivized at $0.40 - $0.65/kWh.

Table 6-12 summarizes the measures offered under this program.

Table 6-12: Small Business Lighting Program Measures

Measure	Savings Source
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W	Prescriptive Calulations with Custom Inputs
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	
LED Fixture - replacing FLT12, 400W - 1000W with OCC	
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	
LED Retrofit Kit - replacing FLT12, 400W - 1000W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W with OCC	
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W with OCC	
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W with OCC	
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W with OCC	
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W with OCC	
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W with OCC	
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W	
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W	
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W	

Small Business Lighting Program impact evaluation by measure, and then are summarized in Table 6-13.

Table 6-13: Small Business Lighting Program Verified Electric Savings

Measure	Count of Measures	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate

LED Fixture - replacing CFL Screw-in/Pin-based, 8W - 40W	136	18,973	18,973	18,973	100.0%
LED Fixture - replacing FLT12, 400W - 1000W	1025	614,733	614,741	614,741	100.0%
LED Fixture - replacing FLT12, 400W - 1000W with OCC	2496	2,122,319	1,800,114	1,800,114	84.8%
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W	79	36,376	36,424	36,424	100.1%
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W with OCC	805	920,502	832,355	832,355	90.4%
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W	871	270,947	270,947	270,947	100.0%
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	1066	697,187	639,356	639,356	91.7%
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W	66	48,261	48,261	48,261	100.0%
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W with OCC	14	22,847	19,614	19,614	85.8%
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W	2298	862,255	861,710	861,710	99.9%
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W with OCC	210	125,264	99,173	99,173	79.2%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W	237	77,170	77,170	77,170	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W with OCC	23	19,395	17,331	17,331	89.4%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	331	168,686	168,686	168,686	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W with OCC	189	229,135	191,572	191,572	83.6%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	210	288,383	288,383	288,383	100.0%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W with OCC	23	46,369	37,858	37,858	81.6%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	359	548,694	548,126	548,126	99.9%
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	378	728,021	641,736	641,736	88.1%
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W	6804	643,602	643,602	643,602	100.0%

LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W with OCC	9	2,653	2,653	2,653	100.0%
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W	478	48,668	48,416	48,416	99.5%
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W	25138	1,753,459	1,753,411	1,753,411	100.0%
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	82	26,845	23,796	23,796	88.6%
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W	3223	897,010	897,010	897,010	100.0%
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W with OCC	407	225,375	181,686	181,686	80.6%
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, < 100W	26	5,639	5,639	5,639	100.0%
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	19	8,680	8,680	8,680	100.0%
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	5	1,186	1,186	1,186	100.0%
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	1	1,130	1,130	1,130	100.0%
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	6	7,476	6,004	6,004	80.3%
LED Retrofit Kit - replacing FLT12, 400W - 1000W	30	26,910	26,910	26,910	100.0%
LED Retrofit Kit - replacing FLT12, 400W - 1000W with OCC	37	15,535	13,657	13,657	87.9%
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	53	13,357	11,360	11,360	85.1%
LED Retrofit Kit - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	76	84,536	84,536	84,536	100.0%
Totals	**47,210**	**11,607,579**	**10,922,204**	**10,922,204**	**94.1%**

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

Table 6-14: Small Business Lighting Lighting Program Costs by Measure

Measure	Measure Count (Savings Units)	Total Electric Incentives	Measure Costs	Total Costs
LED Fixture - replacing CFL Screw-in/Pin-based, 8W - 40W	136	$19,055.25	$1,645.36	$20,700.61
LED Fixture - replacing FLT12, 400W - 1000W	1,025	$395,524.47	$53,311.45	$448,835.92

LED Fixture - replacing FLT12, 400W - 1000W with OCC	2,496	$1,425,333.48	$156,109.22	$1,581,442.70
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W	79	$27,850.23	$3,158.74	$31,008.97
LED Fixture - replacing FLT5: 2ft to 8ft, 14W - 54W with OCC	805	$617,647.31	$72,183.34	$689,830.65
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W	871	$167,154.94	$23,496.99	$190,651.93
LED Fixture - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	1,066	$482,752.86	$55,446.16	$538,199.02
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W	66	$27,201.70	$4,284.05	$31,485.75
LED Fixture - replacing Halogen/Incandescent lamp, 150W - 1500W with OCC	14	$13,402.82	$1,741.09	$15,143.91
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W	2,298	$528,225.57	$76,492.21	$604,717.78
LED Fixture - replacing Halogen/Incandescent lamp, 20-150W with OCC	210	$80,631.90	$8,803.35	$89,435.25
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W	237	$50,763.49	$6,850.18	$57,613.67
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, < 100W with OCC	23	$12,656.85	$1,538.40	$14,195.25
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	331	$111,260.54	$14,973.96	$126,234.50
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W with OCC	189	$89,183.70	$17,005.43	$106,189.13
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	210	$182,563.72	$25,599.15	$208,162.87
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W with OCC	23	$49,988.06	$3,360.60	$53,348.66
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	359	$367,181.02	$48,656.00	$415,837.02
LED Fixture - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	378	$508,475.59	$56,965.60	$565,441.19
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W	6,804	$260,600.59	$55,814.39	$316,414.98
LED Replacement Lamp - replacing FLT12: 2ft to 8ft, 34W - 80W with OCC	9	$916.39	$230.10	$1,146.49
LED Replacement Lamp - replacing FLT5: 2ft to 8ft, 17W - 54W	478	$21,079.52	$4,198.74	$25,278.26
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W	25,138	$710,524.55	$152,059.03	$862,583.58
LED Replacement Lamp - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	82	$14,653.26	$2,063.63	$16,716.89
LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W	3,223	$338,742.17	$77,790.31	$416,532.48

LED Replacement Lamp - replacing Halogen/Incandescent lamp, 20-150W with OCC	407	$79,910.02	$15,756.11	$95,666.13
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, < 100W	26	$2,645.80	$500.58	$3,146.38
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 100W - 250W	19	$5,970.61	$770.52	$6,741.13
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 320W - 400W	5	$807.00	$105.24	$912.24
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	1	$451.96	$100.30	$552.26
LED Replacement Lamp - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W with OCC	6	$3,230.57	$532.95	$3,763.52
LED Retrofit Kit - replacing FLT12, 400W - 1000W	30	$9,170.00	$2,333.66	$11,503.66
LED Retrofit Kit - replacing FLT12, 400W - 1000W with OCC	37	$10,877.30	$1,184.35	$12,061.65
LED Retrofit Kit - replacing FLT8: 2ft to 8ft, 17W - 59W with OCC	53	$13,374.02	$985.15	$14,359.17
LED Retrofit Kit - replacing Metal Halide/High Pressure Sodium lamp, 400W - 1000W	76	$37,936.71	$7,504.12	$45,440.83
Totals:	**47,210**	**$6,667,743.97**	**$953,550.44**	**$7,621,294.41**

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

6.3.2.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Small Business Lighting Program. The Evaluators reviewed a representative sample (80) of projects, verifying that wattages listed in program tracking data were those specified by product literature. For measures listed as having integrated occupancy sensors, this configuration was also checked. No discrepancies were found. Below, Table 6-15 shows the project population, the number of projects checked and the overall precision.

Table 6-15: Small Business Lighting Program Verification Precision

Population	Sampled	Precision
407	80	90% ± 1.70%

6.3.2.2 Impact Analysis

The Evaluators calculated verified savings by using a standard engineering algorithms:

6.3.2.3 Lighting Fixtures

$$kWh_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times AOH \times ISR$$

Where:

Nfixt(i), pre = Pre-retrofit number of fixtures of type i
Nfixt(i), post = Post-retrofit number of fixtures of type i
Wfixt(i), pre = Rated wattage of pre-retrofit fixtures of type i (Standard Wattage Table developed from RTF materials)
Wfixt(i), post = Rated wattage of post-retrofit fixtures of type i (Varies). Self-reported, verified.
AOH = Annual operating hours for specified space type (Varies). Self-reported. Reported weekly hours were divided by seven, then multiplied by 365.25.
ISR = The In-Service Rate. Due to the DI delivery channel, this is assumed to be 100%.

6.3.2.4 Occupancy Sensors

$$kWh_{savings} = \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \times AOH \times reduction$$

Where:

Nfixt(i), post = Post-retrofit number of fixtures of type i
Wfixt(i), post = Rated wattage of post-retrofit fixtures of type i (Varies). Self-reported, verified.
AOH = Annual operating hours for specified space type (Varies). Self-reported.
reduction = The reduction in operating hours as a result of the installation of occupancy sensors, 32%for fixture/ceiling mounted sensors.

6.3.2.5 Verified Savings

The verified savings for the program is 10,922,204 kWh with a realization rate of 94.1%, as displayed in Table 6-13. For measures without occupancy sensors, realization is ±1% of expectations, with any differences likely due to rounding. For measures with occupancy sesnsor, the Evaluators found that expected savings were calculated by applying the occupancy sensor reduction factor both the operating hours and the connected load of the lighting retrofit , slightly 'double counting' savings. To account for occupancy sensor savings in verified calculations, the Evaluators applied the 32% reduction to the operation of the post-install equipment, then added this value to the retrofit savings, resulting in slightly lower verified savings.

6.3.2.6 Reccomendations for Future Program Cycles

- Report savings from lighting retrofits and sensor installation separately.
- Specify the type of control method employed.
- In tracking data, denote the wattage controlled by each installed occupancy sensor.
- If possible, record building type, vintage and HVAC configuration to calculate and include additional savings resulting from HVAC interactive effects.

6.3.3 Prescriptive HVAC VFD Program

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

The Prescriptive HVAC Variable Frequency Drive Retrofit Program is offered for retrofitting VFDs on existing HVAC equipment. Customers must submit a completed rebate form, invoices, and documentation to verify the horsepower of the motor on which the VFD was installed within 90 days of installation. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. The website is also used to communicate program requirements, incentives, and forms.

Table 6-16 summarizes the measures rebated in PY2023 under this program.

Table 6-16: Prescriptive HVAC VFD Program Measures

Measure	Impact Analysis Methodology
HVAC Cooling Pump	Avista TRM UES
HVAC Fan	Avista TRM UES
HVAC Heating Pump or Combo	Avista TRM UES

The following table summarizes the verified electric energy savings for the Prescriptive HVAC VFD Program impact evaluation.

Table 6-17: Prescriptive HVAC VFD Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
VFD on Supply/Exhaust Fan	1	329,595	329,595	329,595	100.0%
Smart Thermostat	1	257	257	257	100.0%
Totals	**2**	**329,852**	**329,852**	**329,852**	**100.0%**

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

Table 6-18: Prescriptive HVAC VFD Program Costs by Measure

Measure	Measure Count	Measure Count (Horsepower)	Total Electric Incentive	Measure Costs	Total Costs
VFD on Supply/Exhaust Fan	11	6	$64,500.00	$21,229.99	$85,729.99
Smart Thermostat	1	10	0	$8.08	$8.08
Totals	**12**	**15**	**$64,500.00**	**$21,238.06**	**$85,738.06**

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

6.3.3.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive HVAC VFD Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 6. Verification of project documents included data points such as quantity, motor horsepower, installation location and costs of the equipment. Table 6-19 shows the project population, the number of projects checked and the overall precision.

Table 6-19: Prescriptive HVAC VFD Program Verification Precision

Population	Sampled	Precision
1	1	0.0%

The Evaluators did not find any deviations between project applications and program tracking data.

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

6.3.3.2 Impact Analysis

This section summarizes the verified savings results for the Prescriptive HVAC VFD Program. The Evaluators calculated verified savings for VFD measures using the Avista TRM. The Evaluators attempted to use the RTF to calculate verified savings, however found project documentation to be insufficient to determine key characteristics necessary to assign RTF UES. A recommendation is made below to address this. Final verified savings were calculated by applying the appropriate TRM UES to a census of measures.

6.3.3.3 Verified Savings

The Evaluators reviewed and applied the current TRM UES values to verified tracking data to estimate net program savings for this measure. The verified savings for the program is 329,852 kWh with a realization rate of 100.00%, as displayed in Table 6-17.

6.3.4 Food Service Equipment Program

The Food Service Equipment Program offers incentives for commercial customers who purchase or replace food service equipment with ENERGY STAR-qualified equipment. This prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista electricity to operate the equipment submitted for a rebate are eligible for this program. Customers must submit a completed rebate form and invoices within 90 days after the installation has been completed. Avista will send incentive checks to the customers or their designees after each project is approved. The website is also used to communicate program requirements, incentives, and forms.

Table 6-20 summarizes the measures rebated in PY2023 under this program.

Table 6-20: Prescriptive Food Service Equipment Program Measures

Measure	Impact Analysis Methodology
Convection oven	RTF, Convection Oven v4.2
Combination oven	RTF, Commercial Cooking RTF Combination Ovens v4.2
Griddle	RTF, Griddles v1.2
Rack oven	RTF, Rack Ovens v1.2
Dishwasher	Avista TRM, Non-Res Dishwashers (multiple)
Energy Star ice machine	RTF, Commercial ENERGY STAR™ Ice Makers v1.3
Fryer	RTF, Commercial Cooking Fryer v4.2
Hot food holding cart	RTF, Commercial Cooking Hot Food Cabinet v4.2
Steam cookers	RTF, Commercial Cooking Steamer v4.2
Pre-rinse sprayer	Avista TRM, Non-Res Pre-Rinse Sprayer (multiple)
Overwrapper	RTF, On-Demand Overwrappers v1.1

The following table summarizes the verified electric energy savings for the Prescriptive Food Service Equipment Program impact evaluation.

Table 6-21: Prescriptive Food Service Equipment Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Commercial Convection Oven Electric full size	1	1,954	2,991	1,496	76.6%
Commercial Dishwasher Low Temp Electric Hot Water	1	3,801	3,801	3,801	100.0%
Hot Food Holding Cabinet Less Than 15 Cubic Feet HFHC (1/2 size)	1	398	398	398	99.9%
Totals	**3**	**6,153**	**7,190**	**5,695**	**92.6%**

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

Table 6-22: Prescriptive Food Service Equipment Program Costs by Measure

Measure	Measure Count	Total Electric Incentives	Total Non-Incentive Costs	Total Costs
Commercial Convection Oven Electric full size	2	$400.00	$85.27	$485.27
Commercial Dishwasher Low Temp Electric Hot Water	1	$750.00	$319.19	$1,069.19

Hot Food Holding Cabinet Less Than 15 Cubic Feet HFHC (1/2 size)	1	$80.00	$19.83	$99.83
Totals	**4**	**$1,230.00**	**$424.29**	**$1,654.29**

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

6.3.4.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Food Service Equipment Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 6. Data points checked between project applications and program tacking include fuel type, capacity, ENERGYSTAR® status, quantity and measure cost values.

Table 6-22 shows the project population, the number of projects checked and the overall precision.

Table 6-23: Prescriptive Food Service Equipment Program Verification Precision

Population	Sampled	Precision
3	3	0.0%

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

6.3.4.2 Impact Analysis

This section summarizes the verified savings results for the Prescriptive Food Service Equipment Program. The Evaluators calculated verified savings for the food service measures using RTF UES in place at the time the savings goals for the program was finalized. For measures where RTF UES were not available or unsuitable, the Avista TRM was used to verify savings. Final verified savings were calculated by applying the appropriate UES to a census of measures.

6.3.4.3 Verified Savings

The Evaluators reviewed and applied the appropriate UES values to verified tracking data to estimate program savings for these measures. Verified savings for the program is 5,695 kWh with a realization rate of 92.6%, as displayed in Table 6-21. For one measure, Convection Ovens, the Evaluators found that claimed savings used value of 977 kWh savings per measure from the Avista TRM. The RTF specifies 1,496 kWh for this measure, resulting in slightly higher verified savings. The Evaluators did not find any other deviations from RTF/TRM UES.

6.3.5 Grocer Program

This program offers incentives to customers who increase the energy efficiency of their refrigerated cases and related grocery equipment. Refrigeration often represents the primary electricity expense in a grocery store or supermarket. The prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista fuel for the measure applied for are eligible.

Customers must submit a completed rebate form and invoice within 90 days after the installation has been completed. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. The website is also used to communicate program requirements, incentives, and forms.

Table 6-24 summarizes the measures rebated in PY2023 under this program.

Table 6-24: Grocer Program Measures

Measure	Impact Analysis Methodology
Refrigerator Case Lighting	RTF EUS
ASH Controls	RTF EUS
Door Gaskets	Avista TRM UES
Floating Head Pressure Controls	RTF EUS
Strip Curtains	RTF EUS
Walk-In ECM Controllers	RTF EUS
ECMs on Evaporator Fans	Avista TRM UES
ECM Replacing Evaporator PS and PSC	RTF EUS
Refrigerator Case Lighting	RTF Commercial Grocery Display Case Lighting v1.2
ASH Controls	RTF EUS
Door Gaskets	RTF EUS
Floating Head Pressure Controls	RTF EUS
Strip Curtains	RTF EUS

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

Table 6-25: Grocer Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Med Temp ECM	1	688	688	688	100.0%
Case Light	1	15,600	15,600	15,600	100.0%
Totals:	**2**	**16,288**	**16,288**	**16,288**	**100.0%**

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

Table 6-26: Grocer Program Costs by Measure

Measure	Measure Count	Total Electric Incentives	Total Non-Incentive Costs	Total Costs
Med Temp ECM	1	$50.00	$69.86	$119.86
Case Light	150	$2,250.00	$800.20	$3,050.20
Totals:	**151**	**$2,300.00**	**$870.06**	**$3,170.06**

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

6.3.5.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Grocer Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 6. Data points checked between project applications and program tacking including measure specification, quantity and measure cost values.

Table 6-27 shows the project population, the number of projects checked and the overall precision.

Table 6-27: Verification Precision

Population	Sampled	Precision
2	2	0.0%

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

6.3.5.2 Impact Analysis

This section summarizes the verified savings results for the Prescriptive Food Service Equipment Program. The Evaluators calculated verified savings for the food service measures using RTF UES in place at the time the savings goals for the program was finalized. Final verified savings were calculated by applying the appropriate UES to a census of measures.

6.3.5.3 Verified Savings

The Evaluators reviewed and applied the appropriate UES values to verified tracking data to estimate program savings for these measures. The verified savings for the program is 16,288 kWh with a realization rate of 100.00%, as displayed in Table 6-26.

6.3.6 Prescriptive Shell Program

The Commercial Prescriptive Shell Program offers incentives to commercial customers who improve the envelopes of their existing buildings by adding insulation, which may make a business more energy-efficient and comfortable. This prescriptive rebate approach issues payment to the customer after the measure has been installed by a licensed contractor. Commercial customers must have an annual heating footprint for a fuel provided by Avista.

Customers must submit a completed rebate form, invoices, and an insulation certificate within 90 days after the installation has been completed. Avista will send incentive checks to customers or their designees after each project is approved. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. The website is also used to communicate program requirements, incentives, and forms.

Table 6-28 summarizes the measures rebated in PY2023 under this program.

Table 6-28: Prescriptive Shell Program Measures

Measure	Impact Analysis Methodology
Attic Insulation	Avista TRM UES
Roof Insulation	Avista TRM UES
Wall Insulation	Avista TRM UES

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

Table 6-29: Prescriptive Shell Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
Attic =< R11 to R45+	16	37,488	59,998	59,998	160.0%
Wall =< R4 to 19+	5	13,942	22,186	22,186	159.1%
Attic =< R11 to R30-R44	4	426	4,829	4,829	1133.3%
Totals	**25**	**51,856**	**87,012**	**87,012**	**167.8%**

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

Table 6-30 Prescriptive Shell Program Costs by Measure

Measure	Measure Count (Square Feet Installed)	Incentive Costs	Non-Incentive Costs	Total Costs
Attic =< R11 to R30-R44	46,364	$31,766.57	$8,713.44	$40,480.01
Attic =< R11 to R45+	5,832	$3,676.24	$3,222.02	$6,898.26
Wall =< R4 to 19+	6,334	$156.20	$701.26	$857.46
Totals	**58,530**	**$35,599.01**	**$12,636.72**	**$48,235.73**

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

6.3.6.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Shell Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 6. Data points checked between project applications and program tacking include R-levels, square footage of installation, HVAC configuration and measure cost values. Below, Table 6-31 shows the project population, the number of projects checked and the overall precision.

Table 6-31: Prescriptive Shell Program Verification Precision

Population	Sampled	Precision
8	8	0.0%

In one project, the Evaluators found the both the beginning R and final R values differed between the application and the program tracking data. After correction, no adjustments to savings were necessary.

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

6.3.6.2 Impact Analysis

This section summarizes the verified savings results for the Prescriptive Shell Program. The Evaluators calculated verified savings for the insulation measures using the 2022 Avista TRM, in place at the time the savings goals for the program was finalized. Final verified savings were calculated by applying the appropriate UES to a census of measures.

6.3.6.3 Verified Savings

The Evaluators reviewed and applied the appropriate UES values to verified tracking data to estimate program savings for these measures. The verified savings for the program is 87,012 kWh with a realization rate of 167.8%, as displayed in Table 6-29.

Upon analysis, the Evaluators found that UES used to develop claimed savings did not correspond to UES found in the 2022 Avista TRM[11]. For this measure, savings is given by multiplying a savings factor by the square feet of insulation installed. Using correct multipliers resulted in higher verified savings. Table 6-32 below shows the measure, the claimed savings UES and the verified (TRM) UES multipliers.

Table 6-32: Prescriptive Shell Program Ex Ante and Ex Post Savings Multipliers

Measure	Claimed Savings Multiplier	Adjusted and Verified Savings Multiplier
Attic =< R11 to R30-R44	0.09	1.02
Attic =< R11 to R45+	0.13	1.39
Wall =< R4 to R11-R19	0.27	2.82
Wall =< R4 to 19+	0.39	4.11

[11] These measures did not having kWh savings entries in the 2023 Avista TRM, so the evaluation was carried out using 2022 Avista TRM.

6.3.7 Green Motors Program

The Green Motors Program ensures quality rewinding that results in the motor maintaining its original efficiency, which is commonly called a "green rewind." The Green Motors Practices Group (GMPG) is a non-profit organization that identifies, promotes, and verifies only excellent member motor service centers. These companies are committed to consistently producing repair/rewinds that retain or improve reliability and efficiency and provide on-site motor driven systems assistance.

The incentive for this program is $1 per HP of the motor being rewound, up to $10,000 for 5,000 HP, and is taken directly off the customer bill at the service center. There is also a $1 per HP fee paid to the service center for participating.

Table 6-33 summarizes the measures rebated in PY2023 under this program.

Table 6-33: Green Motors Program Measures

Measure	Impact Analysis Methodology
Motor Rewind (Industrial)	RTF Ind_and_Ag_GreenMotorRewind_v3_1

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

Table 6-34: Green Motors Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
300 HP Ind	1	4,535	4,535	4,535	100.0%
Totals	**1**	**4,535**	**4,535**	**4,535**	**100.0%**

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

Table 6-35: Green Motors Program Costs by Measure

Measure	Measure Count	Incentive Costs	Total Non-Incentive Costs	Total Costs
300 HP Ind	1	$650.00	$260.29	$910.29
Totals	**1**	**$650.00**	**$260.29**	**$910.29**

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

6.3.7.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Green Motors Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 6. Data points checked between project applications and program tacking including operating hours, RPM, motor horsepower and measure cost values.

Table 6-36 shows the project population, the number of projects checked and the overall precision.

Table 6-36: Green Motors Program Verification Precision

Population	Sampled	Precision
1	1	0.0%

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

6.3.7.2 Impact Analysis

The Evaluators reviewed and applied the appropriate UES values to verified tracking data to estimate program savings for these measures. The Evaluators did not find any deviations from TRM UES. Final verified savings were calculated by applying the appropriate UES to a census of measures.

6.3.7.3 Verified Savings

The verified savings for the program is 4,535 kWh with a realization rate of 100.0%, as displayed in Table 6-34.

6.3.8 Midstream Program (Non-Residential)

Avista designed the Midstream Program to shift the onus of applying for rebates from end-use customers to distributors. Not only does this reduce customers'/contractors' administrative burden (i.e., no need to submit paperwork tracking energy efficient installations), but it is also anticipated to increase high-efficiency equipment options at competitive prices. Midstream rebates provide an immediate discount on eligible products, which appear as a line item on customer invoices. Starting on July 1, 2023, the Midstream Program replaced Avista's residential and commercial downstream space-heating and water-heating programs as well as the commercial food service equipment rebate program.

Through the Midstream Program, Avista seeks to achieve three overall objectives:

- Provide greater long-term, cost-effective savings for residential and commercial customers alike
- Reduce Avista's administrative burden in processing space-heating, water-heating, and commercial kitchen equipment applications
- Accelerate the market transformation of energy-efficient equipment

The Midstream Program provides bought-down equipment to both Residential and Commercial entities. This chapter discusses and presents results only for the non-residential measures. See Section 3.2.8 for the residential portion.

Table 6-37 summarizes the measures rebated in PY2023 under this program.

Table 6-37: Non-Residential Midstream Program Measures

Measure	Measure	Impact Analysis Methodology
Food Service	Convection Oven	RTF Convection Ovens
	Dishwasher	Avista TRM
	Ice Machine	RTF Ice Makers
HVAC	Water Source Heat Pump	Engineering algorithm
	Mini/Multi Split	Engineering algorithm
	Packaged Unitary Equipment	Engineering algorithm

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

Table 6-38: Non-Residential Midstream Program Verified Electric Savings

Measure	PY2023 Participation (Projects)	Expected Savings (kWh)	Adjusted kWh	Verified Savings (kWh)	Realization Rate
Convection Oven	2	10,380	10,380	5,982	57.6%
Dishwasher	2	15,621	15,621	3,801	24.3%
Ice Machine	5	3,409	3,409	1,293	37.9%
Mini/Multi Split	20	37,259	19,993	19,897	53.4%
Packaged Unitary Equipment	8	11,261	2,141	25,838	229.4%
Water Source Heat Pump	2	1,488	4,050	1,481	99.5%
Totals	**38**	**79,419**	**55,595**	**58,291**	**73.4%**

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

Table 6-39: Non-Residential Midstream Program Costs by Measure

Measure	Measure Count	Incentive Costs	Total Non-Incentive Costs	Total Costs
Convection Oven	4	$3,838.82	$341.00	$4,179.82
Dishwasher	2	$4,935.63	$319.19	$5,254.83
Ice Machine	5	$1,325.31	$73.68	$1,398.99
Mini/Multi Split	21	$10,373.97	$2,524.72	$12,898.69
Packaged Unitary Equipment	8	$7,220.65	$2,220.12	$9,440.76
Water Source Heat Pump	6	$1,003.12	$199.45	$1,202.58
Totals	**46**	**$28,697.50**	**$5,678.16**	**$34,375.66**

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

6.3.8.1 Database Review & Document Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Midstream Program. Due to the program delivery pathway, the Program does not include project applications. For this program, the Evaluators examined a representative sample of projects to ensure that program tracking data accurately reflected measure characteristics used in assessing savings. Data points checked include: equipment configurations, capacities and efficiency levels.

Table 6-36 shows the project population, the number of projects checked and the overall precision.

Table 6-40: Non-Residential Midstream Program Verification Precision

Population	Sampled	Precision
39	39	0.0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Midstream Program and no substantive equipment specifications differed from those in the tracking data.

6.3.8.2 Impact Analysis

Once verification was completed, to estimate program savings for these measures the Evaluators reviewed and applied the appropriate UES values from the RTF. If a measure was not covered by an RTF entry then a UEF from the Avista TRM was used as the source for verified savings. For measures not included in either the RTF or Avista TRM, verified savings was calculated using standard engineering algorithms with project-specific specs and RTF inputs.

6.3.8.3 Verified Savings

The verified savings for the program is 58,291 kWh with a realization rate of 73.40%, as displayed in Table 6-39.

Adjusted savings comes from the program planning workbooks used by program implementors. Results show that these values were not applied to tracking data as originally intended.

Verified savings for food service equipment was taken from RTF workbooks and is specific to the equipment configuration(s). Expected savings came from UES in the program implementation

workbook. This workbook did not contain supporting calculations for these measures, precluding determining how these estimates resulted in significantly different estimates from the RTF.

Savings for Mini/Multi Splits, Package/Unitary Equipment and Water Source Heat Pumps was calculated using standard engineering algorithms, with equipment-specific inputs for capacity and efficiency, and EFLH values from the Midstream planning workbook. Results for Mini Splits and Package HVAC equipment varied considerably from expected savings. Adjusted savings were calculated using unit savings multipliers from the Midstream planning book, which resulted in significantly different estimates than those claimed for these measures and WSHPs, indicating that savings values are not being applied consistently.

6.3.9 Site-Specific Program

The Site-Specific Program provides calculated incentives to support the installation of qualifying energy efficiency equipment at commercial/industrial sites. These projects typically have a higher degree of complexity than the traditional prescriptive offerings and rely on custom calculations of savings and incentive levels. Examples of these projects include process improvements, upgrades to specialized equipment used in manufacturing, lighting installations that rely on specialized controls, and other measures designed around the customer's specific needs.

Avista's Site-Specific Program is a major component in its non-residential electric offerings. The program approach strives for a flexible response to energy efficiency projects that have demonstrable kWh savings within program criteria. The majority of site-specific kWh savings are composed of custom lighting projects and custom HVAC, envelope, and industrial process load projects that do not fit the prescriptive path. The Site-Specific Program is available to all commercial/industrial retail electric customers, and typically brings in the largest portion of savings to the overall energy efficiency portfolio.

The following table summarizes the verified electric energy savings for the Site-Specific Program impact evaluation.

Table 6-41: Site-Specific Program Verified Electric Savings

Type of Project	PY2023 Participation	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Verified Realization Rate
Lighting	28	9,166,364	9,166,364	10,293,194	112.3%
Non-Lighting	26	1,748,500	1,748,500	1,979,722	113.2%
Totals	**54**	**10,914,864**	**10,914,864**	**12,272,916**	**112.4%**

The Site-Specific Program displayed verified savings of 12,272,916 kWh with a realization rate of 112.4% against the expected savings for the program.

Table 6-42: Site-Specific Program Costs

Type of Project	Incentive Costs	Non-Incentive Costs	Total Costs
Lighting	$5,489,105.00	$1,084,128.77	$6,573,233.77
Non-Lighting	$1,357,180.00	$208,513.86	$1,565,693.86
Totals	**$6,846,285.00**	**$1,292,642.62**	**$8,138,927.62**

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

6.3.9.1 Sample Design

Unlike other non-residential programs, completing a census review of all Site-Specific projects is not feasible. To ensure accurate verified savings estimates, the Evaluators developed a sample of representative sites to inspect using the Stratified Random Sampling procedure detailed in Section 2.2.2.3. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than random sampling would require, by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results.

The participant population for the Site-Specific Program was divided into five strata. Table 6-43 summarizes the strata boundaries and sample frames for the Site-Specific Program.

Table 6-43: Site-Specific Program Sample Design

Statistic Description	Stratum 1	Stratum 2	Stratum3	Stratum 4	Stratum 5	Totals
Strata boundaries	< 14,000	14,001 - 50,000	50,001 - 200,000	200,001 - 900,000	> 900,001	
Number of	19	10	17	4	4	**54**
Total kWh	111,961	235,450	2,175,713	1,106,734	7,285,006	**10,914,864**
Average kWh	5,893	23,545	127,983	276,684	1,821,252	**202,127**
Standard	4,621	7,458	48,548	28,512	681,785	**497,249**
Coefficient of variation	0.784	0.317	0.379	0.288	0.374	**2.460**
Final design	**3**	**4**	**4**	**2**	**4**	**17**

Four of the highest-savings sites (both in the 5th stratum) were also specifically selected for verification and analysis. Verified sampling precision is 6.01% at 90%.

Table 6-44: Site-Specific Program Sample Summary

# Projects in Population	Review Sample Size	Precision
54	17	6.00%

6.3.9.2 Project Document Review and On-Site Visits

Once representative projects were selected, the Evaluators obtained all project-related documentation for review. These documents typically included spec sheets, building characteristics, calculators, invoices, project photos and trending data. This information allowed the Evaluators to replicate claimed savings estimates and develop M&V plans to be used in assessing verified savings and collecting on-site data.

Using project-specific M&V plans, the Evaluators visited sampled to verify measure installation and operating parameters, as well as building parameters such as square footage and HVAC configurations. The Evaluators were able to conduct visits at 11 of the 15 sampled projects[12].

6.3.9.3 Impact Approaches

The majority (12/17) projects were lighting projects and could be analyze using standard savings algorithms. Below, the two equations show the algorithms used in calculating savings from lighting projects.

$$kWh_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times AOH \times IEF$$

$$kW_{savings} = \sum \left(\left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{pre} - \left[N_{fixt(i)} \times \frac{W_{fixt(i)}}{1000} \right]_{post} \right) \times CF \times IEF$$

Where:

Nfixt(i), pre = Pre-retrofit number of fixtures of type i
Nfixt(i), post = Post-retrofit number of fixtures of type i

[12] Two projects were located at the same site, necessitating only a single visit.

Wfixt(i), pre = Rated wattage of pre-retrofit fixtures of type i (Standard Wattage Table developed from RTF materials)
Wfixt(i), post = Rated wattage of post-retrofit fixtures of type i (Taken from project spec sheets)
CF = Peak demand coincidence factor (calculated from verified operating schedules)
AOH = Annual operating hours for specified space type (Varies. Collected during M&V site visits)
IEF = Site-Specific Interactive effects factor specific to building and Site-Specific configuration (developed from RTF materials)

For non-lighting projects, specific methodology varies between IPMVP Options A-C, and is described as needed in individual site reports, located in Appendix C: Site-Specific Program Project Reports.

6.3.9.4 Site-Level Realization

Adjusted and verified savings were developed for each sampled site. The realization rates for sites within each stratum were then applied to the non-sampled sites within their respective stratum. Table 6-45 presents realization at the site level, with Table 6-46 presenting results at the stratum level.

Table 6-45: Site-Specific Expected, Adjusted and Verified kWh Savings by Project

Project ID	Expected kWh Savings	Adjusted kWh Savings	Verified kWh Savings	Realization Rate
SSLP_113852	3,431	3,431	3,431	100.0%
SSLP_113539	5,358	5,358	5,093	95.1%
SSLP_112667	13,207	13,207	13,339	101.0%
SSOP_117689	21,450	21,450	11,481	53.5%
SSOP_82514	14,520	14,520	14,520	100.0%
SSLP_116802	21,553	21,553	21,553	100.0%
SSLP_119029	25,711	25,711	25,711	100.0%
SSOP_82425	67,661	67,661	67,661	100.0%
SSLP_107183	107,816	107,816	192,761	178.8%
SSLP_108622	163,290	163,290	192,761	118.0%
SSOP_77513	192,868	192,868	189,291	98.1%
SSLP_107181	280,323	280,323	501,178	178.8%
SSOP_110087	386,851	386,851	396,662	102.5%
SSLP_116835	952,532	952,532	970,354	101.9%
SSLP_79541	1,602,747	1,602,747	1,602,747	100.0%
SSLP_80606	2,341,985	2,341,985	2,874,846	122.8%
SSLP_80607	2,387,742	2,387,742	2,387,742	100.0%
Totals:	**8,589,045**	**8,589,045**	**9,471,131**	**110.3%**

Table 6-46: Site-Specific Summary of kWh Savings by Sample Stratum

Stratum	Expected kWh Savings	Adjusted kWh Savings	Verified kWh Savings	Realization Rate
1	111,961	111,961	111,289	99.4%
2	235,450	235,450	207,250	88.0%

3	2,175,713	2,175,713	2,629,316	120.8%
4	1,106,734	1,106,734	1,489,372	134.6%
5	7,285,006	7,285,006	7,835,689	107.6%
Total	**10,914,864**	**10,914,864**	**12,272,916**	**112.4%**

6.3.9.5 Discussion of Non-100% Realization

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

- **SSLP_113539** Posted hours of operation are Monday through Friday, 8:00am until 4:30pm. Allowing an extra ½ hour per day for lights to operate briefly prior to open/after close, yields 2,348 annual hours of operation, slightly lower than those used in ex ante calculations (2,470). Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 36%, resulting in a lower verified peak kW reduction.
- **SSOP_117689** Models used to access therm savings from the natural gas side of the project did not account for increased burden placed on electrical systems, resulting is less saved kWh than originally expected.
- **SSLP_107183** The lighting operates for 18 hours per day from November 15th through April 15th, which is 2,736 hours annually. Expected savings calculations used 2,745 hours, slightly overestimating savings. Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 42%, resulting in a lower verified peak kW reduction.
- **SSLP_107181** Expected savings calculations used the full potential wattage of the post fixtures (660.7W), but on site the Evaluators found that all fixtures were operated at half wattage, 330.4W. Using the reduced wattage in verified savings calculations yielded higher savings. This adjustment also somewhat lowered the verified peak kW reduction, but this estimate was also affected by a change to the peak CF: By default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 37%. The combination of this adjustment and the lower operating wattage resulted in the lower verified peak kW reduction.
- **SSLP_116835** The lighting operates for 12 hours per day, 4,838 hours annually. This is slightly higher than the estimate used in expected savings calculations (4,303), resulting in slightly higher verified savings. Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 50%, resulting in a lower verified peak kW reduction.
- **SSLP_80606** The lighting operates for 18 hours per day from November 15th through April 15th, which is 2,736 hours annually. Expected savings calculations used 2,745 hours, slightly overestimating savings. Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 42%, resulting in a lower verified peak kW reduction.

- **SSOP_77513** Measured savings are lower than expectations.

Additionally, ex ante calculations for all lighting projects assumed an 80% chance that lighting would operate during times of peak demand. The Evaluators found that for multiple projects the lighting fixtures runs continuously, so there is a 100% chance of them operating during the peak period. The coincidence factor was adjusted from 80% to 100% for these measures.

Individual reports for each sampled site are included in Appendix C: Site-Specific Program Project Reports.

6.3.9.6 Verified Savings

The Site-Specific Program in total displays a realization rate of 112.40% with 12,272,916 kWh verified electric energy savings in the Washington service territory, as displayed in Table 6-41.

7. Appendix A: Billing Analysis Results

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

7.1 Shell Program

The results of the billing analysis for the Shell program are provided below. Table 61 shows customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis. A billing analysis was completed for measures that had at least 75 customers with single-measure installations. This ensured that measures would have a sufficient sample size after applying PSM data restrictions (e.g. sufficient pre- and post-period data). The billing analysis included participants in Washington and Idaho service territories to acquire the maximum number of customers possible. The billing analysis on individual measures did not find significant savings due to variability observed in the data. The results reported combine measures across Idaho and Washington to produce a statistically significant estimate. The following section reports the combined analysis.

Table 7-1: Measures Considered for Billing Analysis, Shell Program

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
E Attic Insulation With Electric Heat	✓	22*	
E Window Replc With Electric Heat	✓	78*	✓

*This count includes rebates from Washington and Idaho

The Evaluators were successful in creating a matched cohort for each of the measures with sufficient participation. Customers were matched on zip code (exact match) and their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household. The Evaluators were provided a considerable pool of control customers to draw upon, as shown in Table 7-2. Also shown in Table 62, are the impact of various restrictions on the number of treatment and control customers that were included in the final regression model. The “Starting Count” displays the beginning number of customers available prior to applying the data restrictions, while the “Ending Count” displays the number of customers after applying data restrictions and final matching.

Table 7-2: Cohort Restrictions, Shell Program

Measure	Data Restriction	# of Treatment Customers	# of Control Customers
G Attic Insulation With Natural Gas Heat	Starting Count	75	15,365
	Install Date Range: January 1, 2022 to June 30, 2022	75	15,365
	Control Group Usage Outlier (>2X max treatment usage)	70	15,354
	Incomplete Post-Period Bills (<6 months)	25	14,092

	Incomplete Pre-Period Bills (<10 months)	25	11,544
	Ending Count (Matched by PSM)	22	22
G Window Replc With Natural Gas Heat	Starting Count	254	15,365
	Install Date Range: January 1, 2022 to June 30, 2022	254	15,365
	Control Group Usage Outlier (>2X max treatment usage)	252	15,360
	Incomplete Post-Period Bills (<6 months)	81	14,095
	Incomplete Pre-Period Bills (<10 months)	81	11,546
	Ending Count (Matched by PSM)	78	78

Figure 7-1 and *Figure 7-2* display the density of each variable employed in propensity score matching for the combined measures, before and after conducting matching.

For the combined measures, the covariate balance shows moderate differences between the treatment and control groups before and after matching. Control usage seems to be substantially lower than treatment usage before matching; however, after running PSM, treatment and control groups are very similar on aggregate.

Figure 7-1: Covariate Balance Before Matching, Shell Attic Insulation and Shell Window Replacement

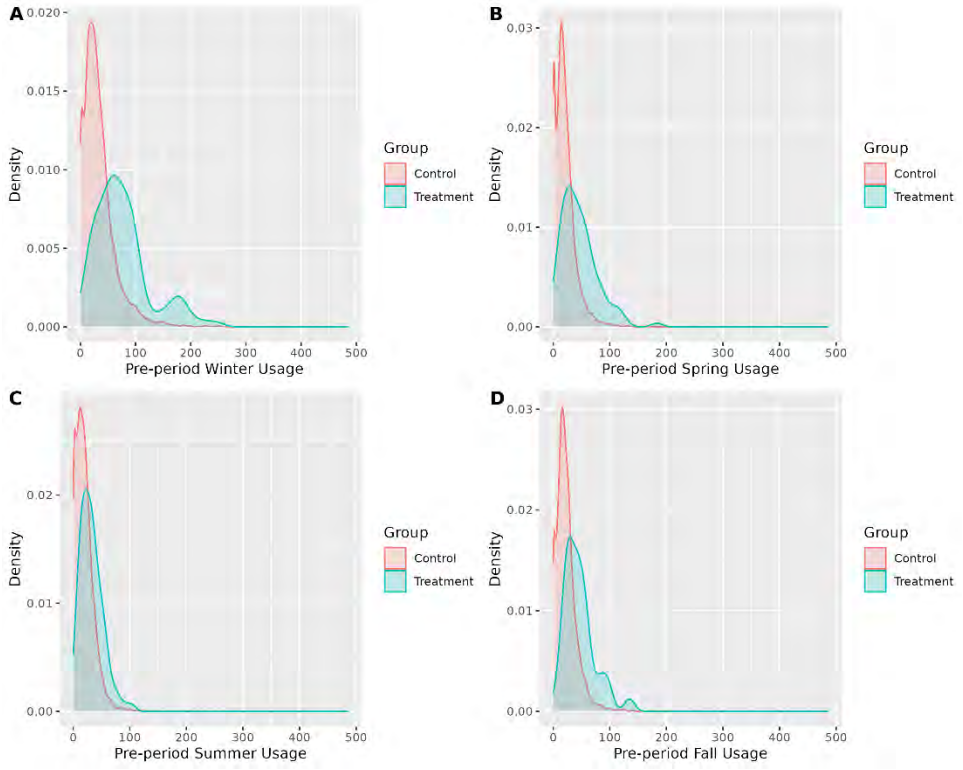
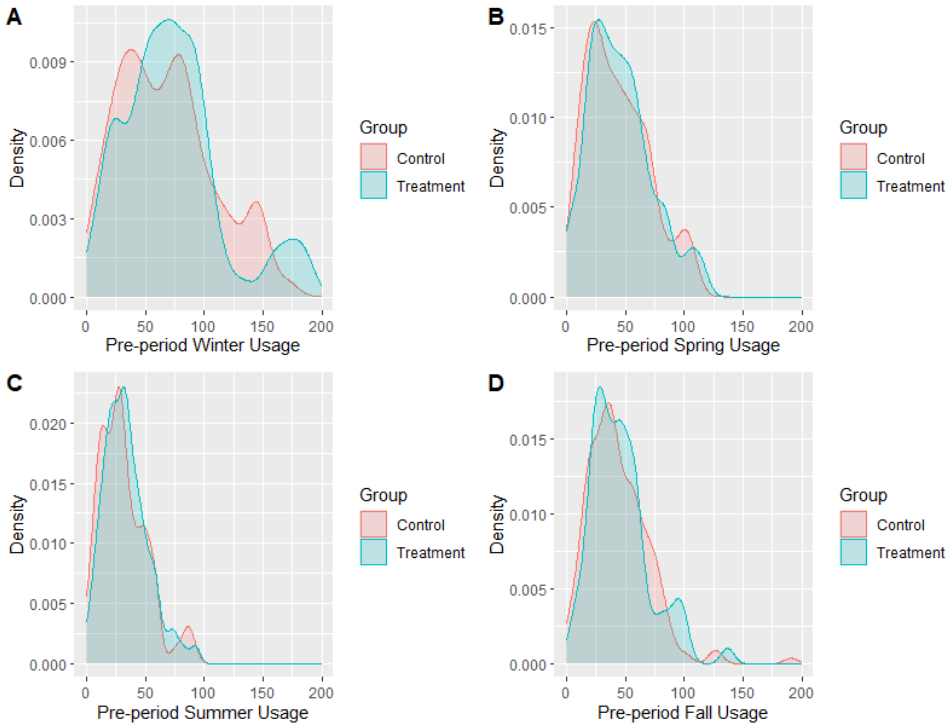


Figure 7-2: Covariate Balance After Matching, Shell Attic Insulation and Shell Window Replacement, Washington and Idaho



The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure. The t-test displayed no statistically significant differences at the 95% level in average daily consumption between the treatment and control groups for any month in the pre-period.

Table 7-3 provides results for the *t*-test on pre-period usage between the treatment and control groups after matching for the Shell program. The P-Value is over 0.05 for each month, meaning pre-period usage between treatment and control groups is similar at the 95% confidence level.

Table 7-3: Pre-period Usage T-test for Attic Insulation and Window Replacement Washington and Idaho, Shell Program

Month	Average Daily Usage (kWh), Control	Average Daily Usage (kWh), Treatment	T Statistic	Std Error	P-Value	Reject Null?
Jan	45.645	50.641	-1.194	2.957	0.234	No
Feb	45.780	50.576	-1.149	2.950	0.252	No

Mar	45.615	50.063	-1.071	2.935	0.286	No
Apr	47.283	50.641	-0.748	3.166	0.456	No
May	47.190	50.641	-0.774	3.145	0.440	No
Jun	47.046	50.417	-0.774	3.072	0.440	No
Jul	46.849	51.095	-0.956	3.132	0.340	No
Aug	46.574	50.893	-0.986	3.091	0.325	No
Sep	47.772	50.250	-0.554	3.149	0.580	No
Oct	46.686	50.185	-0.798	3.092	0.426	No
Nov	47.043	50.641	-0.807	3.145	0.421	No
Dec	46.419	50.290	-0.890	3.068	0.375	No

Table 7-4 provides customer counts for customers in the final regression model by assigned weather station ID for each measure. In addition, TMY HDD and CDD from the nearest available TMY weather station is provided as well as the weighted HDD/CDD for each measure. The HDD and CDD was weighted by the number of treatment customers assigned to a weather station.

Table 7-4: TMY Weather, Shell Program

Measure	USAF Station ID	# of Treatment Customers	TMY USAF ID	TMY HDD	TMY CDD	Weighted TMY HDD	Weighted TMY CDD
E Attic Insulation With Electric Heat and E Window Replc With Electric Heat	720322	4	726985	4207	245	6053	413
	726817	3	726985	4207	245	6053	413
	726873	7	727830	5347	861	6053	413
	727830	4	727830	5347	861	6053	413
	727834	12	727834	6773	343	6053	413
	727850	5	727850	6436	224	6053	413
	727855	3	727855	7224	437	6053	413
	727856	69	727856	6052	437	6053	413
	727857	12	727857	6322	265	6053	413
	727870	13	727857	6322	265	6053	413

Table 7-5 provides annual savings per customer for the Shell program for each measure and regression model. The PPR model was selected for ex post savings because it provided the best fit for the data (highest adjusted R-squared).

Table 7-5: Measure Savings for All Regression Models, Shell Program

Measure	Model	# of Treatment Customers	# of Control Customers	Annual Savings/Customer (kWh)	90% Lower CI	90% Upper CI	Adjusted R-Squared
E Attic Insulation and E Window Replc With Electric Heat	Diff-in-diff	132	165	1901.59*	0.00	50998.13	0.149
	PPR	100	99	1284.69	135.61	2433.76	0.65
	Treatment Only (Gross)	132	165	300.60*	0.00	5563.03	0.23

*Not statistically significant

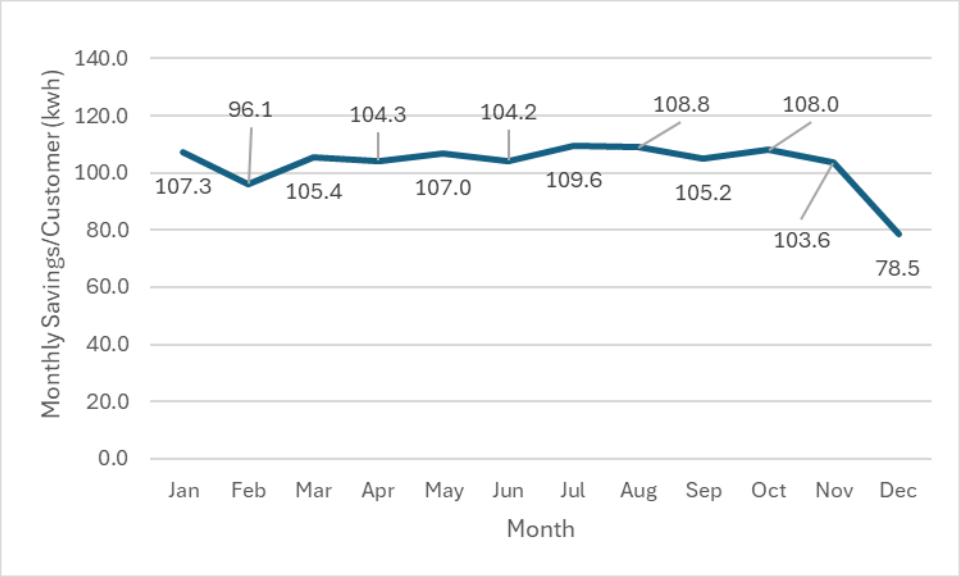
Savings are statistically significant at the 90% level for the combined measures but the adjusted R-squared shows the model provided a poor fit for the data.

Table 7-6: Measure Savings, Shell Program

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (kWh)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
E Attic Insulation and E Window Replc With Electric Heat	100	99	1284.69	135.61	2433.76	0.65	Model 2: PPR

Figure 7-3 provides monthly TMY savings per customer for the Shell program. Unexpectedly, the model did not attribute savings to weather dependent model components. This and the low adjusted R-squared lead us to conclude the billing analysis is failing to properly attribute savings.

Figure 7-3: Monthly Savings, Shell Program



7.2 Low-Income Program

The Evaluators conducted a whole-home billing analysis for all the electric measures combined in order to estimate savings for the average household participating in the program, across all measures. The Evaluators successfully created a matched cohort for the electric measure households. Customers were matched on their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household.

The Evaluators were provided a considerable pool of control customers to draw upon, as shown in Table 7-7. Also shown in Table 7-7, are the impact of various restrictions on the number of treatment and control customers that were included in the final regression model. The "Starting Count" displays the beginning number of customers available prior to applying the data restrictions, while the "Ending Count" displays the number of customers after applying data restrictions and final matching.

Table 7-7: Cohort Restrictions, Low-Income Program

Measure	Data Restriction	# of Treatment Customers	# of Control Customers
Whole home electric	Starting Count	815	412
	Install Date Range: January 1, 2020 to June 30, 2021	815	412
	Control Group Usage Outlier (>2X max treatment usage)	642	401
	Incomplete Post-Period Bills (<4 months)	350	226
	Incomplete Pre-Period Bills (<10 months)	320	218
	Ending Count (Matched by PSM)	283	215

Figure 7-4 and Figure 7-5 display the density of each variable employed in propensity score matching for the combined electric measures before and after conducting matching.

The distributions prior to matching appear to be less similar in summer, with control customers averaging higher usage. However, after matching, the pre-period usage distribution in summer is more similar between the groups. The remaining pre-period seasons (winter, summer, fall), closely overlap before and after matching, indicating little differences exist on average between the groups prior to matching and validating the initial selection of control customers.

Figure 7-4: Covariate Balance Before Matching, Low-Income Electric Measures

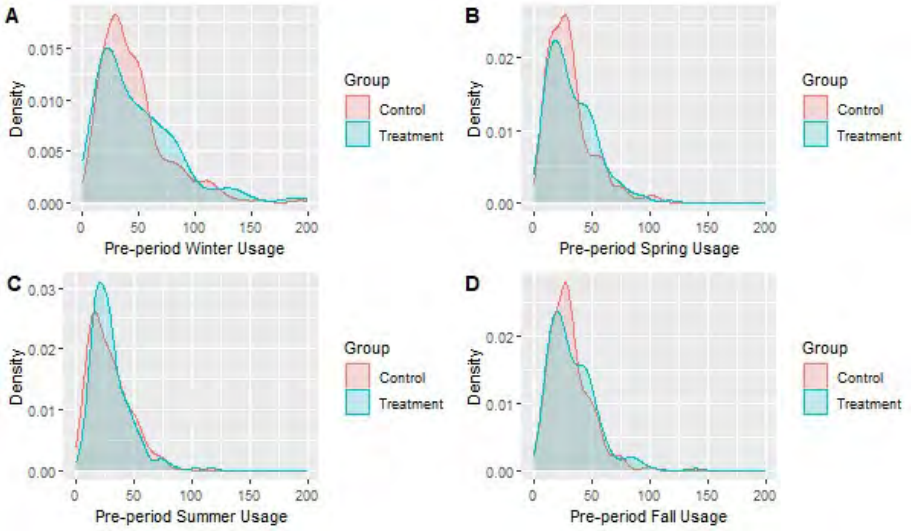
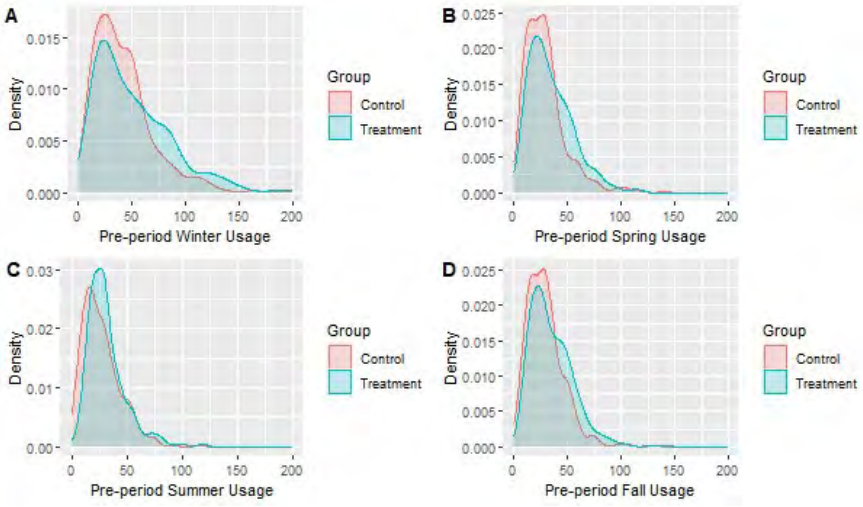


Figure 7-5: Covariate Balance After Matching, Low-Income Electric Measures



The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month

2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure. The t-test displayed no statistically significant differences at the 95% level in average daily consumption between the treatment and control groups for any month in the pre-period. In addition, the chi-squared test returned a p-value well over 0.05 for all measures, indicating that pre-period usage was balanced between the groups. Lastly, the standardized difference test returned values were under 10 (well under the recommended cutoff of 25), further indicating the groups were well matched on all included covariates.

Table 7-8 provides results for the *t*-test on pre-period usage between the treatment and control groups after matching for the Low-Income program. The P-Value is over 0.05 for each month, meaning pre-period usage between treatment and control groups is similar at the 95% confidence level.

Table 7-8: Pre-period Usage T-test for Electric Measures, Low-Income Program

Month	Average Daily Usage (Therms), Control	Average Daily Usage (Therms), Treatment	T Statistic	Std Error	P-Value	Reject Null?
Jan	44.40	48.94	-1.59	2.84	0.11	No
Feb	41.86	45.39	-1.35	2.61	0.18	No
Mar	36.17	38.41	-1.09	2.05	0.27	No
Apr	30.23	31.89	-1.09	1.52	0.28	No
May	25.50	25.68	-0.16	1.14	0.87	No
Jun	25.40	24.66	0.72	1.02	0.47	No
Jul	30.01	31.15	-0.91	1.26	0.36	No
Aug	30.03	31.54	-1.22	1.24	0.22	No
Sep	24.47	24.37	0.10	0.99	0.92	No
Oct	26.94	27.72	-0.70	1.13	0.49	No
Nov	38.81	41.49	-1.44	1.86	0.15	No
Dec	42.98	45.64	-1.27	2.09	0.20	No

Table 7-9 provides customer counts for customers in the final regression model by assigned weather station ID for each measure. In addition, TMY HDD and CDD from the nearest available TMY weather station is provided as well as the weighted HDD/CDD for each measure. The HDD and CDD was weighted by the number of treatment customers assigned to a weather station.

Table 7-9: TMY Weather, Low-Income Program

Measure	USAF Station ID	# of Treatment Customers	TMY USAF ID	TMY HDD	TMY CDD	Weighted TMY HDD	Weighted TMY CDD
All Electric Measures	727827	3	726985	4207	245	5829	376
	727830	3	727830	5347	861	5829	376
	727834	3	727834	6773	343	5829	376
	727850	1	727850	6436	224	5829	376

	727855	17	727856	6052	437	5829	376
	727856	7	727857	6322	265	5829	376
	727857	2	727857	6322	265	5829	376

In addition to the net savings value represented above, the Evaluators also conducted a treatment-only regression model for each of the measures described above. Table 7-10 provides annual savings/customer for the Low-Income program for all electric measures and regression model. The PPR model was selected for ex-post net savings because it provided the best fit for the data (highest adjusted R-squared). The treatment-only model represents estimated gross savings for this measure. The Evaluators estimate gross savings for each Low-Income participant is 1,005 kWh per year.

Table 7-10: Household Savings for All Regression Models, Low-Income Program

Measure	Model	# of Treatment Customers	# of Control Customers	Annual Savings/Customer	90% Lower CI	90% Upper CI	Adjusted R-Squared
All Electric Measures	Diff-in-diff	283	215	1005.41*	0.00	4340.16	0.29
	PPR	283	215	363.26*	0.00	1235.33	0.74
	Treatment Only (Gross)	283	215	5,082.85	3,186.76	6,978.93	0.27

*Not statistically significant

The results of the billing analysis indicate no statistically significant savings were found for the electric measures.

8. Appendix B: Summary of Survey Respondents

This section summarizes additional insights gathered from the simple verification surveys deployed by the Evaluators for the impact evaluation of Avista's Residential and Low-Income Programs.

Survey respondents confirmed installing between one and three measures that were rebated by Avista, displayed in Table 8-1. This table is missing information from 29 low-income, CEEP, and MFDI survey respondents who did not indicate the number nor type of measures they received.

Table 8-1: Type and Number of Measures Received by Respondents

Measure Category	Total	Percent
No Measures	304	13.8%
One Measure	1218	55.4%
Two Measures	440	20.0%
Three Measures	171	7.8%
Four Measures	47	2.1%
Five or more measures	20	0.9%
HVAC	289	13.1%
Water Heater	136	6.2%
Smart Thermostat	515	23.4%
Clothes Washer	297	13.5%
Clothes Dryer	189	8.6%

The Evaluators asked respondents to provide information regarding their home, as displayed in Table 8-2. Similar to the previous impact evaluation findings, the majority of respondents noted owning a single-family home between 1,000 and 3,000 square feet with central air conditioning.

Table 8-2: Survey Respondent Home Characteristics[13]

Question	Response	Percent
Do you rent your home? (n=755)	Own	93.8%
	Rent	1.9%
	Own and rent to someone else	1.3%
	I don't know	0.1%
	Prefer not to answer	2.9%
Which of the following best describes your home? (n=755)	Single-family house detached	86.0%
	Single-family house attached to one or more other houses	2.3%
	Mobile or manufactured home	8.2%
	Apartment with 2 to 4 units	0.8%
	Apartment with 5+ units	0.3%
	Other	1.4%
	I don't know	0.2%
	Prefer not to answer	0.7%
Does your home have central air conditioning? (n=755)	Yes	72.6%
About how many square feet is your home? (n=629)	Less than 1,000ft^2	6.6%
	1,000-1,999ft^2	42.4%

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

	2,000-2,999ft^2	32.3%
	3,000-3,999ft^2	13.5%
	4,000ft^2 or more	5.2%
When was your home built? (n=719)	Before 1950	20.0%
	1950 to 1959	10.3%
	1960 to 1969	6.6%
	1970 to 1979	15.3%
	1980 to 1989	7.7%
	1990 to 1999	15.3%
	2000 to 2009	13.2%
	2010 to 2019	4.7%
	2020 to Present	5.6%
	I don't know	1.1%
	Prefer not to answer	0.2%

9. Appendix C: Site-Specific Program Project Reports

This section displays site reports for each sampled project in the Site-Specific Program.

Project Number SSLP_113852

Project Background

The participant is an elementary school which received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (20) 3L F28T8 HBs were replaced by (20) LED Wafer Cans

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Primary School	AC, gas heat	2,806	2,806	36%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
3L F28T8 HB to LED Wafer Cans	20	20	97	18	2,086	2,086	3,431	3,431	3,431	100.0%
Totals							**3,431**	**3,431**	**3,431**	**100.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
3L F28T8 HB to LED Wafer Cans	20	20	97	18	0.36	1.31	1.32	0.59	44.7%
Totals:						**1.31**	**1.32**	**0.59**	**44.7%**

Results

For project #113852 the kWh realization rate is 100.0% and the kW realization rate is 44.7%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
3L F28T8 HB to LED Wafer Cans	3,431	0.59	100.0%	44.7%	0	0.00	-63
Totals:	**3,431**	**0.59**	**100.0%**	**44.7%**	**0**	**0.00**	**-63**

Ex ante calculations assumed an 80% peak coincidence factor. The actual lighting operating schedule showed that there was only a 36% chance of lighting operation during peak times, resulting in a slightly low verified peak kW reduction.

Project Number SSLP_113539

Project Background

The participant is a county office building that received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (33) 1L 65W CFs were replaced by (33) Screw-in LED Bulbs

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Small Standalone Office	AC, gas heat	2,348	2,348	36%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L 65W CF to Screw-in LED Bulbs	33	33	72	11	2,348	2,348	5,358	5,358	5,093	95.1%
Totals							**5,358**	**5,358**	**5,093**	**95.1%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L 65W CF to Screw-in LED Bulbs	33	33	72	11	0.36	1.74	1.74	0.77	44.3%
Totals						**1.74**	**1.74**	**0.77**	**44.3%**

Results

For project # SSLP_113539 the kWh realization rate is 95.1% and the kW realization rate is 44.3%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L 65W CF to Screw-in LED Bulbs	5,093	0.77	95.1%	44.3%	0	0.00	-95
Totals	**5,093**	**0.77**	**95.1%**	**44.3%**	**0**	**0.00**	**-95**

Posted hours of operation are Monday through Friday, 8:00am until 4:30pm. Allowing an extra ½ hour per day for lights to operate briefly prior to open/after close, yields 2,348 annual hours of operation, slightly lower than those used in ex ante calculations (2,470). Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 36%, resulting in a lower verified peak kW reduction.

Project Number SSLP_112667

Project Background

The participant is an outdoor agricultural facility which received incentives from Avista for retrofitting energy efficient exterior lighting. The Evaluators verified the participant had installed:

- (4) 1L MH 1000s were replaced by (4) Topaz F-ARL 300W

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below. Annual hours and peak CF were calculated using actual hours of operation.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Greenhouse Agriculture	No AC, no heat	4,331	4,331	49%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L MH 1000 to Topaz F-ARL 300W	4	4	1,070	300	4,331	4,331	13,207	13,207	13,339	101.0%
Totals							**13,207**	**13,207**	**13,339**	**101.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L MH 1000 to Topaz F-ARL 300W	4	4	1,070	300	0.49	2.46	2.46	1.52	61.8%
Totals						**2.46**	**2.46**	**1.52**	**61.8%**

Results

For project # SSLP_112667 the kWh realization rate 101.0% and the kW realization rate is 61.8%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L MH 1000 to Topaz F-ARL 300W	13,339	1.52	101.0%	61.8%	0	0.00	0
Totals	**13,339**	**1.52**	**101.0%**	**61.8%**	**0**	**0.00**	**0**

The lighting operates for 83 hours per week, or 11.9 hours daily. Extrapolating this to a full year yields 4,331 annual hours of operation, slightly higher than those used in expected savings calculations, 4,288. Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 49%, resulting in a lower verified peak kW reduction.

Project Number SSLP_119029

Project Background

The participant is an indoor agriculture facility that received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (9) 1L HPS 1000s were replaced by (9) Gavita 1700e (retrofit)
- (5) 1L HPS 1000s were replaced by (5) Gavita 1700e (new const.)

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Indoor Agriculture	none	4,380	4,380	50%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L HPS 1000 to Gavita 1700e (retrofit)	9	9	1,080	661	4,380	4,380	16,529	16,529	16,529	100.0%
1L HPS 1000 to Gavita 1700e (new const.)	5	5	1,080	661	4,380	4,380	9,183	9,183	9,183	100.0%
Totals:							**25,711**	**25,711**	**25,711**	**100.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L HPS 1000 to Gavita 1700e (retrofit)	9	9	1,080	661	0.50	3.02	3.02	1.89	62.6%
1L HPS 1000 to Gavita 1700e (new const.)	5	5	1,080	661	0.50	1.68	1.68	1.05	62.5%
Totals:						**4.70**	**4.70**	**2.94**	**62.6%**

Results

For project #SSLP_119029 the kWh realization rate is 100.0% and the kW realization rate is 62.6%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L HPS 1000 to Gavita 1700e (retrofit)	16,529	3.02	100.0%	100.0%	0	0.00	0
1L HPS 1000 to Gavita 1700e (new const.)	9,183	1.68	100.0%	100.0%	0	0.00	0
Totals:	**25,711**	**4.70**	**100.0%**	**100.0%**	**0**	**0.00**	**0**

By default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 50%, resulting in a lower verified peak kW reduction.

Project Number SSLP_107183

Project Background

The participant is an indoor agricultural facility which received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (80) 1L HPS 1000s were replaced by (80) Gavita Pro 1700e 661W LED

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation, assumed operating parameters and HVAC configuration(s). Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below. Annual hours and peak CF were calculated using actual hours of operation.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Indoor Agriculture	AC, no heat	3,204	3,204	37%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L HPS 1000 to Gavita Pro 1700e 661W LED	80	80	1,080	330	3,204	3,204	107,816	107,816	192,761	178.8%
Totals							**107,816**	**107,816**	**192,761**	**178.8%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L HPS 1000 to Gavita Pro 1700e 661W LED	80	80	1,080	330	0.37	26.91	26.92	21.99	81.7%
Totals						**26.91**	**26.92**	**21.99**	**81.7%**

Results

For project #SSLP_107183 the kWh realization rate is 178.8% and the kW realization rate is 81.7%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L HPS 1000 to Gavita Pro 1700e 661W LED	192,761	21.99	178.8%	81.7%	0	0.00	0
Totals	**192,761**	**21.99**	**178.8%**	**81.7%**	**0**	**0.00**	**0**

Expected savings calculations used the full potential wattage of the post fixtures (660.7W), but on site the Evaluators found that all fixtures were operated at half wattage, 330.4W. Using the reduced wattage in verified savings calculations yielded higher savings. This adjustment also somewhat lowered the verified peak kW reduction, but this estimate was also affected by a change to the peak CF: By default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 37%. The combination of this adjustment and the lower operating wattage resulted in the lower verified peak kW reduction.

Project Number SSLP_108622

Project Background

The participant is a greenhouse agricultural facility which received incentives from Avista for retrofitting energy efficient lighting. The Evaluators verified the participant had installed:

- (108) 1L HPS 1000s were replaced by (108) GPL TLC 1800 DRW

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below. Annual hours and peak CF were calculated using actual hours of operation.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Greenhouse Agriculture	No AC, no heat	2,736	2,736	42%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L HPS 1000 to GPL TLC 1800 DRW	108	108	1,080	529	2,736	2,736	163,290	163,290	162,755	99.7%
Totals:							**163,290**	**163,290**	**162,755**	**99.7%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L HPS 1000 to GPL TLC 1800 DRW	108	108	1,080	529	0.42	47.59	47.59	24.76	52.0%
Totals:						**47.59**	**47.59**	**24.76**	**52.0%**

Results

For project #SSLP_108622 the kWh realization rate 99.7% and the kW realization rate is 52.0%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L HPS 1000 to Gavita Pro 1700e 661W LED	162,755	24.76	99.7%	52.0%	0	0.00	0
Totals:	**162,755**	**24.76**	**178.8%**	**52.0%**	**0**	**0.00**	**0**

The lighting operates for 18 hours per day from November 15th through April 15th, which is 2,736 hours annually. Expected savings calculations used 2,745 hours, slightly overestimating savings. Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 42%, resulting in a lower verified peak kW reduction.

Project Number SSLP_107181

Project Background

The participant is an indoor agricultural facility which received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (208) 1L HPS 1000s were replaced by (208) Gavita Pro 1700e 661W LED

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation, assumed operating parameters and HVAC configuration(s). Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below. Annual hours and peak CF were calculated using actual hours of operation.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Indoor Agriculture	AC, no heat	3,204	3,204	37%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L HPS 1000 to Gavita Pro 1700e 661W LED	208	208	1,080	330	3,204	3,204	280,323	280,323	501,178	178.8%
Totals:							**280,323**	**280,323**	**501,178**	**178.8%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L HPS 1000 to Gavita Pro 1700e 661W LED	208	208	1,080	330	0.37	69.98	69.99	58.62	83.8%
Totals:						**69.98**	**69.99**	**58.62**	**83.8%**

Results

For project #SSLP_107181 the kWh realization rate is 178.8% and the kW realization rate is 83.3%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L HPS 1000 to Gavita Pro 1700e 661W LED	501,178	58.62	178.8%	83.8%	0	0.00	0
Totals:	**501,178**	**58.62**	**178.8%**	**83.8%**	**0**	**0.00**	**0**

Expected savings calculations used the full potential wattage of the post fixtures (660.7W), but on site the Evaluators found that all fixtures were operated at half wattage, 330.4W. Using the reduced wattage in verified savings calculations yielded higher savings. This adjustment also somewhat lowered the verified peak kW reduction, but this estimate was also affected by a change to the peak CF: By default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 37%. The combination of this adjustment and the lower operating wattage resulted in the lower verified peak kW reduction.

Project Number SSLP_116835

Project Background

The participant is an indoor agriculture facility that received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (528) 1L HPS 1000s were replaced by (528) Gavita Pro 1700e

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation, assumed operating parameters and HVAC configuration(s). Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Indoor Agriculture	none	4,383	4,383	50%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L HPS 1000 to Gavita Pro 1700e	528	528	1,080	661	4,383	4,383	952,532	952,532	970,354	101.9%
Totals:							**952,532**	**952,532**	**970,354**	**101.9%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L HPS 1000 to Gavita Pro 1700e	528	528	1,080	661	0.50	177.11	177.11	110.70	62.5%
Totals:						**177.11**	**177.11**	**110.70**	**62.5%**

Results

For project # SSLP_116835 the kWh realization rate is 101.9% and the kW realization rate is 62.5%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjustments	kW Adjustments	Therm Penalty
1L HPS 1000 to Gavita Pro 1700e	970,354	110.70	101.9%	62.5%	0	0.00	0
Totals:	**970,354**	**110.70**	**101.9%**	**62.5%**	**0**	**0.00**	**0**

The lighting operates for 12 hours per day, 4,838 hours annually. This is slightly higher than the estimate used in expected savings calculations (4,303), resulting in slightly higher verified savings. Also, by default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 50%, resulting in a lower verified peak kW reduction.

Project Number SSLP_79541

Project Background

The participant is an indoor agriculture facility that received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (443) 1L HPS 1000s were replaced by (886) Philips 250W HO
- (109) 8L F54T5HOs were replaced by (80) Philips 250W HO
- (84) 1L MH 1000s were replaced by (112) Philips 250W HO

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation, assumed operating parameters and HVAC configuration(s). Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Indoor Agriculture	none	4,000	4,000	46%
Indoor Agriculture	none	6,570	6,570	75%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L HPS 1000 to Philips 250W HO	443	886	1,080	259	4,000	4,000	999,041	999,041	999,041	100.0%
8L F54T5HO to Philips 250W HO	109	80	472	259	6,570	6,570	202,521	202,521	202,521	100.0%
1L MH 1000 to Philips 250W HO	84	112	1,070	259	6,570	6,570	401,184	401,184	401,184	100.0%
Totals:							**1,602,747**	**1,602,747**	**1,602,747**	**100.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L HPS 1000 to Philips 250W HO	443	886	1,080	259	0.46	199.81	199.81	114.05	57.1%
8L F54T5HO to Philips 250W HO	109	80	472	259	0.75	24.66	24.66	23.12	93.8%
1L MH 1000 to Philips 250W HO	84	112	1,070	259	0.75	48.85	48.85	45.80	93.8%
Totals:						**273.32**	**273.32**	**182.97**	**66.9%**

Results

For project # SSLP_79541 the kWh realization rate is 100.0% and the kW realization rate is 66.9%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L HPS 1000 to Philips 250W HO	999,041	114.05	100.0%	57.1%	0	0.00	0
8L F54T5HO to Philips 250W HO	202,521	23.12	100.0%	93.8%	0	0.00	0
1L MH 1000 to Philips 250W HO	401,184	45.80	100.0%	93.8%	0	0.00	0
Totals:	**1,602,747**	**182.97**	**100.0%**	**66.9%**	**0**	**0.00**	**0**

By default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 46% for one area and 75% in the others, resulting in a lower verified peak kW reduction.

Project Number SSLP_80606

Project Background

The participant is an indoor agriculture facility that received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (416) 1L HPS 1000s were replaced by (416) Fluence VYPR R4 637W
- (416) 1L MH 1000s were replaced by (208) Fluence VYPR R6 627W

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation, assumed operating parameters and HVAC configuration(s). Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Indoor Agriculture	none	4,380	4,380	50%
Indoor Agriculture	none	6,570	6,570	75%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L HPS 1000 to Fluence VYPR R4 637W (Ghse 7 & 8, flwr)	416	416	1,080	637	4,380	4,380	807,801	807,801	807,801	100.0%
1L MH 1000 to Fluence VYPR R6 627W (Ghse 11, veg)	416	208	1,070	627	6,570	6,570	2,067,045	2,067,045	2,067,045	100.0%

Totals:	**2,874,846**	**2,874,846**	**2,874,846**	**100.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L HPS 1000 to Philips 250W HO	443	886	1,080	259	0.46	199.81	199.81	114.05	57.1%
8L F54T5HO to Philips 250W HO	109	80	472	259	0.75	24.66	24.66	23.12	93.8%
Totals:						**399.24**	**399.23**	**328.17**	**82.2%**

Results

For project #SSLP_80606 the kWh realization rate is 100.0% and the kW realization rate is 82.2%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L HPS 1000 to Fluence VYPR R4 637W (Ghse 7 & 8, flwr)	807,801	92.21	100.0%	62.5%	0	0.00	0
1L MH 1000 to Fluence VYPR R6 627W (Ghse 11, veg)	2,067,045	235.96	100.0%	93.8%	0	0.00	0
Totals	**2,874,846**	**328.17**	**100.0%**	**82.2%**	**0**	**0.00**	**0**

By default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 50% for one area and 75% in the others, resulting in a lower verified peak kW reduction.

Project Number SSLP_80607

Project Background

The participant is an indoor agriculture facility that received incentives from Avista for retrofitting energy efficient interior lighting. The Evaluators verified the participant had installed:

- (345) 1L HPS 1000s were replaced by (345) Fluence VYPR R4 637W
- (344) 1L MH 1000s were replaced by (172) Fluence VYPR R6 627W

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation, assumed operating parameters and HVAC configuration(s). Savings for the lighting measures were calculated using industry standard lighting retrofit algorithms. Annual lighting hours of operation and peak coincidence factors are based verified actual hours of lighting operation.

The values used in calculating savings are presented in the table below.

Savings Inputs

Space Type	HVAC Configuration	Pre Annual Hours	Post Annual Hours	CF
Indoor Agriculture	none	4,565	4,565	100%
Indoor Agriculture	none	6,494	6,494	100%

Savings Calculations

Using deemed values from the table above, the evaluators calculated lighting savings as follows:

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Pre AOH	Post AOH	Expected kWh	Adjusted kWh	Verified kWh	kWh Realization Rate
	Base	Post	Base	Post						
1L HPS 1000 to Fluence VYPR R4 637W	345	345	1,080	637	4,565	4,565	698,227	698,227	698,227	100.0%
1L MH 1000 to Fluence VYPR R6 627W	344	172	1,070	627	6,494	6,494	1,689,514	1,689,515	1,689,515	100.0%
Totals:							**2,387,741**	**2,387,742**	**2,387,742**	**100.0%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		CF	Expected kW	Adjusted kW	Verified kW	kW Realization Rate
	Base	Post	Base	Post					
1L HPS 1000 to Fluence VYPR R4 637W	345	345	1,080	637	0.52	122.36	122.36	79.65	65.1%
1L MH 1000 to Fluence VYPR R6 627W	344	172	1,070	627	0.74	208.14	208.13	192.73	92.6%
Totals:						**330.50**	**330.49**	**272.38**	**82.4%**

Results

For project #SSLP_80607 the kWh realization rate is 100.0% and the kW realization rate is 82.4%.

Verified Gross Savings, Realization Rates & Adjustments

Measure	Verified kWh Savings	Verified kW Reduction	kWh Realization Rate	kW Realization Rate	kWh Adjust-ments	kW Adjust-ments	Therm Penalty
1L HPS 1000 to Fluence VYPR R4 637W	698,227	79.65	100.0%	65.1%	0	0.00	0
1L MH 1000 to Fluence VYPR R6 627W	1,689,515	192.73	100.0%	92.6%	0	0.00	0
Totals:	**2,387,742**	**272.38**	**100.0%**	**82.4%**	**0**	**0.00**	**0**

By default, expected savings are calculated using an 80% peak CF. Using the lighting operating schedule, the Evaluators calculated that the chance the lights would be operating during the peak period is 52% for one area and 74% in the others, resulting in a lower verified peak kW reduction.

10. Appendix D: Cost Benefit Analysis Results

The Evaluators estimated the cost-effectiveness for the Avista Residential and Low-Income Programs using evaluated savings results, economic inputs provided by Avista, and incremental costs and non-energy impacts from the RTF. The table below presents the cost-effectiveness results for the PY2023 portfolio.

Table 10-1: Cost-effectiveness Results

Program	TRC	UCT	RIM	PCT	TRC Net Benefits
Residential	1.26	1.77	0.68	1.49	$1,987,609
Residential Low Income	0.73	0.26	0.21	N/A*	-$917,749
Nonresidential	2.03	1.98	0.66	3.09	$22,323,366
Total	**1.71**	**1.74**	**0.64**	**N/A***	**$23,393,225**
***Low Income is offered at no cost to participants; PCT is not calculable.**					

10.1 Approach

The California Standard Practice Model was used as a guideline for the calculations. The cost-effectiveness analysis methods that were used in this analysis are among the set of standard methods used in this industry and include the Utility Cost Test (UCT)[14], Total Resource Cost Test (TRC), Ratepayer Impact Measure Test (RIM), and Participant Cost Test (PCT). All tests weigh monetized benefits against costs. These monetized amounts are presented as NPV evaluated over the lifespan of the measure. The benefits and costs differ for each test based on the perspective of the test. The definitions below are taken from the California Standard Practice Manual.

- The TRC measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs.
- The UCT measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the TRC benefits. Costs are defined more narrowly.
- The PCT is the measure of the quantifiable benefits and costs to the customer due to participation in a program. Since many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.
- The RIM test measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program. Rates will go down if the change in revenues from the program is greater than the change in utility costs. Conversely, rates or bills will go up if revenues collected after program implementation is less than the total costs

[14] The UCT is also referred to as the Program Administrator Cost Test (PACT).

incurred by the utility in implementing the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.

A common misperception is that there is a single best perspective for evaluation of cost-effectiveness. Each test is useful and accurate, but the results of each test are intended to answer a different set of questions. The questions to be addressed by each cost test are shown in the table below.[15]

Table 10-2: Questions Addressed by the Various Cost Tests

Cost Test	Questions Addressed
Participant Cost Test (PCT)	▪ Is it worth it to the customer to install energy efficiency?
	▪ Is it likely that the customer wants to participate in a utility program that promotes energy efficiency?
Ratepayer Impact Measure (RIM)	▪ What is the impact of the energy efficiency project on the utility's operating margin?
	▪ Would the project require an increase in rates to reach the same operating margin?
Utility Cost Test (UCT)	▪ Do total utility costs increase or decrease?
	▪ What is the change in total customer bills required to keep the utility whole?
Total Resource Cost Test (TRC)	▪ What is the regional benefit of the energy efficiency project (including the net costs and benefits to the utility and its customers)?
	▪ Are all of the benefits greater than all of the costs (regardless of who pays the costs and who receives the benefits)?
	▪ Is more or less money required by the region to pay for energy needs?

Overall, the results of all four cost-effectiveness tests provide a more comprehensive picture than the use of any one test alone. The TRC cost test addresses whether energy efficiency is cost-effective overall. The PCT, UCT, and RIM address whether the selection of measures and design of the program are balanced from the perspective of the participants, utilities, and non-participants. The scope of the benefit and cost components included in each test are summarized in the table below.[16]

[15] http://www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf
[16] Ibid.

Table 10-3: Benefits and Costs Included in Each Cost-Effectiveness Test

Test	Benefits	Costs
PCT (Benefits and costs from the perspective of the customer installing the measure)	▪ Incentive payments ▪ Bill Savings ▪ Applicable tax credits or incentives	▪ Incremental equipment costs ▪ Incremental installation costs
UCT (Perspective of utility, government agency, or third party implementing the program	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	▪ Program overhead costs ▪ Utility/program administrator incentive costs
TRC (Benefits and costs from the perspective of all utility customers in the utility service territory)	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution ▪ Additional resource savings ▪ Monetized non-energy benefits	▪ Program overhead costs ▪ Program installation costs ▪ Incremental measure costs
RIM (Impact of efficiency measure on non-participating ratepayers overall)	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	▪ Program overhead costs ▪ Lost revenue due to reduced energy bills ▪ Utility/program administrator installation costs

10.2 Non-Energy Benefits

Non-energy Benefits (NEBs) were sourced from the 2022 Annual Conservation Plan developed by Avista. NEBs included avoided illness from air pollution, avoided calls to the utility, avoided fires/insurance damage, and other impacts relative to energy efficiency upgrades offered to customers in each of Avista's programs.

- Residential measures with NEBs included air source heat pumps, ductless heat pumps, windows, and insulation measures.
- Low Income NEBs included the NEBs described for Residential as well as a dollar-for-dollar benefit adder for health and safety spending.

10.3 Economic Inputs for Cost Effectiveness Analysis

The Evaluators used the economic inputs provided by Avista for the cost benefit analysis. Avista provided the Evaluators with avoided costs on the following basis:

- Hourly avoided commodity costs
- Modifications for the Clean Premium
- Avoided capacity costs
- Avoided transmission
- 10% Conservation Adder
- Line losses
- Discount rate (after tax Weighted Average Cost of Capital)

The values were aggregated to provide a single benefit multiplier on a kWh basis for every hour of the year (8,760). Savings by measure were then parsed out to the following load shapes provided by Avista:

- Residential Space Heating
- Residential Air Conditioning
- Residential Lighting
- Residential Refrigeration
- Residential Water Heating
- Residential Dishwasher
- Residential Washer/Dryer
- Residential Furnace Fan
- Residential Miscellaneous

The Evaluators in addition created a Residential Heat Pump load shape by weighting the relative magnitude of cooling versus heating savings from a heat pump and assigning these to weight the Residential Space Heating and Residential Air Conditioning load shapes.

10.4 Results

The tables below outline the results for each test, for both the programs and the portfolio as a whole. Summations may differ by $1 due to rounding.

Table 10-4: Cost-Effectiveness Results by Sector

Sector	TRC	UCT	RIM	PCT
Residential	1.26	1.77	0.68	1.49
Residential Low Income	0.73	0.26	0.21	N/A*
Nonresidential	2.03	1.98	0.66	3.09
Total	**1.71**	**1.74**	**0.64**	**N/A***
*Low Income is offered at no cost to participants; PCT is not calculable.				

Table 10-5: Cost-Effectiveness Benefits by Sector

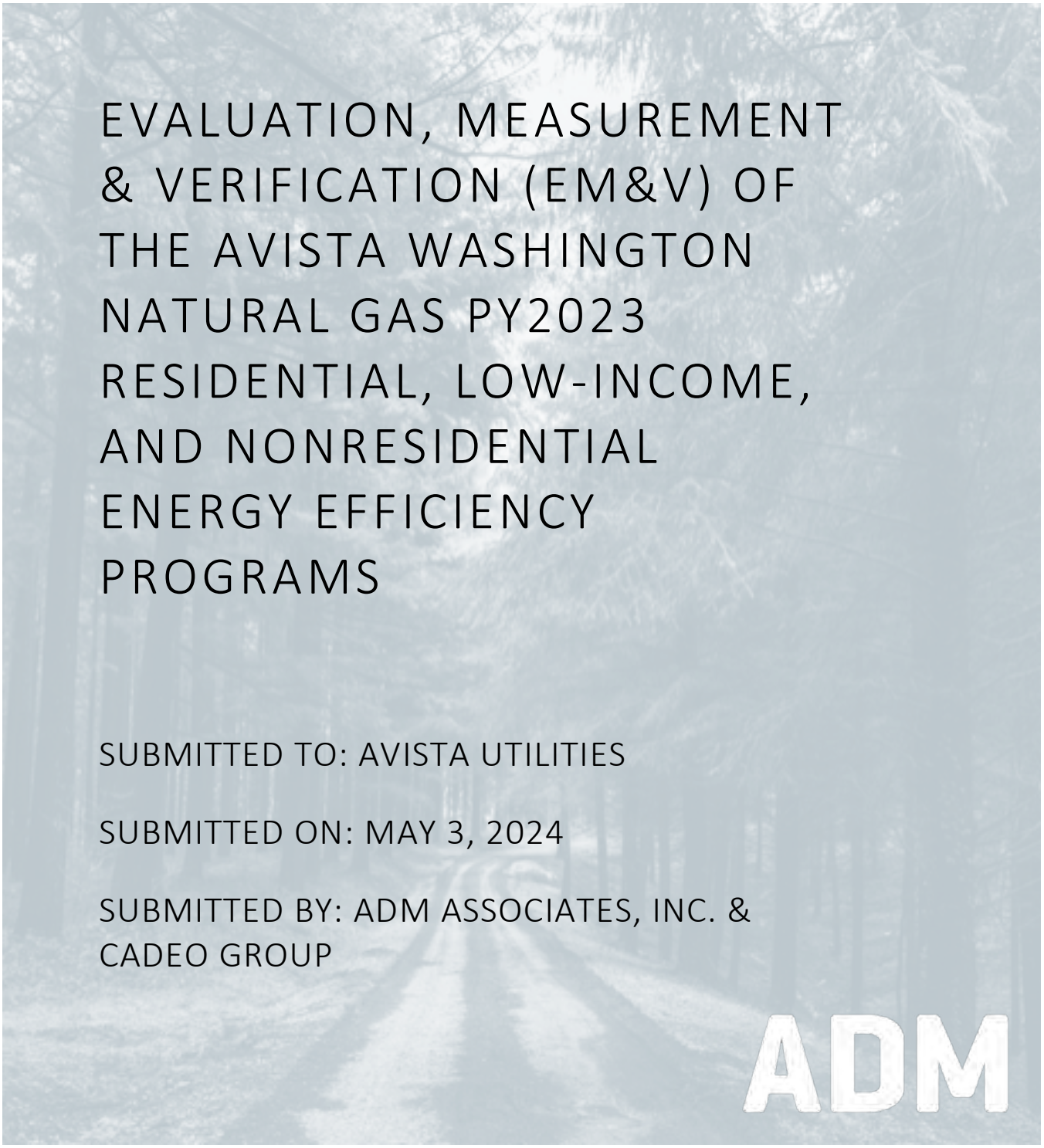
Program	TRC Benefits	UCT Benefits	RIM Benefits	PCT Benefits
Residential	$9,982,961	$7,797,199	$7,797,199	$7,858,310
Residential Low Income	$2,538,883	$897,912	$897,912	$2,305,173
Nonresidential	$44,039,335	$40,035,598	$40,035,598	$56,829,729
Total	**$56,561,179**	**$48,730,709**	**$48,730,709**	**$66,993,212**

Table 10-6: Cost-Effectiveness Costs by Sector

Program	TRC Costs	UCT Costs	RIM Costs	PCT Costs
Residential	$7,895,896	$4,407,053	$11,433,548	$5,274,679
Residential Low Income	$3,456,395	$3,456,395	$4,226,478	$1,689,991
Nonresidential	$21,697,292	$20,195,795	$60,869,227	$18,377,355
Total	**$33,049,582**	**$28,059,243**	**$76,529,253**	**$25,342,025**

Table 10-7: Cost-Effectiveness Net Benefits by Sector

Program	TRC Net Benefits	UCT Net Benefits	RIM Net Benefits	PCT Net Benefits
Residential	$2,087,065	$3,390,146	($3,636,349)	$2,583,632
Residential Low Income	($917,512)	($2,558,482)	($3,328,566)	$615,181
Nonresidential	$22,342,043	$19,839,802	($20,833,629)	$38,452,374
Total	**$23,511,596**	**$20,671,466**	**($27,798,544)**	**$41,651,187**



EVALUATION, MEASUREMENT & VERIFICATION (EM&V) OF THE AVISTA WASHINGTON NATURAL GAS PY2023 RESIDENTIAL, LOW-INCOME, AND NONRESIDENTIAL ENERGY EFFICIENCY PROGRAMS

SUBMITTED TO: AVISTA UTILITIES

SUBMITTED ON: MAY 3, 2024

SUBMITTED BY: ADM ASSOCIATES, INC. & CADEO GROUP

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1 EXECUTIVE SUMMARY

1.1 Overview

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

1.2 Savings & Cost-Effectiveness Results

The Evaluators conducted an impact evaluation for Avista's Residential, Low-Income, and Nonresidential programs for PY2023. The Residential portfolio savings amounted to 435,191 Therms with a 64.94% realization rate. The Low-Income portfolio savings amounted to 14,749 Therms with a 94.84% realization rate. The Nonresidential portfolio savings amounted to 137,839 Therms with a 106.60% realization rate. The Evaluators summarize the Residential, Low-Income, and Nonresidential portfolio verified savings in Table 1-1 through Table 1-3, respectively.

The Residential portfolio reflects a TRC value of 2.21 and a UCT value of 1.32. The Low-Income portfolio reflects a TRC value of 0.13 and a UCT value of 0.14. The Nonresidential portfolio reflects a TRC value of 1.57 and a UCT value of 2.36. This led to a total Portfolio TRC of 1.62 and a UCT of 1.09. Table 1-4 summarizes the evaluated TRC and UCT values with each the Residential, Low-Income, and Nonresidential portfolios.

TABLE 1-1: RESIDENTIAL VERIFIED IMPACT SAVINGS BY PROGRAM

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate	Total Costs
Water Heat	16,612	14,945	89.96%	$134,713.82
HVAC	229,813	208,468	90.71%	$2,093,389.96
Shell	87,304	87,129	99.80%	$2,743,350.01
ENERGY STAR Homes	469	469	100.00%	$7,486.13
Small Home & MF Weatherization	5,842	6,443	110.29%	$69,605.01
Multifamily Direct Install	2,586	2,586	100.00%	$12,688.14
Appliances	784	646	82.45%	$10,303.01
Midstream	326,743	114,505	35.04%	$1,081,497.93
Total Res	**670,154**	**435,191**	**64.94%**	**$6,153,034.01**

TABLE 1-2: LOW-INCOME VERIFIED IMPACT SAVINGS BY PROGRAM

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate	Total Costs
Low-Income	15,552	14,749	94.84%	$3,140,089.11
Total Low-Income	**15,552**	**14,749**	**94.84%**	**$3,140,089.11**

TABLE 1-3: NONRESIDENTIAL VERIFIED IMPACT SAVINGS BY PROGRAM

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate	Total Costs
HVAC	9,987	9,987	100.00%	$59,083.78
Food Service Equipment	10,273	10,258	99.85%	$41,504.94
Shell	4,263	4,263	100.00%	$44,264.05
Midstream	45,423	21,368	47.04%	$198,071.60
Site-Specific	59,354	91,963	154.94%	$438,269.20
Non-Residential Totals:	**129,300**	**137,839**	**106.60%**	**$781,193.58**

TABLE 1-4: COST-EFFECTIVENESS SUMMARY

Sector	TRC			UCT		
	Benefits	Costs	B/C Ratio	Benefits	Costs	B/C Ratio
Residential	$17,837,146	$8,063,506	2.21	$8,114,762	$6,147,436	1.32
Low-Income	$413,571	$3,140,095	0.13	$365,170	$2,593,117	0.14
Nonresidential	$2,294,105	$1,460,323	1.57	$1,921,808	$815,547	2.36
Total	**$20,544,822**	**$12,663,924**	**1.62**	**$10,401,740**	**$9,556,100**	**1.09**

Table 1-5 summarizes the gas programs offered to residential and low-income customers in the Washington Avista service territory in PY2023 as well as the Evaluators' evaluation tasks and impact methodology for each program.

TABLE 1-5: IMPACT EVALUATION ACTIVITIES BY PROGRAM AND SECTOR

Sector	Program	Database Review	Survey Verification	Impact Methodology
Residential	Water Heat	✓	✓	Avista TRM
Residential	HVAC	✓	✓	Avista TRM/IPMVP Option A
Residential	Shell	✓	✓	Avista TRM
Residential	ENERGY STAR® Homes	✓		Avista TRM
Residential	Small Home & MF Weatherization	✓	✓	Avista TRM
Residential	Appliances	✓	✓	Avista TRM
Residential	AeroBarrier	✓		RTF with adjustments
Residential	Multifamily Direct Install	✓		SBW TRM
Low-Income	Low-Income	✓		Avista TRM
Low-Income	Community Energy Efficiency Program (CEEP)	✓		Avista TRM
Nonresidential	HVAC	✓		RTF, Avista TRM
Nonresidential	Food Service Equipment	✓		RTF, Avista TRM
Nonresidential	Shell	✓		Avista TRM
Nonresidential	Midstream	✓		RTF, Avista TRM
Nonresidential	Site-Specific	✓		IPMVP Options

1.3 Conclusions and Recommendations

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

1.3.1 Conclusions

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

1.3.1.1 Residential Programs

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

- The Evaluators found the **Residential** portfolio to demonstrate a total of 435,191 Therms with a realization rate of 64.94%. The Evaluators also conducted a cost-benefit analysis in order to estimate the Residential portfolio's cost-effectiveness. The resulting TRC value for this sector is 2.21 while the UCT value is 1.32. Further details on cost-effectiveness methodology can be found in Appendix C.
- The Residential Portfolio impact evaluation resulted in a realization rate of 64.94% due to discrepancy in expected savings for the Midstream Program and due to differences between the implementer-assigned expected savings values using minimum code baseline and the RTF-implemented market practice baseline. The Evaluators utilized engineering algorithms to evaluate this program based on purchased equipment efficiency level. The Evaluators also applied RTF market practice baseline equivalents to the engineering algorithms in order to maintain consistency with evaluation methods between the downstream and midstream programs, while taking into account the often-higher efficiency values of the purchased equipment. Although the Evaluators note instances in which the implementer's engineering algorithm were applied incorrectly in the calculation of the expected savings values, the market practice baseline adjustment led to the largest downward adjustment, leading to a low realization rate for the program.
- The **Midstream Program**, which contributes 49% of the expected savings, resulted in a realization rate of 35% whereas each of the other programs resulted in a combined 107% realization rate. The Midstream Program contributed to a 42% decrease in the overall residential sector, which displayed a realization rate of 64%.
- The Evaluators conducted verification surveys via web survey to collect information from customers who participated in the Water Heat, HVAC, and Appliance Programs. The Evaluators collected information including the functionality of the efficient equipment, and the functionality of the replaced equipment. The Evaluators calculated in-service rates for the measures within these programs in order to apply findings to the verified savings results for each program.
- The realization rate for the natural gas savings in the **Water Heat Program** was 90% with 14,945 verified Therms saved. The Evaluators found two instances in which a project savings deviated from the expected savings. The Evaluators found three instances in which a tankless water heater rebate was provided for a boiler equipment. One project did not qualify for savings due to lack of efficiency requirement being met. The Evaluators removed savings for these projects. This discrepancy alone led to less than 100% realization for the program.
- The Evaluators explored a billing analysis for the natural gas water heater measures within the **Water Heat Program**. However, the G 50 Gallon Natural gas Water Heater and the G Tankless Gas Water

Heater measures resulted in savings that were not statistically significant. Therefore, the Evaluators elected to use Avista TRM values to estimate verified savings.

- In the **Water Heat Program**, the Evaluators found that Avista TRM savings values are slightly lower than the RTF savings assigned for the appropriate water heater tank size and tier efficiency. The Evaluators found a majority of water heaters to be Tier 3 or higher, but the Avista TRM only includes savings for a combination of Tier 2 and Tier 3 savings. The Evaluators recommend that Avista document tier rating of heat pump water heaters to ensure proper validation of savings.
- The **HVAC Program** in total displays a realization rate of 91% with 208,468 Therms verified natural gas savings in the Washington service territory. The realization rate for the natural gas savings in the HVAC Program deviates from 100% due to differences between the billing analysis results and the RTF UES. In addition, six smart Thermostat projects were verified to not qualify based device capabilities and therefore the Evaluators removed savings for this project. All other rebates were assigned savings equivalent to the expected savings through Avista TRM values.
- The Evaluators attempted to estimate smart thermostat measure savings values through a billing analysis for the **HVAC Program**. However, because the results from the billing analyses for smart Thermostats were contradictory and/or inconclusive, the Evaluators elected to utilize Avista TRM values to estimate verified savings for these measures.
- The **Shell Program** displayed verified savings of 87,129 Therms with a realization rate of 99.80% against the expected savings for the program. The realization rate for the natural gas savings in the Shell Program deviates from 100% due to the differences in quantities between the Avista tracking database and the verified documents. The Evaluators conducted a billing analysis for the attic insulation and window replacement measures, however, due to unexpectedly low savings estimates, the Evaluators chose to verify savings through the Avista TRM.
- The **ENERGY STAR Homes Program** displayed a realization rate of 100% at 469 Therms saved across 7 projects in PY2023. The Evaluators found no deviations in savings for this program; however, the Evaluators note that program application forms commonly lacked information about home primary and secondary space and water heating type. The Evaluators recommend updating the Avista measure savings database to match the primary heating type for duel fuel households.
- The **Small Home & MF Weatherization Program** in total displays a realization rate of 110% with 6,443 Therms verified natural gas energy savings in the Washington service territory. The realization rate for the program deviates from 100% due to differences in the Natural Gas Furnaces, Attic Insulation, DIY Window Replacements, and Paid Window Replacements measures. These were primarily due to small discrepancies in the square footage reported as well as a miscalculation of the value used in the TRM for Natural Gas Furnaces. The Evaluators also note there was one project in which the square footage for the associated attic insulation was used in place of the project's wall insulation, and vice versa. The Evaluators recommend that Avista perform additional QA/QC efforts to ensure square footage is tracked properly, especially for projects in which multiple insulation projects occur. The Evaluators also found that 13 of the sampled projects with insulation or window replacement did not track square footage of installed units in the tracking database. Furthermore, two insulation projects that contained square footage data did not match the project documents for square footage. In addition, U-values for window measures were not consistently tracked, which is an important savings unit assignment requirement.

The Evaluators recommend Avista incorporate a u-value field to the tracking database and add additional QA/QC procedures for documenting square footage for these measures in the program.

- In the **Small Home & MF Weatherization Program**, the Evaluators found that many projects exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units).
- The **Multifamily Direct Install Program** displayed a realization rate of 100% at 2,586 Therms saved in PY2023. The Evaluators found no discrepancy between the savings values in the tracking database and the TRM values leading to a realization rate of 100% for these measures. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data in order to apply more specific savings values to each project.
- The **Appliance Program** displayed a realization rate of 82.45% at 646 Therms saved in PY2023. The realization rate for the natural gas savings in the Appliance Program deviate from 100% due to errors in converting kWh to Therms savings for the clothes washers and erroneously applying Avista TRM values to the measure. The Evaluators estimated gas savings for these measures by converting measure RTF electric savings into Therms savings. The Evaluators note that all gas clothes dryer rebates were assigned 0 Therms expected savings. However, the Evaluators applied Avista TRM UES to these rebates, therefore leading to a high realization rate for the measure. The Evaluators removed savings applied to the top load washer, as the RTF clothes washer workbook calculates negative savings for the top load washer, as the market practice baseline for this measure is already more efficient than the incentivized efficiency. Finally, the Avista TRM erroneously converted the electric savings for the front load clothes washer to 6 Therms/unit. The correct conversion leads to 4 Therms/unit. Additionally, the Avista TRM erroneously converted the electric savings for the clothes dryers to 2.72 Therms while the correct conversion leads to 9.6 Therms/unit. The Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions. The Evaluators recommend incorporating cubic volume in the Appliance Program tracking database.
- The Evaluators evaluated the **Midstream Program** in its launch year of PY2023. The program started in summer 2023. Through this program, Avista effectively converted several water heater and HVAC residential appliances from a downstream measure into a midstream delivery, effectively removing the barriers for end-use customers by removing the requirement to deliver rebate applications to Avista. The program is implemented by Energy Solutions. The implementer defined expected savings for each measure delivered in the program, which displayed savings drastically higher than the Avista TRM and RTF UES documented savings. Therefore, the realization rates for the program are 35% of expected savings. The Evaluators reviewed program documentation and found that the implementer engineering algorithm results were inflated due to incorporating code minimum baselines whereas the RTF and Avista TRM incorporate estimated market baseline. In addition, the Evaluators found that the implementer engineering algorithms were not applied properly, leading to even further inflated savings. The Evaluators note that, had the program utilized the Avista TRM to evaluate expected savings for the program, the realization rate for the program would have been near-100%. The Evaluators recommend that Avista and the implementers update the expected savings calculation methodology to incorporate market practice baseline rather than minimum code baseline values in order to remain consistent with

the baseline methods utilized in the downstream measure programs and more accurately estimate expected savings in future iterations of this program.

1.3.1.2 Low Income Programs

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

- The Evaluators found the **Low-Income** portfolio to demonstrate a total of 14,749 Therms with a realization rate of 95%. The Evaluators conducted a cost-benefit analysis in order to estimate the Low-Income portfolio's cost-effectiveness. The resulting TRC value for this sector is 0.13 while the UCT value is 0.14. These values are expected, as the Low-Income portfolio is not expected to meet cost-effectiveness but are implemented in order to provide energy efficiency benefits to low-income customers. Further details on cost-effectiveness methodology can be found in Appendix C.
- The Evaluators attempted to estimate measure-level Low-Income Program energy savings through billing analysis regression with a counterfactual group selected via propensity score matching. The Evaluators attempted to isolate each unique measure. However, participation for the Low-Income program resulted in a small number of customers with isolated measures and therefore the Evaluators conducted a whole-home billing analysis for all the natural gas measures combined in the Low-Income in order to estimate savings for the average household participating in the program, across all measures. However, the billing analysis results were not statistically significant. Therefore, the Evaluators found a realization rate of 91% from the desk review with Avista TRM values.
- The Evaluators received a lower number of project documents than intended due to the CAP agency having low bandwidth for fulfilling these time consuming paperwork requests. During the review, the Evaluators found there were several projects with missing data. In total, eight projects were unable to be verified due to missing or incomplete data.
- During the review, the Evaluators found there were several projects with missing data. In total, seven projects were unable to be verified due to missing or incomplete data. The Evaluators note that the majority of deviations from 100% realization rate in the Low-Income were due to small differences in the reported savings and Avista TRM documentation 20% annual household energy caps not properly applied in a few instances. The Evaluators recommend additional QA/QC efforts are completed to ensure the program is properly applying the 20% annual household cap by using available household billing data.

1.3.1.3 Nonresidential Programs

The Evaluators provide the following conclusions regarding Avista's Non-Residential natural gas programs:

- The Evaluators found the **Non-Residential** portfolio to demonstrate a total of 137,839 Therms with a realization rate of 106.60%. The difference can be attributed to projects in the Site-Specific Program showing higher levels of measured savings than were expected using ex ante calculations.
- The Evaluators also conducted a cost-benefit analysis in order to estimate the Non-Residential portfolio's cost-effectiveness. The resulting TRC value for this sector is 1.57 while the UCT value is 2.36. Further details on cost-effectiveness methodology can be found in Appendix D: Cost Benefit Analysis Results.
- The verified savings for the **HVAC Program** are 9,987 Therms with a realization rate of 100.00%
- The verified savings for the **Food Service Program** are 10,258 Therms with a realization rate of 99.85%.

- The verified savings for the **Shell** program are 4,263 Therms with a realization rate of 100.00%.
- The verified savings for the **Midstream** program are 21,368 Therms with a realization rate of 47.04%.
    - Adjusted savings comes from the program planning workbooks used by program implementors. Results show that these values were not applied to tracking data as originally intended.
    - Savings for food service equipment was assigned using UES in the program implementation workbook, however did not provide the same estimates that were claimed, indicating that expected UES values were not applied correctly or consistently for Conveyor Ovens and Fryers.
    - Verified savings for boilers was taken from the RTF workbook and is specific to the equipment configuration, capacity and type of facility it is installed in.
    - Savings for Furnaces, Instantaneous Water Heaters and Storage Water Heaters was calculated using standard engineering algorithms, with equipment-specific inputs for capacity and efficiency, and EFLH values from the Midstream planning workbook. Groundwater temps were taken from the RTF, and estimates of gallons of water used per year were taken from the IL TRM 12.0 and assigned to specific facility types. Expected savings for both instantaneous and storage water heaters assumed annual water usage that varied between 348% and 461% of usage estimates in the IL and AR TRMs. Verified savings this for these measures used the more reasonable annual water usage estimates from the IL TRM 12.0, resulting in low verified savings.
    - Results for Furnaces, Instantaneous Water Heaters and Storage Water Heaters varied considerably from expected savings. Adjusted savings were calculated using unit savings multipliers from the Midstream planning book, which resulted in significantly different estimates than those claimed for these measures, indicating that savings values are not being applied consistently.
- The **Site-Specific Program** in total displays a realization rate of 154.94% with 91,963 Therms verified natural gas energy savings in the Washington service territory.
    - **SSOP_117689 –** Measured savings are higher than ex ante predictions.
    - **SSOP_80621 –** Measured savings are higher than ex ante predictions.

1.3.2 Recommendations

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

1.3.2.1 Residential Programs

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

- The Evaluators note instances found in which the web-based rebate data indicates the household has electric space heating, but all other sources (project data and document verification) indicate natural gas space heating, and vice versa. The Evaluators recommend updating data collection standards in order for all sources of information to reflect the same values as the project documentation.
- The Evaluators found a handful of instances in which the rebated equipment did not meet the program minimum requirements for efficiency. The Evaluator recommend Avista check the source AHRI documentation and product level documentation to verify efficiency prior to incentivizing installation of the measure. For example, six of the smart thermostats did not qualify for RTF savings and two appliances were verified to lack ENERGY STAR qualifications.

- The Evaluators found that many projects claimed under the **Small Home & MF Weatherization Program** exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). The Evaluators recommend claiming projects on single family homes that are larger than 1,000 SQFT into the Shell Program.
- The Evaluators imputed home type and space heating type for a large number of sampled rebates, as the tracking database does not contain values for these characteristics or remain outdated. The mail-in rebates collect this information; however, it does not seem to be required to complete the rebate and therefore many rebates are missing this information. The Evaluators recommend verifying home type and space heating type during rebate application approval in order to apply correct savings values to each project.
- The Evaluators found a handful of instances where the rebated equipment did not meet the program minimum requirements for efficiency. The Evaluator recommend Avista check the source AHRI document to verify efficiency prior to incentivizing installation of the measure.
- In the **Water Heat Program**, the Evaluators found that Avista TRM savings values are slightly lower than the RTF savings assigned for the appropriate water heater tank size and tier efficiency. The Evaluators found a majority of water heaters to be Tier 3 or higher, but the Avista TRM only includes savings for a combination of Tier 2 and Tier 3 savings. The Evaluators recommend that Avista document tier rating of heat pump water heaters to ensure proper validation of savings.
- In the **Energy Star Homes Program**, the Evaluators note that program application forms commonly lacked information about home primary and secondary space and water heating type. The Evaluators recommend updating the Avista measure savings database to match the primary heating type for duel fuel households.
- The **Small Home & MF Weatherization Program** displayed small discrepancies in the square footage reported; there was one project in which the square footage for the associated attic insulation was used in place of the project's wall insulation, and vice versa. The Evaluators recommend that Avista perform additional QA/QC efforts to ensure square footage is tracked properly, especially for projects in which multiple insulation projects occur.
- The **Small Home & MF Weatherization Program** displayed inconsistent u-values, which is an important savings unit assignment requirement. The Evaluators recommend Avista incorporate a u-value field to the tracking database and add additional QA/QC procedures for documenting square footage for these measures in the program.
- The Evaluators recommend removing the top load washer from **Appliance Program** offerings, as the RTF clothes washer workbook calculates negative savings for the top load washer. This indicates that the market practice baseline for this measure is already more efficient than the incentivized to load washer efficiency.
- In the **Appliance Program**, the Evaluators note that the current tracking database does not document the cubic volume for the refrigerators and freezers, which is an RTF requirement with minimum restrictions. The Evaluators recommend incorporating cubic volume in the Appliance Program tracking database.
- The Evaluators recommend Avista update the front load clothes washer Avista TRM value to correctly convert 120 kWh/unit to 4 Therms/unit. Currently, the Avista TRM reflects 6 Therms/unit. Additionally,

The Evaluators recommend Avista update the clothes dryer Avista TRM value to correctly convert 281 kWh/unit to 9.6 Therms/unit. Currently, the Avista TRM reflects 2.72 Therms/unit.

- The Evaluators note that, had the **Midstream Program** utilized the Avista TRM to evaluate expected savings for the program, the realization rate for the program would have been near-100%. The Evaluators recommend Avista work with the implementer of the Midstream Program to update expected savings values in the implementer TRM in order to more accurately predict program-level savings in future program cycles.

1.3.2.2 Low Income Programs

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

- The Evaluators note that the majority of deviations from 100% realization rate in the **Low-Income Program** is due to slight deviations between the reported savings and the Avista TRM as well as some measures where 20% annual household energy caps were improperly applied. The Evaluators recommend verifying that the Avista TRM values and the 20% household cap are properly applied when calculating measure savings by utilizing available household billing data.

1.3.2.3 Nonresidential Programs

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

- For the **Midstream Program**:
  - Administrators should verify that UES and savings multipliers are applied consistently across measures. The Evaluators found that in many cases program planning estimates could not replicate claimed savings.
  - Drivers of differences between implementor and RTF EUS for Food Equipment cannot be assessed, but are likely due to differences in baseline efficiency assumptions.
  - The Evaluators suggest that program implementors calculate expected savings for HVAC measures using prescriptive algorithms and measure-specific characteristics. Capacities and efficiency levels very considerably within these measures and current planning materials only produce very general savings estimates.
  - Update annual water usage estimates for storage and instantaneous water heaters.
  - Refer to RTF savings estimates for boilers.

2 General Methodology

The Evaluators performed an impact evaluation on each of the programs summarized in Table 1-5. The Evaluators used the following approaches to calculate energy impact defined by the International Performance Measurement and Verification Protocols (IPMVP)[1] and the Uniform Methods Project (UMP)[2]:

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

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

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

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

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

2.1 Glossary of Terminology

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

- **Deemed Savings** – An estimate of an energy savings outcome (gross savings) for a single unit of an installed energy efficiency measure. This estimate (a) has been developed from data sources and analytical methods that are widely accepted for the measure and purpose and (b) are applicable to the situation being evaluated.
- **Expected Savings** – Calculated savings used for program and portfolio planning purposes.

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[1] https://www.nrel.gov/docs/fy02osti/31505.pdf

[2] https://www.nrel.gov/docs/fy18osti/70472.pdf

[3] https://rtf.nwcouncil.org/measures

[4] Notably, The Uniform Methods Project (UMP) includes the following chapters authored by ADM. Chapter 9 (Metering Cross- Cutting Protocols) was authored by Dan Mort and Chapter 15 (Commercial New Construction Protocol) was Authored by Steven Keates.

[5] Core Concepts: International Measurement and Verification Protocol. EVO 100000 – 1:2016, October 2016.

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

2.2 Summary of Approach

This section presents our general cross-cutting approach to accomplishing the impact evaluation of Avista's Residential, Low-Income, and Nonresidential programs listed in Table 1-5. The Evaluators start by presenting our general evaluation approach. This chapter is organized by general task due to several overlap across programs.

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

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

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

- A *Deemed Savings* approach involves using stipulated savings for energy conservation measures for which savings values are well-known and documented. These prescriptive savings may also include an adjustment for certain measures, such as lighting measures in which site operating hours may differ from RTF values.
- A *Billing Analysis* approach involves estimating energy savings by applying a linear regression to measured participant energy consumption utility meter billing data. Billing analyses included billing

data from nonparticipant customers. This approach does not require on-site data collection for model calibration. This approach aligns with the IPMVP Option C.

- A *Custom* approach, used for the Site-Specific program involves selecting the appropriate IPMVP option to apply to the specific measure or project. Typically this is Option A as most projects in the program are lighting retrofits, however Options B, C and D are also employed, depending upon the project. Specific methods are discussed in each site report.

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

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

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

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

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

2.2.1 Database Review

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

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

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

2.2.2 Verification Methodology

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

2.2.2.1 Sampling Methodology

The Evaluators summarize the methods for each verification effort:

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

2.2.2.2 Sampling Methodology

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

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

EQUATION 1: SAMPLE SIZE FOR INFINITE SAMPLE SIZE

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

EQUATION 2: SAMPLE SIZE FOR FINITE POPULATION SIZE

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

Where,

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

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

2.2.2.3 Sampling Methodology for the Site-Specific Program

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

To address this situation, we use a sample design for selecting projects for the M&V sample that considers such skewness. With this approach, we select several sites with large savings for the sample with certainty and take a random sample of the remaining sites. To improve the precision, non-certainty sites are selected for the sample

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

through systematic random sampling. That is, a random sample of sites remaining after the certainty sites have been selected is selected by ordering them according to the magnitude of their savings and using systematic random sampling. Sampling systematically from a list that is ordered according to the magnitude of savings ensures that any sample selected will have some units with high savings, some with moderate savings, and some with low savings. Samples cannot result that have concentrations of sites with atypically high savings or atypically low savings. Specific sampling characteristics are shown in the Site-Specific section of this report.

2.2.2.4 Document-Based Verification

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

- Water Heat Program
- HVAC Program (res)
- Shell Program (res)
- ENERGY STAR® Homes Program
- Small Home & MF Weatherization Program
- Appliances Program
- Low-Income Program
- HVAC Program (non-res)
- Food Service Equipment Program
- Shell Program (non-res)

This sample of documents was used to cross-verify tracking data inputs. In the case the Evaluators found any deviations between the tracking data and application values, the Evaluators reported and summarized those differences in the Database Review sections presented for each program in Section 3.2 and 5.2.

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

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

TABLE 2-1: DOCUMENT-BASED VERIFICATION SAMPLES AND PRECISION BY PROGRAM

Sector	Program	Gas Population	Sample (With Finite Population Adjustment)*	Precision at 90% CI
Residential	Water Heat	277	56	90% ± 9.84%
Residential	HVAC	4,091	78	90% ± 9.22%
Residential	Shell	1,774	71	90% ± 9.57%
Residential	ENERGY STAR® Homes	7	7	90% ± 100.0%
Residential	Small Home & MF Weatherization	104	51	90% ± 8.26%
Residential	Appliances	194	53	90% ± 9.66%
Residential	Midstream	2,115	67	90% ± 10.00%
Residential	Multifamily Direct Install	69	N/A	N/A
Low-Income	Low-Income	634	72	90% ± 9.13%
Non-Residential	HVAC	25	25	90% ±0.0%
Non-Residential	Food Service Equipment	13	13	90% ±0.0%
Non-Residential	Shell	11	11	90% ±0.0%
Non-Residential	Midstream	64	64	90% ±0.0%
Non-Residential	Site-Specific	9	5	90% ±8.63%**

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

** The Site-Specific Program sample is chosen via a random stratified sample and does not include the FPC. However, it is included in this table for illustrative and informative purposes.

The table above represents the number of rebates in both Washington service territory alone. The Evaluators ensured representation of state and fuel type in the sampled rebates for document verification.

2.2.2.5 Survey-Based Verification

The Evaluators conducted survey-based verification for the Water Heat Program and HVAC Program. The primary purpose of conducting a verification survey is to confirm that the measure was installed and is still currently operational and whether the measure was early retirement or replace-on-burnout.

The Evaluators summarize the final sample sizes shown in Table 2-2 for the Water Heat, HVAC, and the Appliances Programs for the Washington Gas Avista projects. The Evaluators developed a sampling plan that achieved a sampling precision of ±4.65% at 90% statistical confidence for ISRs estimates at the measure-level during web-based survey verification.

TABLE 2-2: SURVEY-BASED VERIFICATION SAMPLE AND PRECISION BY PROGRAM

Sector	Program	Population	Respondents	Precision at 90% CI
Residential	Water Heat	277	56	90% ± 9.84%
Residential	HVAC	4,091	214	90% ± 5.47%
Residential	Small Home & MF Weatherization	104	0	90% ± 100.00%*
Residential	Appliances	194	33	90% ± 13.08%*
Total		**4,664**	**303**	**90% ±4.57%**

*This program did not meet 90% confidence at 10% precision goals and therefore 100% in-service rate was assumed for this program

The Evaluators implemented a web-based survey to complete the verification surveys. The findings from these activities served to estimate ISRs for each measure surveyed. These ISRs were applied to verification sample desk review rebates towards verified savings, which were then applied to the population of rebates. The measure-level ISRs resulting from the survey-based verification are summarized in Section 5.2.5.

2.2.2.6 On-Site Visits

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

2.2.3 Impact Evaluation Methodology

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

- Deemed Savings
- Billing Analysis (IPMVP Option C)
- Billing Heating Load Estimation (IPMVP Option A)

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

2.2.3.1 Deemed Savings

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

In cases where the RTF has existing unit energy savings (UES) applicable to Avista's measures, the Evaluators verified the quantity and quality of installations and apply the RTF's UES to determine verified savings. For gas measures, this applies to the Therms penalties found in electric measures in the RTF.

2.2.3.2 Billing Analysis

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

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

period identifies the period prior to measure installation while the post-period refers to the period following measure installation.

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

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

2.2.3.3 Cohort Creation

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

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

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

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

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

2.2.3.4 Data Collected

The following lists the data collected for the billing analysis:

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

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

5. Typical Meteorological Year (TMY3) data

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

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

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

2.2.3.5 Data Preparation

The following steps were taken to prepare the billing data:

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

17. Removed customers with incomplete post-period bills (<6 months).
18. Removed customers with incomplete pre-period bills.
19. Restricted control customers to those with usage that was comparable with the treatment group usage.
20. Created a matched control group using PSM and matching on pre-period seasonal usage and zip code.

2.2.3.6 Regression Models

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

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

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

EQUATION 3: FIXED EFFECTS DIFFERENCE-IN-DIFFERENCE (D-N-D) MODEL SPECIFICATION

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

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage reading *t* for household *i* during the post-treatment period
- $Post_{it}$ = A dummy variable indicating pre- or post-period designation during period *t* at home *i*
- $Treatment_i$ = A dummy variable indicating treatment status of home *i*
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*
- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home i *(if electric usage)*
- $Month_t$= A set of dummy variables indicating the month during period *t*
- $Customer\ Dummy_i$ = a customer-specific dummy variable isolating individual household effects
- ε_{it} = The error term
- α_0= The model intercept
- β_{1-10} = Coefficients determined via regression

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

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

EQUATION 4: SAVINGS EXTRAPOLATION

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

2.2.3.8 Model 2: Random Effects Post-Program Regression Model

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

The model specification is as follows:

EQUATION 5: POST-PROGRAM REGRESSION (PPR) MODEL SPECIFICATION

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

Where,

- *i* = the *i*th household
- *t* = the first, second, third, etc. month of the post-treatment period
- ADC_{it} = Average daily usage for reading *t* for household *i* during the post-treatment period
- $Treatment_i$ = A dummy variable indicating treatment status of home *i*
- $Month_t$ = Dummy variable indicating month of month *t*
- $PreUsageSpring_i$ = Average daily usage in the spring months across household *i*'s available pre-treatment billing reads
- $PreUsageSummer_i$ = Average daily usage in the summer months across household *i*'s available pretreatment billing reads
- $PreUsageFall_i$ = Average daily usage in the fall months across household *i*'s available pretreatment billing reads
- $PreUsageWinter_i$ = Average daily usage in the winter months across household *i*'s available pre-treatment billing reads
- HDD_{it} = Average heating degree days (base with optimal Degrees Fahrenheit) during period *t* at home *i*

- CDD_{it} = Average cooling degree days (base with optimal Degrees Fahrenheit) during period *t* at home i *(if electric usage)*
- ε_{it} = Customer-level random error
- α_0= The model intercept for home *i*
- β_{1-14} = Coefficients determined via regression

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

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

EQUATION 6: SAVINGS EXTRAPOLATION

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

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

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

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

EQUATION 7: TREATMENT-ONLY FIXED EFFECTS WEATHER MODEL SPECIFICATION

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

Where,

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

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

2.2.3.10 Billing Heating Load Estimation

In addition to the regression based IPMVP Option C billing analysis, the Evaluators also employed a heating load estimation billing analysis. Heating load estimation is a prime methodology for estimating savings associated with space heating measures such as furnaces. This methodology follows IPMVP Option A, in which the estimation of a key parameter is used to calculate savings. The heating load estimation methodology follows the same data collection and data preparation steps outlined in Sections 2.2.3.4 and 2.2.3.5, respectively. However, instead of ending with a regression analysis, post-period billing data are used to estimate customer heating load, which is used as an input in a deemed savings formula to calculate energy savings.

The first step in heating load estimation is calculating TMY3 weather normalized average daily consumption. To do so, customer-specific regressions are run to determine the effect of daily HDD on average daily consumption. This is a straightforward regression of the form:

EQUATION 8: HEATING LOAD REGRESSION

$$ADC_i = \alpha_0 + \beta_1 (HDD)_i$$

Where,

- *i* = the *i*th household
- ADC_i = Average daily usage for household *i* during the post-treatment period
- HDD_i = Average heating degree days (base with optimal Degrees Fahrenheit) at home *i*
- β_1 = Coefficient determined via regression

This regression is run separately for each customer to determine β_1, impact of HDD on average daily consumption (i.e., the change in Therms usage per HDD). From there, β_1 multiplied by HDD is subtracted from ADC and $\beta_1$multiplied by TMY3_HDD is added back to ADC to calculate TMY3 weather normalized average daily consumption. The actual HDD attributable Therms usage is subtracted from average daily consumption and the TMY_HDD attributable Therms are added back in, as outlined in the following equation.

EQUATION 9: NORMALIZED AVERAGE DAILY CONSUMPTION

$$NADC_i = ADC_i - \beta_1 * (HDD)_i + \beta_1 * (TMY\_HDD)_i$$

Where,

- *i* = the *i*th household
- $NADC_i$ = TMY normalized average daily usage for household *i* during the post-treatment period
- β_1 = Customer-specific Therms usage per HDD
- ADC_i = Average daily usage for household *i* during the post-treatment period
- HDD_i = Average heating degree days (base with optimal Degrees Fahrenheit) at home *i*
- TMY_HDD_i = Average TMY heating degree days at home *i*

Once TMY normalized average daily usage is calculated, the penultimate step to heat load estimation is calculating customer baseload usage. Customer baseload usage represents the energy customers use for non-

heating needs, such as a gas stove or dryer. For gas heating measures, customer baseload usage can be calculated as the average NADC across June, July, and August. Customer-specific baseload usage is then subtracted from NADC and to determine customer daily heating load.

Customer heating loads are then used in the following deemed savings equation to calculate the annual savings associated with gas furnace installation.

EQUATION 10: GAS FURNACE SAVINGS

$$Savings_i = 365 * HL_i * (\frac{1}{Base_i} - \frac{1}{Eff_i})$$

Where,

- *i* = the *i*th household
- $Savings_i$ = Annual Therms savings for household *i* based on post-treatment period billing data
- 365 = Days in the year
- HL_i = Customer-specific daily heating load for household *i*
- $Base_i$ = Baseline furnace efficiency at home *i*, which is assumed to be 85.5% per the RTF Gas Furnace UES Measure[8]
- Eff_i = Installed furnace efficiency at home *i*, which is assumed to be 95%

2.2.4 Net-to-Gross

The Northwest RTF UES measures do not require NTG adjustments as they are built into the deemed savings estimates. In addition, billing analyses with counterfactual control groups, as proposed in our impact methodology, does not require a NTG adjustment, as the counterfactual represents the efficiency level at current market (i.e. the efficiency level the customer would have installed had they not participated in the program).

2.2.5 Cost-Effectiveness Tests

The Evaluators calculated each program's cost-effectiveness, avoided energy costs, and implementation costs. The Evaluators used our company-developed cost-effectiveness tool to provide cost-effectiveness assessments for the each the Residential, Low-Income, and Nonresidential Portfolio by program, fuel type, program year, and measure, for each state.

As specified in this solicitation, the Evaluators determined the economic performance with the following cost-effectiveness tests:

- Total Resource Cost (TRC) test;
- Utility Cost Test (UCT);
- Participant Cost Test (PCT); and
- Rate Impact Measure (RIM).

2.2.6 Non-Energy Benefits

The Evaluators used the non-energy impact (NEI) values estimated and filed in Avista's 2022 Annual Conservation Plan. Measures with quantified NEBs include residential insulation, high efficiency windows, air source heat pumps, and ductless heat pumps.

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

In addition to the residential NEBs, the Evaluators applied the end-use non-energy benefit and health and human safety non-energy benefit to the Low-Income Program. The Evaluators understand that the two major non-energy benefits referenced above are uniquely applicable to the Low-Income Program. The Evaluators applied those benefits to the program impacts as well as additional non-energy benefits associated with individual measures included in the program. The Evaluators incorporated additional NEBs to the impact evaluation, as applicable. Additional details on the non-energy benefits applied can be found in Section 9.

3 Residential Impact Evaluation Results

The Evaluators completed an impact evaluation on Avista's Residential portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each natural gas impact evaluation in the Residential Portfolio in the Washington service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, RTF, and billing analysis of participants and nonparticipants to evaluate savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data. Table 3-1 summarizes the Residential verified impact savings by program. Table 3-2 summarizes the Residential portfolio's cost-effectiveness.

TABLE 3-1: RESIDENTIAL VERIFIED IMPACT SAVINGS BY PROGRAM

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Water Heat	16,612	14,945	89.96%
HVAC	229,813	208,468	90.71%
Shell	87,304	87,129	99.80%
ENERGY STAR Homes	469	469	100.00%
Small Home & MF Weatherization	5,842	6,443	110.29%
Multifamily Direct Install	2,586	2,586	100.00%
Appliances	784	646	82.45%
Midstream	326,743	114,505	35.04%
Total Res	**670,154**	**435,191**	**64.94%**

TABLE 3-2: RESIDENTIAL PORTFOLIO COST-EFFECTIVENESS SUMMARY

Sector	TRC			UCT		
	Benefits	Costs	B/C Ratio	Benefits	Costs	B/C Ratio
Residential	$17,837,146	$8,063,506	2.21	$8,114,762	$6,147,436	1.32

In PY2023, Avista completed and provided incentives for residential natural gas measures in Washington and reported total natural gas savings of 435,191 Therms, leading to an overall achievement of 64.94% of the expected savings for the residential programs. The Evaluators estimated the TRC value for the Residential portfolio is 2.21 while the UCT value is 1.32. Further details of the impact evaluation results by program are provided in the sections following.

3.1 Simple Verification Results

The Evaluators surveyed 2,229 unique customers that participated in Avista's residential energy efficiency program from October 2022 and in December 2023 using an email survey approach. The Evaluators surveyed customers that received rebates for HVAC, Water Heater, and Appliance Programs.

TABLE 3-3: SUMMARY OF SURVEY RESPONSE RATE

Population	Respondents
Initial email contact list	8,262
Invalid or bounced	416
Invalid or bounced email (%)	5.0%
Invitations sent (unique valid)	7,846
Completions	2,229
Response rate (%)	28.4%

3.1.1 In-Service Rates

The Evaluators calculated in-service rates of installed measures from simple verification surveys deployed to program participants for the Water Heat, HVAC, Small Home & MF Weatherization, and Appliance Programs. Evaluators asked participants if the rebated equipment is currently installed and working, in addition to questions about the new equipment fuel type. The Evaluators achieved ±4.6% precision across the programs surveyed for the natural gas measures in Avista's service territory, summarized in Table 3-4. When mixing survey-level responses between Idaho and Washington, the Evaluators achieved 3.6% precision (Table 3-5).

TABLE 3-4: STATE-SPECIFIC SIMPLE VERIFICATION PRECISION BY PROGRAM

Sector	Program	Population	Respondents	Precision at 90% CI
Residential	Water Heat	277	56	90% ± 9.8%
Residential	HVAC	4,089	213	90% ± 5.4%
Residential	Small Home & MF Weatherization	104	0	90% ± 100.0%
Residential	Appliances	194	33	90% ± 13.1%
Total		**4,664**	**302**	**90% ±4.6%**

TABLE 3-5: MIXED-STATE-SPECIFIC SIMPLE VERIFICATION PRECISION BY PROGRAM

Sector	Program	Population	Respondents	Precision at 90% CI
Residential	Water Heat	433	80	90% ± 8.3%
Residential	HVAC	5,730	345	90% ± 4.3%
Residential	Small Home & MF Weatherization	236	1	90% ± 82.3%
Residential	Appliances	309	60	90% ± 9.6%
Total		**6,708**	**298**	**90% ±3.6%**

The measure-level ISRs determined from the verification survey for each program in which simple verification was conducted is presented in Table 3-6 through Table 3-8.

TABLE 3-6: WATER HEAT PROGRAM ISRS BY MEASURE

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
G 50 Gallon Natural Gas Water Heater	17	100%	21	100%	State-specific ISR
G Tankless Water Heater	39	100%	59	100%	State-specific ISR

TABLE 3-7: HVAC PROGRAM ISRS BY MEASURE

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
G FURNACE 95% (Multi-Stage or Modulating)	54	98%	54	98%	State-specific ISR
G FURNACE 95% (Multi-Stage)	2	100%	2	100%	State-specific ISR
G Natural Gas Boiler 96%+	1	100%	1	100%	State-specific ISR
G Natural Gas Boiler 95%	10	100%	14	100%	State-specific ISR
G Natural Gas Furnace	40	100%	98	100%	State-specific ISR
G Natural Gas Wall Furnace	1	100%	2	100%	State-specific ISR
G Smart Thermostat DIY with Natural Gas Heat	31	100%	52	100%	State-specific ISR
G Smart Thermostat Paid Install with Natural Gas Heat	74	99%	121	99%	State-specific ISR

TABLE 3-8: SMALL HOME & MF WEATHERIZATION PROGRAM ISRS BY MEASURE

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
G Multifamily 50 Gallon Natural Gas Water Heater	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Attic Insulation With Natural Gas Heat	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Energy Star Certified Insulated Door	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Energy Star Rated Front Load Washer	0	N/A	0	N/A	Assume 100% ISR
G Energy Star Rated Front Load Washer	No Participation	N/A	No Participation	N/A	Assume 100% ISR
G Multifamily Energy Star Rated Top Load Washer	0	N/A	0	N/A	Assume 100% ISR
G Multifamily FURNACE 95% (Multi-Stage)	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Natural Gas Boiler	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Natural Gas Furnace	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Smart Thermostat DIY with Natural Gas Heat	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	0	N/A	1	100%	Assume 100% ISR
G Multifamily Tankless Water Heater	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Window DIY Replc With Natural Gas Heat	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Window Replc With Natural Gas Heat	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Energy Star Rated Clothes Dryer	0	N/A	0	N/A	Assume 100% ISR
G Multifamily Wall Insulation With Natural Gas Heat	0	N/A	0	N/A	Assume 100% ISR

*These measures did not receive enough responses to meet 90/10 precision and therefore 100% in-service rate is assumed

TABLE 3-9: APPLIANCE PROGRAM ISRS BY MEASURE

Measure	State-level Respondents	State-level ISR	Mixed State-level Respondents	Mixed State-level ISR	ISR Methodology
G Energy Star Rated Clothes Dryer	4	100%	10	100%	Mixed state ISR
G Energy Star Rated Front Load Washer	15	100%	29	100%	Mixed state ISR
G Energy Star Rated Top Load Washer	14	100%	21	95%	Mixed state ISR

These ISR values were utilized in the desk reviews for the Water Heat, HVAC, Small Home & MF Weatherization, and Appliance Programs in order to calculate verified savings. Additional insights from the survey responses are summarized in Appendix B: Summary of Survey Respondents.

3.2 Program-Level Impact Evaluation Results

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

3.2.1 Water Heat Program

The Water Heat Program encourages customers to replace their existing electric or natural gas water heater with high efficiency equipment. Customers receive incentives after installation and after submitting a completed rebate form. Table 3-10 summarizes the measures offered under this program.

TABLE 3-10: WATER HEAT PROGRAM MEASURES

Measure	Description	Impact Analysis Methodology
G 50 Gallon Natural Gas Water Heater	Storage tank natural gas water heater, 50 gallons or less	Avista TRM
G Tankless Water Heater	Tankless natural gas water heater	Billing Analysis

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

TABLE 3-11: WATER HEAT PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G 50 Gallon Natural Gas Water Heater	59	937	1,286	820	87.50%
G Tankless Water Heater	218	15,675	15,260	14,125	90.11%
Total	**277**	**16,612**	**16,546**	**14,945**	**89.96%**

The Water Heat Program displayed verified savings of 14,945 Therms with a realization rate of 90% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs from the program.

TABLE 3-12: WATER HEAT PROGRAM COSTS

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
G 50 Gallon Natural Gas Water Heater	$4,200.00	$1,476.98	$5,676.98
G Tankless Water Heater	$107,200.00	$21,861.13	$129,061.13
Total	**$111,400.00**	**$23,338.11**	**$134,738.11**

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

3.2.1.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Water Heat Program. The Evaluators selected a subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

The Evaluators found all Water Heat Program rebates to have completed rebate applications with the associated water heater model number and efficiency values filled in either the Customer Care & Billing (CC&B) web rebate data or mail-in rebate applications. The Evaluators note that the CC&B web rebate data reflected consistent values between the mail-in rebate applications, invoices, and AHRI certification documents submitted with the rebate application, except for four rebates.

One G 50 Gallon Natural Gas Water Heater did not qualify for savings due to insufficient efficiency level of the equipment. In addition, three rebates were erroneously categorized as “G Tankless Water Heater” and after further investigation the Evaluators found that these were boilers that were installed leading to 0 kWh savings

being assigned to these measures. Lastly, there were four rebates that did not claim any savings, which the Evaluators appropriately disregarded in the savings calculations.

3.2.1.2 Verification Survey

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure. The Evaluators included questions such as:

- Was this water heater a new construction, or did it replace another water heater?
- Was the previous water heater functional?
- Is the newly installed water heater still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Water Heat Program. Table 3-13 displays the ISRs for each of the Water Heat measures for the Washington territory alone.

TABLE 3-13: WATER HEAT VERIFICATION SURVEY ISR RESULTS

Measure	Number of Rebates*	Number of Survey Completes*	Program-Level Precision at 90% Confidence	In-Service Rate
G 50 Gallon Natural Gas Water Heater	59	17	90% ±9.8%	100%
G Tankless Water Heater	218	39		100%

All survey respondents for each water heater measure described equipment to be currently functioning, leading to a 100% ISR. The Evaluators applied these ISRs to each rebate to quantify verified savings for each measure.

3.2.1.3 Impact Analysis

This section summarizes the verified savings results for the Water Heat Program. The Evaluators conducted a billing analysis for measures where participation allowed. The Evaluators calculated verified savings for the remaining measures using active values from the Avista TRM workbook. These values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.1.4 Billing Analysis

The results of the billing analysis for the Water Heat Program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Table 3-14 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis. The G 50 Gallon Natural Gas Water Heater did not have sufficient participation to move forward with a billing analysis.

TABLE 3-14: MEASURES CONSIDERED FOR BILLING ANALYSIS, WATER HEAT PROGRAM

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations	Sufficient Participation for Billing Analysis
G 50 Gallon Natural Gas Water Heater	✓	51	
G Tankless Gas Water Heater	✓	225	✓

*This count includes rebates from Washington and Idaho

The Evaluators were provided a considerable pool of control customers to draw upon. The Evaluators used nearest neighbor matching with a 5 to 1 matching ratio. Therefore, each treatment customer was matched to 5 similar control customers. The final number of customers in each the treatment and control group are listed in Table 3-15.

The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 3-15 provides annual savings per customer for each measure at 23.82 Therms per year. Model 2 (PPR) was selected as the final model for the Water Heat Program as it provided the highest adjusted R-squared among the regression models. However, savings for the G Tankless Water Heater are lower than RTF savings and therefore not used towards estimating verified savings for the measure.

TABLE 3-15: MEASURE SAVINGS, WATER HEAT PROGRAM

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
G Tankless Water Heater	225	224	21.62	10.1	37.55	0.55	Model 2: PPR

The Evaluators did not utilize the billing analysis values to estimate verified savings for this measure due to unexpectedly low results and low adjusted R-squared value, demonstrating low fit. Further details of the billing analysis for the tankless water heater measure can be found in Appendix A: Billing Analysis Results

3.2.1.5 Verified Savings

The Evaluators reviewed and applied the current Avista TRM values along with verified tracking data to estimate net program savings for this measure. The verified savings for the program is 14,945 Therms with a realization rate of 90%, as displayed in Table 3-11.

The realization rate for the natural gas savings in the tankless and storage tank water heater measures deviated from 100% realization due to differences in home type, heating zone, cooling zone, and efficiency level of the water heater.

3.2.2 HVAC Program

The HVAC program encourages installation of high efficiency HVAC equipment and smart Thermostats through customer incentives. The program is available to residential electric or natural gas customers with a winter heating season usage of 4,000 or more kWh, or at least 160 Therms of space heating in the prior year. Existing or new construction homes are eligible to participate in the program. Table 3-16 summarizes the measures offered under this program.

TABLE 3-16: HVAC PROGRAM MEASURES

Measure	Description	Impact Analysis Methodology
G FURNACE 95% (Multi-stage or Modulating)	Natural gas forced air furnace, multi-stage	Avista TRM
G Natural Gas Boiler 95%+	Natural gas boiler	Avista TRM
G Natural Gas Boiler 96%+	Natural gas boiler	Avista TRM
G Natural Gas Furnace	Natural gas forced air furnace	Avista TRM
G Natural Gas Wall Heater	Natural gas wall heater	Avista TRM
G Smart Thermostat DIY with Natural Gas Heat	Professionally installed connected Thermostats in natural gas-heated home	Avista TRM
G Smart Thermostat Paid Install with Natural Gas Heat	Self-installed connected Thermostats in natural gas-heated home	Avista TRM

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

TABLE 3-17: HVAC PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Smart Thermostat Paid Install with Natural Gas Heat	1,590	42,704	42,970	24,146	56.54%
G Natural Gas Boiler 95%	25	2,572	2,810	2,572	100.00%
G FURNACE 95% (Multi-Stage or Modulating)	776	74,894	75,563	73,507	98.15%
G Natural Gas Furnace	1,028	89,784	90,045	89,784	100.00%
G FURNACE 95% (Multi-Stage)	19	1,843	1,843	1,843	100.00%
G Smart Thermostat DIY with Natural Gas Heat	649	17,822	17,875	16,422	92.14%
G Natural Gas Boiler 96%+	1	112.4	112.4	112.4	100.00%
G Natural Gas Wall Furnace	1	81.66	81.66	81.66	100.00%
Total	**4,089**	**229,813**	**231,301**	**208,468**	**90.71%**

The HVAC Program displayed verified savings of 208,468 Therms with a realization rate of 90.71% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

TABLE 3-18: HVAC PROGRAM COSTS

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
G Smart Thermostat Paid Install with Natural Gas Heat	$310,597.02	$28,555.80	$339,152.82
G Natural Gas Boiler 95%	$10,800.00	$4,164.03	$14,964.03
G FURNACE 95% (Multi-Stage or Modulating)	$617,400.00	$127,947.80	$745,347.80
G Natural Gas Furnace	$722,262.44	$146,712.69	$868,975.13
G FURNACE 95% (Multi-Stage)	$15,200.00	$3,190.25	$18,390.25
G Smart Thermostat DIY with Natural Gas Heat	$89,880.36	$16,386.08	$106,266.44
G Natural Gas Boiler 96%+	$0.00	$179.23	$179.23
G Natural Gas Wall Furnace	$0.00	$147.49	$147.49
Total	**$1,766,139.82**	**$327,283.37**	**$2,093,423.19**

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

3.2.2.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the HVAC Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in in Section 2.2.2.4.

The Evaluators found all HVAC Program rebates to have project documentation with the associated HVAC model number and efficiency values in either the CC&B web rebate data or mail-in rebate applications. The majority of project files contained associated AHRI certifications for the installed equipment. This allowed the Evaluators to easily verify equipment specifications to assign savings values to each sampled project.

The Evaluators note that not all rebate applications contained existing/new construction field and single family home/manufactured home fields. This field is an input to apply correct RTF UES values so the Evaluators imputed these values via a search on Zillow. The Evaluators recommend requiring this field be completed in rebate applications, both mail-in and web-based.

The Evaluators verified smart thermostat model specifications through the ENERGY STAR database and to verify if the thermostats met all conditions required from the RTF measure specifications. The Evaluators verified that six smart thermostats did not meet the RTF measure specifications required by the RTF, specifically, the requirement for occupancy sensing capabilities. Savings were removed for these 8 projects.

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

3.2.2.2 Verification Survey

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.5. The Evaluators included questions such as:

- What type of Thermostat did this Thermostat replace?
- Is your home heating with electricity, natural gas, or another fuel?
- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the HVAC Program. In addition, the Evaluators asked participants how the COVID19 pandemic stay-at-home orders have affected their household's energy consumption. The responses to these additional questions can be found in.

Table 3-19 displays the ISRs for each of the HVAC measures for Washington natural gas territory alone. The ISRs resulted in ±5.4% precision at the 90% confidence interval for the program.

TABLE 3-19: HVAC VERIFICATION SURVEY ISR RESULTS

Measure	Number of Rebates*	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
G FURNACE 95% (Multi-Stage or Modulating)	776	54	90% ±5.4%	98%
G FURNACE 95% (Multi-Stage)	19	2		100%
G Natural Gas Boiler 96%+	1	1		100%
G Natural Gas Boiler 95%	25	10		100%
G Natural Gas Furnace	1028	40		100%
G Natural Gas Wall Furnace	1	1		100%
G Smart Thermostat DIY with Natural Gas Heat	649	31		100%
G Smart Thermostat Paid Install with Natural Gas Heat	1590	74		99%

*This count includes rebates from Washington only

Survey respondents described equipment to be currently functioning, leading to a 100% ISR for all measures except the G Furnace 95% (Multi-Stage or Modulating) measure and the G Smart Thermostat Paid Install with Natural Gas Heat measure. Although less than 100%, the ISR for the referenced measure still met or exceeded ISRs of 98%. The Evaluators applied the ISRs listed in Table 3-19 to each rebate to quantify verified savings for each measure.

3.2.2.3 Impact Analysis

This section summarizes the verified savings results for the HVAC Program. The Evaluators conducted a billing analysis for measures where participation allowed. The Evaluators calculated verified savings for the remaining measures using active values from the Avista TRM workbook. These values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.2.4 Billing Analysis

The results of the billing analysis for the HVAC program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Table 3-20 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis.

TABLE 3-20: MEASURES CONSIDERED FOR BILLING ANALYSIS, HVAC PROGRAM

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
G FURNACE 95% (Multi-Stage)	✓	187	✓
G Natural Gas Boiler	✓	2	
G Natural Gas Furnace	✓	1053	✓
G Smart Thermostat DIY with Natural Gas Heat	✓	427	✓
G Smart Thermostat Paid Install with Natural Gas Heat	✓	608	✓
G FURNACE 95% (Multi-Stage)	✓	187	✓

*This count includes rebates from Washington and Idaho

The Evaluators were provided a considerable pool of control customers to draw upon. The Evaluators used nearest neighbor matching with a 5 to 1 matching ratio. Therefore, each treatment customer was matched to 5 similar control customers. The final number of customers in each the treatment and control group are listed in Table 3-21.

The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 3-21 provides annual savings per customer for each measure. Model 2 (PPR) was selected as the final model for the HVAC Program as it provided the highest adjusted R-squared among the regression models. Savings are not statistically significant at the 90% level for the DIY smart Thermostat measure.

TABLE 3-21: MEASURE SAVINGS, HVAC PROGRAM

Measure	Treatment Cust	Control Cust	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
G FURNACE 95% (Multi-Stage)	187	183	20.28	37.19	3.36	0.91	Model 2: PPR
G Natural Gas Furnace	1053	1,019	13.82	20.23	7.41	0.92	Model 2: PPR
G Smart Thermostat Paid Install with Natural Gas Heat	427	422	13.78	23.69	3.87	0.92	Model 2: PPR
G Smart Thermostat DIY with Natural Gas Heat	608	594	-1.5*	5.64	-8.64	0.94	Model 2: PPR

*Not statistically significant

Because the results from these billing analyses are contradicting and/or inconclusive, the Evaluators elected to utilize Avista TRM values to estimate verified savings for the smart Thermostat measures. The findings from the PY2023 billing analyses for these measures may have been impacted by the COVID19 pandemic. Details for this analysis are provided in the following section. Further details of the billing analysis can be found in Appendix A, Section Appendix A: Billing Analysis Results.

3.2.2.5 Retrofit Isolation Results

A retrofit isolation approach was used to estimate savings for Natural Gas Furnaces in addition to the billing analysis. Because the retrofit isolation approach relies on extracting baseload usage estimate from summer (June – August) billing data, the sample was restricted to customers with installations in January, 2022 and 11 months of post installation data.

Table 3-22 provides annual savings for Natural Gas Furnaces. The Evaluators estimate the G FURNACE 95% (Multi-Stage) at 103.16 Therms and the G Natural Gas Furnace measure to display an annual savings of 123.36 Therms. This verified value was applied to all associated rebates in the Washington gas service territory.

TABLE 3-22: MEASURE SAVINGS FOR NATURAL GAS FURNACES, HVAC PROGRAM

Measure	# of Treatment Customers	Annual Savings/Customer (Therms)	90% Lower CI	90% Upper CI
G FURNACE 95% (Multi-Stage)	183	103.16	2.02	0.02
G Natural Gas Furnace	1,019	123.36	7.92	0.06

3.2.2.6 Verified Savings

The HVAC Program in total displays a realization rate of 91% with 208,468 Therms verified natural gas savings in the Washington service territory, as displayed in Table 3-17.

The realization rate for the natural gas savings in the HVAC Program deviate from 100% due to differences between the billing analysis results and the RTF UES. In addition, six smart thermostats were verified to lack qualification of savings based on device capabilities and therefore the Evaluators removed savings for these three measures. The disqualified smart thermostats lacked occupancy sensor mechanisms, which the RTF requires for savings claimed.

All other rebates were assigned savings equivalent to the expected savings through Avista TRM values yielding an average of 99.69% realization rate.

The realization rate for the electric savings in the HVAC Program deviates from 100% due to the differences between the applied Avista TRM prescriptive savings value and the true Avista TRM or appropriate RTF UES value and due to lack of requirements met by a subset of smart thermostats.

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net program adjusted savings. In addition, the Evaluators reviewed and applied the current RTF UES values for the electric measures along with verified tracking data to estimate net program verified savings for this measure. For the HVAC measures such as ductless heat pumps and air source heat pumps, RTF savings are dependent on housing type (single family/multifamily/manufactured housing). The Evaluators verified home type and imputed where necessary via a search on Zillow when applying RTF values to each sampled project. This led to higher or lower savings than expected, depending on housing type.

The smart thermostat realization rate is low because the Avista TRM uses an average of retail and direct install savings values as well as an average across heating types, while the Evaluators assigned the appropriate RTF UES value for each installation type and heating zone. In addition, six of the thermostat projects did not qualify for savings due to lack of requirements met for RTF savings. The appropriate categories in the RTF led to a lower-than-expected savings for the direct install and retail rebates for this measure. Measure-level ISRs were applied to these savings values, which did not affect the realization rate, as ISRs displayed were 98 to 100% for all measures in the HVAC program.

3.2.3 Shell Program

The Shell Program provides incentives to customers for improving the integrity of the home's envelope with upgrades to windows and storm windows. Rebates are issued after the measure has been installed for insulation and window measures. Participating homes must have natural gas or natural gas heating and itemized invoices including measure details such as insulation levels, window values, and square footage. In order to be eligible for incentive, the single-family households, including fourplex or less, must demonstrate an annual electricity usage of at least 8,000 kWh or an annual gas usage of at least 340 Therms. Multifamily homes have no usage requirement. This program includes free manufactured home duct sealing implemented by UCONS. Table 3-23 summarizes the measures offered under this program.

TABLE 3-23: SHELL PROGRAM MEASURES

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

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

TABLE 3-24: SHELL PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Attic Insulation With Natural Gas Heat	426	29,478	29,423	27,917	94.70%
G Energy Star Certified Insulated Door	114	4,069	3,112	4,069	100.00%
G Floor Insulation With Natural Gas Heat	28	1,177	1,402	688	58.45%
G Storm Windows with Natural Gas Heat	2	19	12	12	63.16%
G Wall Insulation With Natural Gas Heat	112	4,999	5,282	5,311	106.24%
G Window DIY Replc With Natural Gas Heat	43	1,098	1,098	1,104	100.55%
G Window Replc With Natural Gas Heat	1,049	46,462	47,192	48,028	103.37%
Total	**1,774**	**87,304**	**87,520**	**87,129**	**99.80%**

The Shell Program displayed verified savings of 87,129 Therms with a realization rate of 100% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

TABLE 3-25: SHELL PROGRAM COSTS

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
G Attic Insulation With Natural Gas Heat	$701,047.75	$488,148.90	$1,189,196.65
G Energy Star Certified Insulated Door	$15,100.00	$8,658.86	$23,758.86
G Floor Insulation With Natural Gas Heat	$27,787.50	$9,657.32	$37,444.82
G Storm Windows with Natural Gas Heat	$170.25	$15.93	$186.18
G Wall Insulation With Natural Gas Heat	$141,394.15	$54,729.98	$196,124.13
G Window DIY Replc With Natural Gas Heat	$14,452.63	$1,744.17	$16,196.80
G Window Replc With Natural Gas Heat	$1,205,210.42	$75,897.25	$1,281,107.67
Total	**$2,105,162.70**	**$638,852.41**	**$2,744,015.11**

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

3.2.3.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Shell Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

The Evaluators reviewed each measure number of units, square footage, and insulation where available. One of the four floor insulation projects sampled did not include any information regarding floor insulation square footage or R-value. This contributed to a low realization for the floor insulation measure.

The Evaluators found one duplicate rebate in the project data, and it was removed from verified savings.

3.2.3.2 Verification Survey

The Evaluators conducted a verification survey for Energy Star doors and found an in service rate of 100%. The Evaluators did not conduct verification surveys for the other measures in the Shell Program since weatherization measures historically have high verification rates.

3.2.3.3 Impact Analysis

This section summarizes the verified savings results for the Shell Program. The Evaluators calculated verified savings for the natural gas measures using the active Avista TRM values. The Evaluators calculated adjusted savings for each measure using the active Avista TRM values and verified tracking data. The Evaluators conducted a billing analysis for measures where participation allowed. These values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.3.4 Billing Analysis

The results of the billing analysis for the Shell program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Table 3-26 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis. The customers considered for attic insulation and window replacement billing analysis include customers in both Washington and Idaho service territories to gather the maximum number of customers possible for precise savings estimates. Although the table shows that the windows have enough according to our criteria, the regression analysis p-values do not show significant results. To correct for variability in the data, the Evaluators combined all data for gas measures into a single analysis.

TABLE 3-26: MEASURES CONSIDERED FOR BILLING ANALYSIS, SHELL PROGRAM

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
G Attic Insulation With Natural Gas Heat	✓	97*	✓
G Window Replc With Natural Gas Heat	✓	342*	✓
G Attic Insulation and G Window Replc With Natural Gas Heat	✓	439*	✓

*This count includes rebates from Washington and Idaho

The final number of customers in each the treatment and control group are listed in Table 3-27.

The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 3-27 provides annual savings per customer for both measures combined. Model 2 (PPR) was selected as the final model for the Shell Program as it provided the highest adjusted R-squared among the regression models. Savings are statistically significant at the 90% level for all measures and the adjusted R-squared shows the model provided an excellent fit for the data (adjusted R-squared > 0.90).

TABLE 3-27: MEASURE SAVINGS, SHELL PROGRAM

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
G Attic Insulation With Natural Gas Heat	97	436	132.50*	36.06	228.93	0.92	Model 2: PPR
G Window Replc With Natural Gas Heat	342	436	140.13	68.55	211.72	0.93	Model 2: PPR
G Attic Insulation and G Window Replc With Natural Gas Heat	439	436	148.80	77.00	220.6	0.93	Model 2: PPR

*Not statistically significant

The Evaluators found the G Attic Insulation and G Window Replacement measures with Natural Gas Heat display a statistically significant verified savings value of 148.80 Therms per year. Although the Evaluators estimated savings for these measures through billing analysis, the verified savings for the measures were calculated via Avista TRM due to much higher than expected billing analysis results. Further details of the billing analysis for the Shell measures can be found in Appendix A: Billing Analysis Results.

3.2.3.5 Verified Savings

The Shell Program in total displays a realization rate of 100% with a verified natural gas savings of 87,129 Therms in the Washington service territory, as displayed in Table 3-24. The realization rate for the electric savings in the Shell Program deviate from 100% due primarily to the differences between the categories applied in the Avista TRM prescriptive savings values and the more detailed categories present with unique RTF UES values. The Evaluators found minimal discrepancy in square footage values between the tracking data and project-level documents provided.

3.2.4 ENERGY STAR® Homes Program

The ENERGY STAR® Homes Program provides rebates for homes within Avista's service territory that attain an ENERGY STAR® certification. This program incentivizes for ENERGY STAR® Eco-rated homes. Table 3-28 summarizes the measures offered under this program.

TABLE 3-28: ENERGY STAR® HOMES PROGRAM MEASURES

Measure	Description	Impact Analysis Methodology
G ENERGY STAR Home - Manufactured, Gas & Electric	ENERGY STAR-rated manufactured home with gas and electric	RTF UES/Avista TRM
G Energy Star Home - Manufactured, Natural Gas	ENERGY STAR-rated manufactured home with gas only	RTF UES/Avista TRM
E ENERGY STAR Home - Manufactured, Furnace	ENERGY STAR-rated manufactured home with natural gas Furnace	RTF UES
E ENERGY STAR Home - Manufactured, Gas & Electric	ENERGY STAR-rated manufactured home with gas and electric	RTF UES

The following table summarizes the verified natural gas savings for the ENERGY STAR® Homes Program impact evaluation.

TABLE 3-29: ENERGY STAR® HOMES PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Energy Star Home - Manufactured, Gas & Electric	7	469	469	469	100.00%
G Energy Star Home - Manufactured, Natural Gas	0	-	-	-	N/A
Total	**7**	**469**	**469**	**469**	**100.00%**

The ENERGY STAR® Homes Program displayed verified savings of 469 Therms with a realization rate of 100% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

TABLE 3-30: ENERGY STAR® HOMES PROGRAM COSTS

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
G Energy Star Home - Manufactured, Gas & Electric	$7,000.00	$486.64	$7,486.64
G Energy Star Home - Manufactured, Natural Gas	$0.00	$0.00	$0.00
Total	**$7,000.00**	**$486.64**	**$7,486.64**

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

3.2.4.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the ENERGY STAR® Homes Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

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

3.2.4.2 Verification Survey

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

3.2.4.3 Impact Analysis

This section summarizes the verified savings results for the ENERGY STAR® Homes Program. The Evaluators calculated verified savings for the natural gas measures using the most recent RTF workbook for the ENERGY STAR® Homes measures. These RTF UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.4.4 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate adjusted program savings for each of the ENERGY STAR® Homes measures. In addition, the Evaluators reviewed and applied the current RTF UES values for each measure along with verified tracking data to estimate net program savings.

The ENERGY STAR® Homes Program in total displays a realization rate of 100% with 469 Therms verified natural gas energy savings in the Washington service territory, as displayed in Table 3-29. The realization rate for the gas savings in the ENERGY STAR® Homes Program does not deviate from 100%; the Evaluators found the expected savings calculations were attributed correctly to these 7 projects.

The Evaluators note that program application forms commonly lacked information about home primary and secondary space and water heating type. The Evaluators recommend updating the Avista measure savings database to match the primary heating type for duel fuel households.

The Evaluators did not conduct a verification survey for the ENERGY STAR® Homes Program and therefore did not adjust verified savings with an ISR.

3.2.5 Small Home & MF Weatherization Program

The Small Home & MF Weatherization Program is a residential prescriptive program that waives the energy usage requirement that is typically employed for residential prescriptive programs. This benefits small homes (less than 1,000 square feet in size) and multifamily dwellings (specifically customers in condominiums larger than five units in size). While this program is designed for all customers, it could also benefit members of Named Communities who reside in smaller homes.

This section summarizes the impact results of the evaluation results for the Small Home & MF Weatherization Program. Table 3-31 summarizes the measures offered under this program.

TABLE 3-31: SMALL HOME & MF WEATHERIZATION PROGRAM MEASURES

Measure	Description	Impact Analysis Methodology
G Multifamily Attic Insulation With Natural Gas Heat	Attic insulation for multifamily homes with natural gas heat	Avista TRM
G Multifamily Smart Thermostat Paid	Connected Thermostat for multifamily homes with electric heat, contractor-installed	Avista TRM
G Multifamily Smart Thermostat DIY with Natural Gas Heat	Connected Thermostat for multifamily homes with electric heat, self-installed	Avista TRM
G Multifamily Furnace 95%	Install high efficiency single-stage furnace water heater in multifamily home	Avista TRM
G Multifamily FURNACE 95% (Multi-Stage)	Install high efficiency multi-stage furnace water heater in multifamily home	Avista TRM
G Multifamily Natural Gas Boiler	Install high efficiency boiler in multifamily home	Avista TRM
G Multifamily Tankless Water Heater	Install high efficiency tankless water heater in multifamily home	Avista TRM
G Multifamily 50 Gallon Natural Gas Water Heater	Install high efficiency 50 gallon tank water heater in multifamily home	Avista TRM
G Multifamily Wall Insulation With Natural Gas Heat	Wall insulation for multifamily homes with electric heat	Avista TRM
G Multifamily Window Replc With Natural Gas Heat	Window replacement for multifamily homes with natural gas heat	Avista TRM
G Multifamily Window DIY Replc With Natural Gas Heat	Window replacement for multifamily homes with natural gas heat, self-installed	Avista TRM
G Multifamily Energy Star Rated Front Load Washer	Install ENERGY STAR-certified front load clothes washer in multifamily home	Avista TRM
G Multifamily Energy Star Rated Top Load Washer	Install ENERGY STAR-certified top load clothes washer in multifamily home	Avista TRM
G Multifamily Energy Star Rated Clothes Dryer	Install ENERGY STAR-certified clothes dryer in multifamily home	Avista TRM
G Multifamily Energy Star Certified Insulated Door	Install ENERGY STAR-certified insulated door in multifamily home	Avista TRM

The following table summarizes the verified natural gas savings for the Small Home & MF Weatherization Program impact evaluation.

TABLE 3-32: SMALL HOME & MF WEATHERIZATION PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Units	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	12	266	320	266	100.00%
G Multifamily Natural Gas Boiler	1	112	112	112	100.00%
G Multifamily Energy Star Rated Front Load Washer	2	12	12	12	100.00%
G Multifamily Window Replc With Natural Gas Heat	22	1,903	18	2,617	137.52%
G Multifamily FURNACE 95% (Multi-Stage)	5	485	485	485	100.00%
G Multifamily Natural Gas Furnace	23	1,610	1,501	1,475	91.61%
G Multifamily Tankless Water Heater	5	350	350	350	100.00%
G Multifamily Smart Thermostat DIY with Natural Gas Heat	13	373	346	373	100.00%
G Multifamily Attic Insulation With Natural Gas Heat	7	146	0	168	115.07%
G Multifamily Window DIY Replc With Natural Gas Heat	5	375	4	374	99.73%
G Multifamily Energy Star Rated Top Load Washer	1	1	6	1	100.00%
G Multifamily Energy Star Certified Insulated Door	4	83	109	83	100.00%
G Multifamily 50 Gallon Natural Gas Water Heater	1	22	22	22	100.00%
G Multifamily Energy Star Rated Clothes Dryer	2	5	-	5	100.00%
G Multifamily Wall Insulation With Natural Gas Heat	1	99	0	99	100.00%
Total	**104**	**5,842**	**3,286**	**6,443**	**110.29%**

The Small Home & MF Weatherization Program displayed verified savings of 6,443 Therms with a realization rate of 110.30% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

TABLE 3-33: SMALL HOME & MF WEATHERIZATION PROGRAM COSTS

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	$1,891.69	$291.89	$2,183.58
G Multifamily Natural Gas Boiler	$450.00	$149.57	$599.57
G Multifamily Energy Star Rated Front Load Washer	$100.00	$11.73	$111.73
G Multifamily Window Replc With Natural Gas Heat	$20,026.70	$5,912.72	$25,939.42
G Multifamily FURNACE 95% (Multi-Stage)	$4,000.00	$645.41	$4,645.41
G Multifamily Natural Gas Furnace	$16,100.00	$1,963.33	$18,063.33
G Multifamily Tankless Water Heater	$2,500.00	$465.76	$2,965.76
G Multifamily Smart Thermostat DIY with Natural Gas Heat	$1,766.56	$392.76	$2,159.32
G Multifamily Attic Insulation With Natural Gas Heat	$6,729.50	$380.43	$7,109.93
G Multifamily Window DIY Replc With Natural Gas Heat	$2,261.91	$844.67	$3,106.58
G Multifamily Energy Star Rated Top Load Washer	$50.00	$0.87	$50.87
G Multifamily Energy Star Certified Insulated Door	$400.00	$186.87	$586.87
G Multifamily 50 Gallon Natural Gas Water Heater	$100.00	$19.78	$119.78
G Multifamily Energy Star Rated Clothes Dryer	$100.00	$4.58	$104.58
G Multifamily Wall Insulation With Natural Gas Heat	$1,647.00	$223.24	$1,870.24
Total	**$58,123.36**	**$11,493.61**	**$69,616.97**

The Evaluators summarize the program-specific and measure-specific impact analysis activities, results, conclusions, and recommendations for Small Home & MF Weatherization Program in the section below.

3.2.5.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Small Home & MF Weatherization Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

The rebate application form sufficiently collects all required RTF measure specification details. All rebate applications and tracking data contain smart Thermostat manufacturer and model number. The Evaluators were able to verify the models for RTF specifications for connected Thermostats.

The Evaluators found that many projects exceed the "Small Home" definition from Avista - that a home is single family with less than 1,000 SQFT or is a multifamily home (5 or more units). The Evaluators recommend claiming projects on single family homes that are larger than 1,000 SQFT into the Small Home & MF Weatherization Program.

The Evaluators found that measures with significant differences in verified savings included the Natural Gas Furnaces, Attic Insulation, DIY Window Replacements, and Paid Window Replacements. The Natural Gas Furnace measure contained 3 projects which had expected savings of 87 Therms indicating that the Avista TRM was not applied properly; the Avista TRM designates 65.25 Therms to the Natural Gas Furnace measure. The Attic Insulation measure contained one rebate that indicated a square footage of 816 square feet, but the expected savings were calculated using a square footage of 408 square feet which led the realization rate to be higher than expected. Similarly, the DIY Window Replacements as well as the Paid Window Replacements both contained discrepancies in the square footage when calculated savings which led to some realization rates being higher and some being lower than expected. The Evaluators recommend accurately capturing square footage as well as home type to increase the accuracy of the verified savings for the measures listed above.

Finally, the Evaluators note there was one project in which the square footage for the associated attic insulation was used in place of the project's wall insulation, and vice versa. The Evaluators recommend that Avista perform additional QA/QC efforts to ensure square footage is tracked properly, especially for projects in which multiple insulation projects occur.

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

3.2.5.2 Verification Survey

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed non-weatherization measure. The Evaluators included questions such as:

- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Small Home & MF Weatherization Program. Table 3-13 displays the ISRs for each of the measures for the Washington territory alone.

TABLE 3-34: SMALL HOME & MF WEATHERIZATION VERIFICATION SURVEY ISR RESULTS

Measure	Number of Rebates*	Number of Survey Completes*	Program-Level Precision at 90% Confidence	In-Service Rate
G Multifamily 50 Gallon Natural Gas Water Heater	1	0	90% ±100%	100%
G Multifamily Attic Insulation With Natural Gas Heat	7	0		100%
G Multifamily Energy Star Certified Insulated Door	4	0		100%
G Multifamily Energy Star Rated Front Load Washer	2	0		100%
G Energy Star Rated Front Load Washer	0	0		100%
G Multifamily Energy Star Rated Top Load Washer	1	0		100%
G Multifamily FURNACE 95% (Multi-Stage)	5	0		100%
G Multifamily Natural Gas Boiler	1	0		100%
G Multifamily Natural Gas Furnace	23	0		100%
G Multifamily Smart Thermostat DIY with Natural Gas Heat	13	0		100%
G Multifamily Smart Thermostat Paid Install with Natural Gas Heat	12	0		100%
G Multifamily Tankless Water Heater	5	0		100%
G Multifamily Window DIY Replc With Natural Gas Heat	5	0		100%
G Multifamily Window Replc With Natural Gas Heat	22	0		100%
G Multifamily Energy Star Rated Clothes Dryer	2	0		100%
G Multifamily Wall Insulation With Natural Gas Heat	1	0		100%

*This count includes rebates from Washington only

The response rate for this verification survey did not meet 90/10 precision goals. Therefore, the Evaluators assumed 100% in-service rate for these measures. However, survey respondents for each smart thermostat, water heater, or furnace measure described equipment to be currently functioning, further supporting the 100% ISR assumption. The Evaluators applied these ISRs to each rebate to quantify verified savings for each measure.

3.2.5.3 Impact Analysis

This section summarizes the verified savings results for the Small Home & MF Weatherization Program. The Evaluators calculated verified savings for the natural gas measures using the most recent RTF workbook for the Small Home & MF Weatherization measures. These RTF UES values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.5.4 Verified Savings

The Evaluators reviewed the Avista TRM values along with verified tracking data to estimate adjusted program savings for each of the Small Home & MF Weatherization Program measures. In addition, the Evaluators reviewed and applied the current Avista TRM values for each measure along with verified tracking data to estimate net program savings.

The Small Home & MF Weatherization Program in total displays a realization rate of 110% with 6,443 Therms verified natural gas energy savings in the Washington service territory, as displayed in Table 3-32. The realization rate for the natural gas savings in the Small Home & MF Weatherization Program deviates from 100% due to differences in the Natural Gas Furnaces, Attic Insulation, DIY Window Replacements, and Paid Window Replacements measures. These were primarily due to small discrepancies in the square footage reported as well as a miscalculation of the value used in the TRM for Natural Gas Furnaces.

As previously mentioned, the Evaluators note there was one project in which the square footage for the associated attic insulation was used in place of the project's wall insulation, and vice versa. The Evaluators recommend that Avista perform additional QA/QC efforts to ensure square footage is tracked properly, especially for projects in which multiple insulation projects occur.

3.2.6 Multifamily Direct Install Program

The Multifamily Direct Install Program (MFDI) Program is administered by SBW Consulting, Inc (SBW). This program provides direct installation and audits for customers to install direct install measures and identify additional energy efficiency opportunities. This program is available to customers who receive electric service from Avista and have a five-unit or more multifamily property. The program also serves hard-to-reach customer segment as well as Avista's low- and limited-income population. Table 3-35 summarizes the measures offered under this program along with the impact evaluation methods for each measure.

TABLE 3-35: MULTIFAMILY DIRECT INSTALL PROGRAM MEASURES

Measure	Impact Analysis Methodology
Screw-in LED lamp (3.8)	SBW TRM
Screw-in LED lamp (4.8)	SBW TRM
Screw-in LED lamp (A-line 100W)	SBW TRM
Screw-in LED lamp (A-line 40W)	SBW TRM
Screw-in LED lamp (A-line 60W)	SBW TRM
Screw-in LED lamp (BR30)	SBW TRM
Screw-in LED lamp (BR40)	SBW TRM
Screw-in LED lamp (G25)	SBW TRM
Screw-in LED lamp (PAR30)	SBW TRM
Screw-in LED lamp (PAR38)	SBW TRM
Screw-in LED lamp (R20)	Avista TRM/SBW TRM
Faucet aerator (1 GPM)	RTF UES, Aerators_v1_1/SBW TRM
Kitchen Aerator	RTF UES, Aerators_v1_1/SBW TRM
Vending Miser	SBW TRM

The following table summarizes the verified natural gas savings for the Multifamily Direct Install Program (MFDI) Program impact evaluation.

TABLE 3-36: MULTIFAMILY DIRECT INSTALL PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Units	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Faucet aerator (1 GPM)	603	2,192	2,192	100%
Kitchen Aerator	207	393	393	100%
Total	**810**	**2,586**	**2,586**	**100%**

The Multifamily Direct Install Program displayed verified savings of 2,586 Therms with a realization rate of 100.00% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

TABLE 3-37: MULTIFAMILY DIRECT INSTALL PROGRAM COSTS

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
Faucet aerator (1 GPM)	$8,352.00	$2,274.84	$10,626.84
Kitchen Aerator	$1,656.00	$408.09	$2,064.09
Total	**$10,008.00**	**$2,682.93**	**$12,690.93**

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

3.2.6.1 Database Review & Verification

The program administrators do not track data separately from the tracking data. Therefore, there were no documents for the Evaluators to cross-verify for the Multifamily Direct Install Program.

To verify savings, the Evaluators reviewed the tracking data and verified savings using RTF UES values. The Evaluators found no discrepancy between the savings values in the tracking database and the RTF UES values leading to a realization rate of 100% for these measures. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data in order to apply more specific savings values to each project.

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

3.2.6.2 Verification Survey

The Evaluators did not conduct survey verification for the Multifamily Direct Install Program since the MFDI measure savings values have in-service rates embedded.

3.2.6.3 Impact Analysis

This section summarizes the verified savings results for the Multifamily Direct Install Program. The Evaluators calculated verified savings for the natural gas measures using the most recent RTF workbook for the Multifamily Direct Install Program measures. These RTF UES values were applied to all gas measure in the program data.

3.2.6.4 Verified Savings

The program administrators do not track data separately from the tracking data. Therefore, there were no documents for the Evaluators to cross-verify for the Multifamily Direct Install Program.

To verify savings, the Evaluators reviewed the tracking data and verified savings using RTF UES values. The Evaluators found no discrepancy between the savings values in the tracking database and the RTF UES values leading to a realization rate of 100% with 2,586 Therms saved for these measures as displayed in Table 3-36. However, more granularity in per unit savings values could be achieved if the tracking data included data about space heating type for each unit. The Evaluators recommend verifying space heating type in the tracking data in order to apply more specific savings values to each project.

The Evaluators did not conduct survey verification for the Multifamily Direct Install Program since the MFDI measure savings values have in-service rates embedded.

3.2.7 Appliance Program

The Appliances Program is residential prescriptive program that offers incentives for customers to upgrade their existing clothes washers and dryers to ENERGY STAR-rated clothes dryers and washers.

This section summarizes the impact results of the evaluation results for the Appliances Program. Table 3-38 summarizes the measures offered under this program.

TABLE 3-38: APPLIANCE PROGRAM MEASURES

Measure	Description	Impact Analysis Methodology
G Energy Star Rated Clothes Dryer	ENERGY STAR-certified clothes dryer for residential homes	Avista TRM
G Energy Star Rated Front Load Washer	ENERGY STAR-certified front loading clothes washer for residential homes	Avista TRM
G Energy Star Rated Front Load Washer	ENERGY STAR-certified top loading clothes washer for residential homes	Avista TRM

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

TABLE 3-39: APPLIANCE PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G Energy Star Rated Clothes Dryer	21	54	201	192	352.59%
G Energy Star Rated Top Load Washer	62	60	254	0	0.00%
G Energy Star Rated Front Load Washer	111	669	455	455	67.92%
Total	**194**	**784**	**910**	**646**	**82.45%**

The Appliance Program displayed verified savings of 646 Therms with a realization rate of 82% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

TABLE 3-40: APPLIANCE PROGRAM COSTS

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
G Energy Star Rated Clothes Dryer	$1,000.00	$161.31	$1,161.31
G Energy Star Rated Top Load Washer	$3,100.00	$0.00	$3,100.00
G Energy Star Rated Front Load Washer	$5,550.00	$442.33	$5,992.33
Total	**$9,650.00**	**$603.64**	**$10,253.64**

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

3.2.7.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Appliance Program. The Evaluators selected a random subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

The Evaluators found all Appliance Program rebates to have project documentation with the associated model number and efficiency values in either the CC&B web rebate data or mail-in rebate applications. In addition, documents included AHRI certifications or model numbers necessary to verify AHRI certifications. This allowed Evaluators to easily verify model specifications and apply savings.

Overall, the program displays a realization rate of 82% due removal of savings for the top load washer and due to errors in conversion of electric RTF savings to gas Therms savings.

3.2.7.2 Verification Survey

The Evaluators randomly selected a subset of participant customers to survey for simple verification of installed measure described in Section 2.2.2.5.. The Evaluators included questions such as:

- What type of clothes washer/dryer did this clothes washer/dryer replace?
- Is your home's water heated with electricity, natural gas, or another fuel?
- Was the previous equipment functional?
- Is the newly installed equipment still properly functioning?

The responses to this verification survey were used to calculate ISRs for the measures offered in the Appliance Program. In addition, the Evaluators asked participants how the COVID19 pandemic stay-at-home orders have affected their household's energy consumption. The responses to these additional questions can be found in Appendix A.

Table 3-41 displays the ISRs for each of the Appliance measures for Idaho and Washington natural gas territory combined, as the Washington-only territory responses did not meet 90/10 precision goals. The ISRs resulted in ±9.6% precision at the 90% confidence interval for the program.

TABLE 3-41: APPLIANCE VERIFICATION SURVEY ISR RESULTS

Measure	Number of Rebates*	Number of Survey Completes	Precision at 90% Confidence	In-Service Rate
G Energy Star Rated Clothes Dryer	21	10	90% ±9.6%	100%
G Energy Star Rated Top Load Washer	111	29		100%
G Energy Star Rated Front Load Washer	62	21		95%

Survey respondents described equipment to be currently functioning, leading to a 95-100% ISR for all measures. The Evaluators applied the ISRs listed in Table 3-41 to each rebate to quantify verified savings for each measure.

3.2.7.3 Impact Analysis

This section summarizes the verified savings results for the Appliance Program. The Evaluators calculated verified savings for the remaining measures using active values from the Avista TRM workbook. These values were applied to a random sample of participants, with verification of project documents such as rebate applications to verify installation, quantity, and efficiency of the equipment.

3.2.7.4 Verified Savings

The Appliance Program in total displays a realization rate of 82% with 646 Therms verified natural gas savings in the Washington service territory, as displayed in Table 3-39. The realization rate for the natural gas savings in the Appliance Program deviate from 100% due to errors in converting kWh to Therms savings for the clothes dryers and washers. The Evaluators estimated gas savings for these measures by converting measure RTF electric savings into Therms savings. However, the Evaluators applied Avista TRM UES to these rebates, therefore leading to a high realization rate for the measure.

The Evaluators removed savings applied to the top load washer, as the RTF clothes washer workbook calculates negative savings for the top load washer, as the market practice baseline for this measure is already more efficient than the incentivized efficiency.

Finally, the Avista TRM erroneously converted the electric savings for the front load clothes washer to 6 Therms/unit. The correct conversion leads to 4 Therms/unit. Additionally, the Avista TRM erroneously converted the electric savings for the clothes dryers to 2.72 Therms while the correct conversion leads to 9.6 Therms/unit. The combination of these adjustments led to an 82% realization rate for the program.

3.2.8 Midstream Program

Avista converted several residential and nonresidential measures from a downstream delivery channel to a midstream delivery channel via local distributors. As Avista notes, midstream approaches have proven successful in other parts of the Pacific Northwest, as well as nationally. The Midstream Program currently offers midstream incentives to residential customers for measures such as:

- Residential natural gas furnace
- Residential natural gas tankless water heaters

The nonresidential midstream measures and impact evaluation results are presented in Section 3.2.8. This change in delivery channel is seen to expand the benefits gained from the consumer with respect to the midstream incentive design rather than the downstream incentive design, as well as how customers use this offering.

This section summarizes the estimated savings Avista has calculated for the Midstream Program. The Evaluators conducted the first impact evaluation for the measures in this program for PY2023. Table 3-42 summarizes the measures offered under this program.

TABLE 3-42: MIDSTREAM PROGRAM MEASURES

Measure	Description	Impact Analysis Methodology
G Natural Gas Furnace	High efficiency natural gas furnace installation	Avista TRM
G Natural Gas Tankless Water Heater	High efficiency natural gas water heater installation	Avista TRM

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

TABLE 3-43: MIDSTREAM PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Units	Expected Savings (kWh)	Adjusted Savings (kWh)	Verified Savings (kWh)	Realization Rate
G Natural Gas Furnace	1,183	322,128	334,343	106,382	33.02%
G Natural Gas Tankless Water Heater	123	4,615	4,615	8,123	176.03%
Total	**1,306**	**326,743**	**338,958**	**114,505**	**35.04%**

The Midstream Program displayed estimated savings of 114,505 Therms with a realization rate of 35.04%. The following table summarizes the incentive and non-incentive costs associated with the program.

TABLE 3-44: MIDSTREAM PROGRAM COSTS BY MEASURE

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
G Natural Gas Furnace	$824,600.00	$180,182.63	$1,004,782.63
G Natural Gas Tankless Water Heater	$57,875.00	$12,553.53	$70,428.53
Total	**$882,475.00**	**$192,736.16**	**$1,075,211.16**

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

3.2.8.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Midstream Pilot. The Evaluators selected a subset of rebates to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

The Evaluators found all 49 selected rebates documented the information necessary to accurately characterize savings for the program within the Washington natural gas service territory. The Evaluators verified the model

number, efficiency, quantity, and Avista TRM values necessary to calculate verified savings. The Midstream tracking data is tracked and delivered separately from the remaining residential portfolio, often demonstrating extensive detail on product characteristics.

During review, the Evaluators found that the implementer's engineering algorithms, in which expected savings are calculated, differed greatly from the UES previously defined for each measure in the Avista TRM and RTF UES values. That is, the implementer's engineering equations resulted in savings double or triple the amount for the average air source heat pump and heat pump water heater. In addition, the Evaluators found that the engineering algorithms applied to the tracking database equipment were not applied properly to the tracking data inputs. The reasoning for this discrepancy is unclear. The tracking database displays measure-level savings about 40% inflated compared to measure-level savings had the designated baseline and annual operating hours aligned with those values defined in the implementer TRM. This discrepancy is separate from the adjustment for market practice baseline by the RTF.

3.2.8.2 Verification Survey

The Evaluators did not conduct verification surveys for the Midstream Program in PY2023 due to the nature of the midstream delivery channel; customers are not aware that they are participating in the program because they are not required to fill out a downstream rebate application.

3.2.8.3 Impact Analysis

This section summarizes the verified savings results for the Midstream Program. The Evaluators attempted to conduct a billing analysis for each measure with sufficient participation. For measures in which billing analysis was not feasible or displayed inconclusive results, the Evaluators evaluated verified savings for the measure through the Regional Technical Forum workbooks in place at the time of the biennium plan for the Midstream Program.

The Evaluators reviewed the expected savings workbook from the program implementer, Energy Solutions. The implementer defined expected kWh savings for each measure prior to the rollout of the program. The Evaluators note that the expected savings workbook values from the implementer vary from the Avista TRM for the previous prescriptive measure savings expectations. For this reason, it is expected that the realization rate will portray discrepancies between the expected and verified savings.

The Evaluators estimated verified savings using billing analysis results of participating Midstream Program customers as well as Avista's TRM developed for residential prescriptive measures.

3.2.8.4 Billing Analysis

The results of the billing analysis for the Midstream Program are provided in this section. The methodology for the billing analysis is provided in Section 2.2.3.2.

Table 325 displays customer counts for customers considered for billing analysis (i.e. customer with single-measure installations) and identifies measures that met the requirements for a billing analysis.

TABLE 325: MEASURES CONSIDERED FOR BILLING ANALYSIS, MIDSTREAM PROGRAM

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
G Natural Gas Furnace	✓	27*	
G Natural Gas Tankless Water Heater	✓	7*	✓

The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure and the Evaluators conducted a linear regression using the matched participant and nonparticipant monthly billing data.

Table 326 provides annual savings per customer for both measures combined. The post-only heating load extrapolation method using engineering algorithm was used to estimate the natural gas furnace savings. This method is further detailed in Section 2.2.3.10

TABLE 326: MEASURE SAVINGS, MIDSTREAM PROGRAM

Measure	Annual Savings per Customer (kWh)
G Natural Gas Furnace	47.43

The Evaluators found the G Natural Gas Furnace displayed a statistically significant verified savings value of 47.43 Therms per year. Although the Evaluators estimated savings for these measures through billing analysis, the verified savings for the measures were calculated via Avista TRM due to a low adjusted R-Squared value indicating poor fit. Further details of the billing analysis for the Midstream measures can be found in Appendix A: Billing Analysis Results.

3.2.8.5 Verified Savings

The Evaluators reviewed the Energy Solutions implementer expected savings values along with verified tracking data to estimate net adjusted program savings for those measures. In order to calculate verified savings, the Evaluators utilized industry-standard engineering algorithms using purchased equipment efficiency values and RTF-defined market practice baseline values, where appropriate. The Midstream Program displayed 35% realization with 114,505 Therms saved, as displayed in Table 3-32.

The program verified savings resulted in a low realization rate largely due to the fact that the expected savings were inflated due to incorporation of baselines that did not represent market baseline, as the Avista TRM does. The Evaluators compared the implementer-provided expected savings to the previously defined measure-level expected savings defined in the TRM and concluded that, had the Avista TRM been used to define program expected savings, the realization rate would have been 100% realization rather than 35% realization. This difference is seen in the discrepancy between the expected savings value and the adjusted savings value presented in Table 3-32.

The Evaluators did not make any additional adjustments to the purchased equipment, efficiency level of the equipment nor the quantity, as the verification efforts confirmed the details were properly tracked. Therefore, the difference between the established values in the implementer minimum code baseline and the Avista TRM, as well as incorrectly applied engineering algorithms were the driving factor for the low realization rate. The Evaluators recommend that Avista and the implementers update the expected savings calculation methodology

to incorporate market practice baseline rather than minimum code baseline in order to remain consistent with the baseline methods utilized in the downstream measure programs and more accurately estimate expected savings in future iterations of this program.

4 Low-Income Impact Evaluation Results

The Low-Income Program delivers energy efficiency measures to low-income residential customers in its Washington service territory with a partnership with five network Community Action Agencies ("Agencies") and one tribal weatherization organization. The Agencies qualify income to prioritize and treat households based on several characteristics. In-house or contract crews install approved program measures. In addition, the Agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures.

The Evaluators completed an impact evaluation on Avista's Low-Income portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each natural gas impact evaluation in the Low-Income Portfolio in the Washington service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM, and RTF values to evaluate verified savings. This approach provided the strongest estimate of achieved savings practical for each program, given its delivery method, magnitude of savings, number of participants, and availability of data. Table 4-1 summarizes the Low-Income verified impact savings by program. Table 4-2 summarizes the Low-Income portfolio cost-effectiveness results.

TABLE 4-1: LOW-INCOME VERIFIED IMPACT SAVINGS BY PROGRAM

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
Low-Income	15,552	14,749	94.84%
Total	**15,552**	**14,749**	**94.84%**

TABLE 4-2: LOW-INCOME PORTFOLIO COST-EFFECTIVENESS SUMMARY

Sector	TRC			UCT		
	Benefits	Costs	B/C Ratio	Benefits	Costs	B/C Ratio
Low Income	$413,571	$3,140,095	0.13	$365,170	$2,593,117	0.14

In PY2023, Avista completed and provided incentives for low-income gas measures in Washington and achieved total natural gas savings of 14,749 Therms. The Low-Income Program met savings expectations based on reported savings with an achieved realization rate of 95%. The Evaluators estimated the TRC value for the Low-Income portfolio is 0.13 while the UCT value is 0.14. Further details of the impact evaluation results by program are provided in the sections following.

4.1 Program-Level Impact Evaluation Results

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

4.1.1 Low-Income Program

The Low-Income Program delivers energy efficiency measures to low-income residential customers in its Washington service territory with a partnership with five network Community Action Agencies ("Agencies") and one tribal weatherization organization. The Agencies qualify income to prioritize and treat households based on several characteristics. In-house or contract crews install approved program measures. In addition, the Agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures.

Avista provides CAP agencies with the following approved measure list, which are reimbursed in full by Avista. Avista also provides a rebate list of additional energy saving measures the CAP agencies are able to utilize which

are partially reimbursed. Weatherization measures under this program may also be funded by CEEP. The following table summarizes the measures offered under this program.

Table 4-3 summarizes the measures offered under this program.

TABLE 4-3: LOW-INCOME PROGRAM MEASURES

Measure	Impact Analysis Methodology
G Air Infiltration	Avista TRM
G Attic Insulation With Natural Gas Heat	
G Deferred Maintenance Pilot	
G Door Sweep	
G Duct Insulation	
G Duct Sealing	
G Exterior Doors	
G Floor Insulation With Natural Gas Heat	
G Health Safety and Repair	
G Natural Gas Furnace	
G Storm Windows with Natural Gas Heat	
G Tankless Water Heater	
G Wall Insulation With Natural Gas Heat	
G Window Replc With Natural Gas Heat	

Table 4-4 summarizes the verified natural gas savings for the Low-Income Program impact evaluation.

TABLE 4-4: LOW-INCOME PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Participation	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate
G 50 Gallon Natural Gas Water Heater	10	77	77	77	100.00%
G Air Infiltration	66	1,062	1,062	935	88.00%
G Attic Insulation With Natural Gas Heat	39	1,552	1,552	1,552	100.00%
G Deferred Maintenance Pilot	3	-	-	-	N/A
G Door Sweep	4	19	19	19	100.00%
G Duct Insulation	6	269	269	269	100.00%
G Duct Sealing	10	585	585	94	16.01%
G Exterior Doors	95	2,057	2,057	2,057	100.00%
G Floor Insulation With Natural Gas Heat	37	1,660	1,657	1,657	99.79%
G Health Safety and Repair	139	-	-	-	N/A
G Natural Gas Furnace	64	4,781	4,781	4,601	96.24%
G Storm Windows with Natural Gas Heat	1	16	16	16	100.00%
G Tankless Water Heater	7	466	466	466	100.00%
G Wall Insulation With Natural Gas Heat	16	623	623	623	100.00%
G Window Replc With Natural Gas Heat	125	2,384	2,384	2,384	100.00%
Total	**622**	**15,552**	**15,548**	**14,749**	**94.84%**

The Low-Income Program displayed verified savings of 14,749Therms with a realization rate of 94.84% against the expected savings for the program. The following table summarizes the incentive and non-incentive costs associated with the program.

TABLE 4-5: LOW-INCOME PROGRAM COSTS

Measure	Incentive Costs	Non-Incentive Costs	Total Costs
G 50 Gallon Natural Gas Water Heater	$34,808.14	$2,381.21	$37,189.35
G Air Infiltration	$83,175.60	$29,197.07	$112,372.67
G Attic Insulation With Natural Gas Heat	$71,129.54	$97,203.28	$168,332.82
G Deferred Maintenance Pilot	$46,562.47	$0.00	$46,562.47
G Door Sweep	$1,070.89	$37.43	$1,108.32
G Duct Insulation	$9,271.69	$16,842.81	$26,114.50
G Duct Sealing	$7,829.19	$4,088.33	$11,917.52
G Exterior Doors	$158,934.10	$126,444.18	$285,378.28
G Floor Insulation With Natural Gas Heat	$101,887.35	$103,776.01	$205,663.36
G Health Safety and Repair	$537,944.64	$0.00	$537,944.64
G Natural Gas Furnace	$315,539.26	$182,279.16	$497,818.42
G Storm Windows with Natural Gas Heat	$3,282.19	$604.40	$3,886.59
G Tankless Water Heater	$23,517.73	$18,414.09	$41,931.82
G Wall Insulation With Natural Gas Heat	$31,446.73	$39,053.68	$70,500.41
G Window Replc With Natural Gas Heat	$396,860.62	$149,535.39	$546,396.01
Total	**$1,823,260.14**	**$769,857.05**	**$2,593,117.19**

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

4.1.1.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Low-Income Program. The Evaluators selected a subset of rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.

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

The required information necessary to complete verification activities and proper expected savings calculations are: measure installed square footage for insulation measures, measure quantity for appliance measures, and total building annual energy usage in order to calculate proper building savings cap at 20% annual energy usage. The Evaluators found that 25 of the rebated projects lacked annual kWh and Therms usage values.

4.1.1.2 Verification Survey

The Evaluators did not conduct verification surveys for the Low-Income Program.

4.1.1.3 Impact Analysis

This section summarizes the verified savings results for the Low-Income Program. The Evaluators calculated verified savings for Low-Income Program measures using the Avista TRM. However, a whole building billing analysis was completed to supplement the findings from the desk review.

4.1.1.4 Billing Analysis

The Evaluators attempted to estimate measure-level Low-Income Program energy savings through billing analysis regression with a counterfactual group selected via propensity score matching. The Evaluators attempted to isolated each unique measure. In doing so, the Evaluators also isolate the measure effects using the customer's consumption billing data. However, participation for the Low-Income program resulted in a small number of customers with isolated measures and therefore the Evaluators were unable to estimate measure-level savings through billing analysis.

The Evaluators instead conducted a whole-home billing analysis for all the natural gas measures combined in order to estimate savings for the average household participating in the program, across all measures. The Evaluators successfully created a matched cohort for the natural gas measure households. Customers were matched on zip code (exact match) and their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household.

Table 4-6 provides annual savings per customer for each measure. Model 2 (PPR) was selected as the final model for the Low-Income Program as it provided the highest adjusted R-squared among the regression models. However, savings for this model are not statistically significant at the 90% level, indicated by the lower 90% confidence bound at 0 Therms saved per year. The customers considered for billing analysis include customers in both Washington and Idaho service territories to gather the maximum number of customers possible for precise savings estimates.

TABLE 4-6: MEASURE SAVINGS, LOW-INCOME PROGRAM

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
All Gas Measures (Therms)	168	130	13.64*	0	31.23	0.92	Model 2: PPR

*Not statistically significant

Due to lack of statistical significance from the billing analysis results, The Evaluators did not apply these regression savings estimates to the program. Instead, the Evaluators estimated savings through the program by applying Avista TRM values to verified quantities. Further details of the billing analysis can be found in Appendix A: Billing Analysis Results.

4.1.1.5 Verified Savings

Due to lack of significance in the billing analyses, the Evaluators reviewed the Avista TRM values along with verified tracking data to estimate net program savings for those measures. Adjusted savings were estimated using the Avista TRM. The Low-Income Program in total displays a realization rate of 94.84% with 14,749 Therms verified natural gas savings in the Washington service territory, as displayed in Table 4-4.

The Evaluators note that the majority of deviations from 100% realization rate at measure level is due to the change in square footage or number of units verified in the project documentation as well as verifying 20% annual household energy caps were properly applied. The Evaluators recommend additional QA/QC efforts are completed to ensure the program is properly applying the 20% annual household cap by using available household billing data.

5 NONRESIDENTIAL IMPACT EVALUATION RESULTS

The Evaluators completed an impact evaluation on Avista's Non-Residential portfolio to verify program-level and measure-level energy savings for PY2023. The following sections summarize findings for each natural gas impact evaluation in the Non-Residential Portfolio in the Washington service territory. The Evaluators used data collected and reported in the tracking database, online application forms, Avista TRM 2022, RTF, IPMVP, supplemental sources and billing analysis of participants to evaluate savings. The approach selected for each program allowed for the strongest estimate of achieved savings practical for each program, dependent on each program's delivery method, magnitude of savings, number of participants, and availability of data. Table 5-1 summarizes the Non-Residential verified impact savings by program. Table 5-2 summarizes the Non-Residential portfolio's cost-effectiveness.

TABLE 5-1:NON-RESIDENTIAL VERIFIED IMPACT SAVINGS BY PROGRAM

Program	Expected Savings (Therms)	Verified Savings (Therms)	Verified Realization Rate	Total Costs
HVAC	9,987	9,987	100.00%	$59,083.78
Food Service Equipment	10,273	10,258	99.85%	$41,504.94
Shell	4,263	4,263	100.00%	$44,264.05
Midstream	45,423	21,368	47.04%	$198,071.60
Site-Specific	59,354	91,963	154.94%	$438,269.20
Totals:	**129,300**	**137,839**	**106.60%**	**$781,193.58**

TABLE 5-2:NON-RESIDENTIAL PORTFOLIO COST-EFFECTIVENESS SUMMARY

Program	TRC			UCT		
	Benefits	Costs	B/C Ratio	Benefits	Costs	B/C Ratio
Nonresidential	$2,294,105	$1,460,323	1.57	$1,921,808	$815,547	2.36

In PY2023, Avista completed and provided incentives for non-residential natural gas measures in Washington and reported total natural gas energy savings of 137,839 Therms. All programs exceeded savings claims, leading to an overall achievement of 106.60% of the expected savings for the non-residential programs. The Evaluators estimated the TRC value for the Non-Residential portfolio is 1.57 while the UCT value is 2.36. Further details of the impact evaluation results by program are provided in the sections following.

5.1 Verification Results

Before conducting the impact analyses, the Evaluators conducted a database review for all prescriptive programs. The Evaluators selected a random subset of rebate applications and associated documents from participating customers to cross-verify tracking data inputs. These documents included invoices, rebate applications, pictures, AHRI certificates and similar types of documents for the following programs:

- HVAC Program
- Food Service Equipment Program
- Shell Program
- Midstream Program
- Site-Specific Program

For prescriptive programs, this sample of documents was used to cross-verify tracking data inputs. In the case the Evaluators found any deviations between the tracking data and application values, the Evaluators reported and summarized those differences in the appropriate report chapters. For the Site-Specific program, a stratified

sample was drawn based on expected savings and each sampled project was reviewed in the same manner as described above, but sites visits and custom analyses were conducted for each sampled project.

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

Table 5-3 displays program populations, sample sizes for document verification and resulting precision.

TABLE 5-3: NON-RESIDENTIAL PROGRAM-LEVEL VERIFICATION PRECISION

Program	Population	Sampled	Precision at 90% CI
HVAC	25	25	±0.0%
Food Service Equipment	13	13	±0.0%
Shell	11	11	±0.0%
Midstream	64	64	±0.0%
Site-Specific	9	5	±8.63%

5.1.1 On-Site Verification

Unlike Residential measures, non-residential measures typically have a 100% installation rate or a deemed in-service rate (ISR) included in RTF and Avista TRM UES. The exception to this rule are custom projects, such as those in the Site-Specific programs. For this the Evaluators conducted three on-site visits to verify full installation and equipment operation as described in the project scope. The results of these site visits are discussed further in the Site-Specific chapter.

5.2 Program-Level Impact Evaluation Results

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

5.2.1 Prescriptive HVAC Program

The Prescriptive Natural Gas HVAC Program encourages customers to select highly efficient natural gas heating equipment solutions for their business. Installing high efficiency equipment helps lower operating costs and save energy. The prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who heat with Avista natural gas are eligible for this program. Customers must submit a completed rebate form, invoices, and an AHRI certificate within 90 days after the installation has been completed.

Table 5-4 summarizes the measures rebated in PY2023 under this program.

TABLE 5-4: PRESCRIPTIVE HVAC PROGRAM MEASURES

Measure	Impact Analysis Methodology
Natural Gas Boiler	Avista TRM UES
Multi-Stage Furnace	Avista TRM UES
Single-Stage Furnace	Avista TRM UES
Unit Heater	Avista TRM UES

TABLE 5-5: PRESCRIPTIVE HVAC PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Participation (Projects)	Expected Therms Savings	Adjusted Therms Savings	Verified Therms Savings	Realization Rate
Furnace	23	7,512	7,512	7,512	100.0%
Boiler	4	2,158	2,158	2,158	100.0%
Smart Thermostat	8	317	317	317	100.0%
Totals	**35**	**9,987**	**9,987**	**9,987**	**100.0%**

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

TABLE 5-6: PRESCRIPTIVE HVAC PROGRAM COSTS BY MEASURE

Measure	Measure Count	Total Natural Gas Incentive	Measure Costs	Total Costs
Furnace	23	$16,888.00	$14,599.67	$31,487.67
Boiler	4	$12,740.00	$10,869.19	$23,609.19
Smart Thermostat	8	$4,022.82	$268.25	$4,291.07
Total	**35**	**$33,650.82**	**$25,737.11**	**$59,387.93**

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

5.2.1.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive HVAC Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.. Verification of project documents included data points such as input BTUs, efficiency levels and costs of the equipment.

Table 5-7 shows the project population, the number of unique projects checked and the overall precision.

TABLE 5-7: PRESCRIPTIVE HVAC PROGRAM VERIFICATION PRECISION

Population	Sampled	Precision
25	25	±0.0%

The Evaluators did not find any substantive deviations between project applications and program tracking data except one instance: Electric savings was claimed for a single smart thermostat project. At the request of Avista, these claimed savings were transferred from the Prescriptive Natural Gas program to the Prescriptive Electric HVAC program, where both claimed and verified savings are reported. The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Prescriptive HVAC Program.

5.2.1.2 Impact Analysis

This section summarizes the verified savings results for the Prescriptive VFD Program. The Evaluators calculated verified savings for furnace and boiler measures using the Avista TRM. Final verified savings were calculated by applying the appropriate TRM UES to a census of measures.

5.2.1.3 Verified Savings

The Evaluators reviewed and applied the current TRM UES values for the Attic and Wall insulation measures along with verified tracking data to estimate net program savings for this measure. The verified savings for the program is 9,987 Therms with a realization rate of 100%, as displayed in Table 5-5.

5.2.2 Food Service Equipment Program

The Food Service Equipment Program offers incentives for commercial customers who purchase or replace food service equipment with ENERGY STAR-qualified equipment. This prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use Avista natural gas to operate the equipment submitted for a rebate are eligible for this program. Customers must submit a completed rebate form and invoices within 90 days after the installation has been completed. Avista will send incentive checks to the customers or their designees after each project is approved. The website is also used to communicate program requirements, incentives, and forms.

Table 5-8 summarizes the measures rebated in PY2023 under this program.

TABLE 5-8: PRESCRIPTIVE FOOD SERVICE EQUIPMENT PROGRAM MEASURES

Measure	Impact Analysis Methodology
Convection oven	RTF, Convection Oven v4.2
Combination oven	RTF, Commercial Cooking RTF Combination Ovens v4.2
Griddle	RTF, Griddles v1.2
Rack oven	RTF, Rack Ovens v1.2
Dishwasher	Avista TRM, Non-Res Dishwashers (multiple)
Energy Star ice machine	RTF, Commercial ENERGY STAR™ Ice Makers v1.3
Fryer	RTF, Commercial Cooking Fryer v4.2
Hot food holding cart	RTF, Commercial Cooking Hot Food Cabinet v4.2
Steam cookers	RTF, Commercial Cooking Steamer v4.2
Pre-rinse sprayer	Avista TRM, Non-Res Pre-Rinse Sprayer (multiple)
Overwrapper	RTF, On-Demand Overwrappers v1.1

The following table summarizes the claimed, adjusted and verified Therms savings for the program.

TABLE 5-9: PRESCRIPTIVE FOOD SERVICE EQUIPMENT PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Participation (Projects)	Expected Therms Savings	Adjusted Therms Savings	Verified Therms Savings	Realization Rate
Fryer	13	10,100	10,100	10,100	100.0%
Combination Oven	1	173	158	158	91.3%
Totals	**14**	**10,273**	**10,258**	**10,258**	**99.9%**

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

TABLE 5-10: PRESCRIPTIVE FOOD SERVICE EQUIPMENT PROGRAM COSTS BY MEASURE

Measure	Measure Count	Total Natural Gas Incentives	Total Non-Incentive Costs	Total Costs
Fryer	20	$20,000.00	$20,242.45	**$40,242.45**
Combination Oven	1	$1,000.00	$265.80	**$1,265.80**
Totals	**21**	**$21,000.00**	**$20,508.25**	**$41,508.25**

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

5.2.2.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Food Service Equipment Program. The Evaluators review all rebate applications to cross-verify tracking data inputs,

summarized in Section 2.2.2.4.. Data points checked between project applications and program tacking include fuel type, capacity, ENERGYSTAR® status, quantity, and measure cost values.

Table 5-11 shows the project population, the number of unique projects checked and the overall precision.

TABLE 5-11: PRESCRIPTIVE FOOD SERVICE EQUIPMENT PROGRAM VERIFICATION PRECISION

Population	Sampled	Precision
13	13	±0.0%

5.2.2.2 Impact Analysis

During the project year the program rebated one gas Combination Oven, claiming 173 Therms in savings. The Evaluators found that the RTF specifies only 158 Therms savings for the specific configuration, resulting in slightly less verified Therms savings.

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

5.2.2.3 Verified Savings

The Evaluators reviewed and applied the appropriate UES values to verified tracking data to estimate program savings for these measures. The verified savings for the program is 10,258 Therms with a realization rate of 99.9% as displayed in Table 5-9.

5.2.3 Prescriptive Shell Program

The Commercial Prescriptive Shell Program offers incentives to commercial customers who improve the envelopes of their existing buildings by adding insulation, which may make a business more energy-efficient and comfortable. Avista issues payment to the customer after the measure has been installed by a licensed contractor. Commercial customers must have an annual heating footprint for a fuel provided by Avista.

Customers must submit a completed rebate form, invoices, and an insulation certificate within 90 days after the installation has been completed. Avista will send incentive checks to customers or their designees after each project is approved. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. Avista's website is also used to communicate program requirements, incentives, and forms.

Table 5-12 summarizes the measures rebated in PY2023 under this program.

TABLE 5-12: PRESCRIPTIVE SHELL PROGRAM MEASURES

Measure	Impact Analysis Methodology
Attic Insulation	Avista TRM UES
Roof Insulation	Avista TRM UES
Wall Insulation	Avista TRM UES

The following table summarizes the claimed, adjusted and verified Therms savings for the program.

TABLE 5-13: PRESCRIPTIVE SHELL PROGRAM VERIFIED NATURAL GAS SAVINGS

Measure	PY2023 Participation (Projects)	Expected Therms Savings	Adjusted Therms Savings	Verified Therms Savings	Realization Rate
Attic =< R11 to R45+	4	570	570	570	100.0%
Wall =< R4 to 19+	7	2,738	2,738	2,738	100.0%
Attic =< R11 to R30-R44	3	954	954	954	100.0%
Totals	**14**	**4,263**	**4,263**	**4,263**	**100.0%**

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

TABLE 5-14: PRESCRIPTIVE SHELL PROGRAM COSTS BY MEASURE

Measure	Measure Count (Square Feet Installed)	Incentive Costs	Non-Incentive Costs	Total Costs
Attic =< R11 to R45+	21,065	$25,594.45	$27,804.78	**$53,399.23**
Wall =< R4 to 19+	2,650	$3,213.76	$9,686.42	**$12,900.18**
Attic =< R11 to R30-R44	6,334	$6,177.80	$5,788.09	**$11,965.89**
Totals	**30,049**	**$34,986.01**	**$43,279.29**	**$78,265.30**

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

5.2.3.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Prescriptive Shell Program. The Evaluators review all rebate applications to cross-verify tracking data inputs, summarized in Section 2.2.2.4.. Data points checked between project applications and program tacking include R-levels, square footage of installation, HVAC configuration and measure cost values. Below, Table 5-15 shows the project population, the number of unique projects checked and the overall precision.

TABLE 5-15: PRESCRIPTIVE SHELL PROGRAM VERIFICATION PRECISION

Population	Sampled	Precision
11	11	±0.0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Prescriptive Shell Program and there were no substantive deviations between program tracking data and project documents.

5.2.3.2 Impact Analysis

This section summarizes the verified savings results for the Prescriptive Shell Program. The RTF does not provide a current measure listing for the measures in this program. The Evaluators calculated verified savings for the insulation measure using the Avista TRM. Final verified savings were calculated by applying the appropriate UES to a census of measures.

5.2.3.3 Verified Savings

The Evaluators reviewed and applied the current TRM UES values for the Attic and Wall Insulation measures along with verified tracking data to estimate net program savings for this measure. The verified savings for the program is 4,263 Therms with a realization rate of 100%, as displayed in Table 5-13 Evaluators did not find any deviations from TRM UES.

5.2.4 Nonresidential Midstream Program

Avista designed the Midstream Program to shift the onus of applying for rebates from end-use customers to distributors. Not only does this reduce customers'/contractors' administrative burden (i.e., no need to submit paperwork tracking energy efficient installations), but it is also anticipated to increase high-efficiency equipment options at competitive prices. Midstream rebates provide an immediate discount on eligible products, which appear as a line item on customer invoices. Starting on July 1, 2023, the Midstream Program replaced Avista's residential and commercial downstream space-heating and water-heating programs as well as the commercial food service equipment rebate program.

Through the Midstream Program, Avista seeks to achieve three overall objectives:

- Provide greater long-term, cost-effective savings for residential and commercial customers alike
- Reduce Avista's administrative burden in processing space-heating, water-heating, and commercial kitchen equipment applications
- Accelerate the market transformation of energy-efficient equipment

The Midstream Program provides bought-down equipment to both Residential and Commercial entities. This chapter discusses and presents results only for the non-residential measures. See Section 3.2.8 the residential portion.

Table 5-16 summarizes the measures rebated in PY2023 under this program.

TABLE 5-16: NON-RESIDENTIAL MIDSTREAM PROGRAM MEASURES

Category	Measure	Impact Savings Methodology
Food Service	Conveyor Oven	Pre-Approved Implementation Workbook
	Dishwasher	Pre-Approved Implementation Workbook
	Fryer	Pre-Approved Implementation Workbook
Domestic Water Heating	Instantaneous Water Heater	Engineering Algorithm
	Storage Water Heater	Engineering Algorithm
HVAC	Furnace	Engineering Algorithm
	Boiler	RTF

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

TABLE 5-17: NON-RESIDENTIAL MIDSTREAM PROGRAM VERIFIED THERMS SAVINGS

Measure	PY2023 Participation (Projects)	Expected Savings (Therms)	Adjusted Savings (Therms)	Verified Savings (Therms)	Realization Rate
Conveyor Oven	1	1,266	615	615	48.58%
Dishwasher	2	608	607.79	607.79	100.00%
Fryer	21	17,127	14,013	14,013	81.82%
Boiler	7	13,560	1,807	1,807	13.33%
Furnace	13	1,446	1,640	1,640	113.48%
Instantaneous Water Heater	15	5,968	1,529	1,529	25.62%
Storage Water Heater	5	5,449	1,155	1,155	21.20%
Total	**64**	**45,423**	**21,368**	**21,368**	**47.04%**

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

TABLE 5-18: NON-RESIDENTIAL MIDSTREAM PROGRAM COSTS BY MEASURE

Measure	Measure Count	Incentive Costs	Total Non-Incentive Costs	Total Costs
Conveyor Oven	2	$6,750.00	$1,700.97	$8,450.97
Dishwasher	8	$2,700.00	$1,502.87	$4,202.87
Fryer	3	$34,650.00	$28,084.89	$62,734.89
Boiler	27	$62,988.00	$6,806.27	$69,794.27
Furnace	13	$14,330.00	$4,300.81	$18,630.81
Instantaneous Water Heater	21	$12,577.50	$4,849.21	$17,426.71
Storage Water Heater	14	$13,982.50	$2,856.67	$16,839.17
Totals	**88**	**$147,978.00**	**$50,101.68**	**$198,079.68**

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

5.2.4.1 Database Review & Verification

Before conducting the impact analysis, the Evaluators conducted a database review for the Midstream Program. Due to the program delivery pathway, the Program does not include project applications. For this program, the Evaluators examined a representative sample of projects to ensure that program tracking data accurately reflected measure characteristics used in assessing savings. Data points checked include: equipment configurations, capacities and efficiency levels.

Table 5-19 shows the project population, the number of projects checked and the overall precision.

TABLE 5-19: NON-RESIDENTIAL MIDSTREAM PROGRAM VERIFICATION PRECISION

Population	Sampled	Precision
64	64	0.0%

The Evaluators found all rebate equipment met or exceeded the measure efficiency requirements for the Midstream Program and no substantive equipment specifications differed from those in the tracking data.

5.2.4.2 Impact Analysis

Once verification was completed, to estimate program savings for these measures the Evaluators reviewed and applied the appropriate UES values from the RTF. If a measure was not covered by an RTF entry then a UEF from the Avista TRM was used as the source for verified savings. For measures not included in either the RTF or Avista TRM, verified savings was calculated using standard engineering algorithms with project-specific specs and RTF inputs.

5.2.4.3 Verified Savings

The verified savings for the program is 21,368 Therms with a realization rate of 47.04%, as displayed in Table 5-17. Adjusted savings comes from the program planning workbooks used by program implementors. Results show that these values were not applied to tracking data as originally intended.

Savings for food service equipment was assigned using UES in the program implementation workbook, however, did not provide the same estimates that were claimed, indicating that expected UES values were not applied correctly or consistently for Conveyor Ovens and Fryers.

Verified savings for boilers was taken from the RTF workbook and is specific to the equipment configuration, capacity and type of facility it is installed in.

Savings for Furnaces, Instantaneous Water Heaters and Storage Water Heaters was calculated using standard engineering algorithms, with equipment-specific inputs for capacity and efficiency, and EFLH values from the Midstream planning workbook. Groundwater temps were taken from the RTF and estimates of gallons of water used per year were taken from the IL TRM 12.0 and assigned to specific facility types. Expected savings for both instantaneous and storage water heaters assumed annual water usage that varied between 348% and 461% of usage estimates in the IL and AR TRMs. Verified savings this for these measures used the more reasonable annual water usage estimates from the IL TRM 12.0, resulting in low verified savings.

5.2.4.4 Recommendations for Future Program Cycles

The verified savings for the program is 21,142 Therms with a realization rate of 46.5%, as displayed in Table 5-17.

- Administrators should verify that UES and savings multipliers are applied consistently across measures. The Evaluators found that in many cases program planning estimates could not replicate claimed savings.
- Drivers of differences between implementor and RTF EUS for Food Equipment cannot be assessed, but are likely due to differences in baseline efficiency assumptions.
- The Evaluators suggest that program implementors calculated expected savings for HVAC measures using prescriptive algorithms and measure-specific characteristics. Capacities and efficiency levels very considerably within these measures and current planning materials only produce very general savings estimates.
- Update annual water usage estimates for storage and instantaneous water heaters.
- Refer to RTF savings estimates for boilers.

5.2.5 Site-Specific Program

The Site-Specific Program provides calculated incentives to support the installation of qualifying energy efficiency equipment at commercial/industrial sites. These projects typically have a higher degree of complexity than the traditional prescriptive offerings and rely on custom calculations of savings and incentive levels. Examples of these projects include process improvements, upgrades to specialized equipment used in manufacturing, lighting installations that rely on specialized controls, and other measures designed around the customer's specific needs.

The program approach strives for a flexible response to energy efficiency projects that have demonstrable Therms savings within program criteria and are typically composed of custom HVAC, envelope, and industrial process load projects that do not fit the prescriptive path. In PY2023 four projects were completed, consisting of the replacement of:

- Steam traps
- Boilers
- Windows
- Water Heaters

The following table summarizes the verified natural gas energy savings for the Site-Specific Program impact evaluation.

TABLE 5-20: SITE-SPECIFIC PROGRAM VERIFIED NATURAL GAS SAVINGS

PY2023 Participation	Expected Therms Savings	Adjusted Therms Savings	Verified Therms Savings	Verified Realization Rate
9	59,355	59,355	91,963	154.9%

The Site-Specific Program displayed verified savings of 91,963 Therms with a realization rate of 154.9% against the expected savings for the program.

TABLE 5-21: SITE-SPECIFIC PROGRAM COSTS

Incentive Costs	Non-Incentive Costs	Total Costs
$210,910.58	$227,395.29	$438,305.87

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

5.2.5.1 Database Review & Verification

Unlike other non-residential programs, completing a census review of all Site-Specific projects is not feasible. To ensure accurate verified savings estimates, the Evaluators developed a sample of representative sites to inspect using the Stratified Random Sampling procedure detailed in Section 2.2.2.3. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than random sampling would require, by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results.

The participant population for the Site-Specific Program was divided into five strata. Table 5-22 summarizes the strata boundaries and sample frames for the Site-Specific Program.

TABLE 5-22: SITE-SPECIFIC PROGRAM SAMPLE DESIGN

Statistic Description	Stratum 1	Stratum 2	Stratum3	Totals
Strata boundaries (Therms)	< 1,000	1,001 - 10,000	10,001 - 30,000	
Number of projects	4	3	2	**9**
Total Therms savings	1,800.00	15,756.00	41,798.00	**59354**
Average Therms Savings	450.00	5,252.00	20,899.00	**6,594.89**
Standard deviation of Therms savings	191.54	2,484.79	7,844.78	**8,941.95**
Coefficient of variation	0.426	0.473	0.375	**1.356**
Final design sample	**1**	**2**	**2**	**5**

Four of the highest-savings sites (both in the 3rd stratum) were also specifically selected for verification and analysis. Verified sampling precision is 8.63% at 90%.

5.2.5.2 Project Document Review and On-Site Visits

Once representative projects were selected, the Evaluators obtained all project-related documentation for review. These documents typically included spec sheets, building characteristics, calculators, invoices, project photos and trending data. This information allowed the Evaluators to replicate claimed savings estimates and develop M&V plans to be used in assessing verified savings and collecting on-site data.

Using project-specific M&V plans, the Evaluators visited sampled to verify measure installation and operating parameters, as well as building parameters such as square footage and HVAC configurations. The Evaluators were able to conduct visits at 3 of the 5 sampled projects.

5.2.5.3 Impact Analysis

Impact approaches varied by project but adhered to IPMVP options A and C and used methods and inputs from established, reputable sources starting with the Regional Technical Forum, supplemented by the Illinois TRM 9.0. For three sites, whole-facility billing analyses were feasible and provided statistically robust savings estimates. For the remaining site, prescriptive calculations were conducted.

Specified methodology and inputs are discussed in individual site reports, located in Appendix C: Site-Specific Program Project Reports.

5.2.5.4 Site-Level Realization

Adjusted and verified savings were developed for each sampled site. The realization rates for sites within each stratum were then applied to the non-sampled sites within their respective stratum. Table 5-23 presents realization at the site level, with program-level savings.

TABLE 5-23: SITE-SPECIFIC EXPECTED, ADJUSTED AND VERIFIED THERMS SAVINGS BY PROJECT

Project ID	Expected Therms Savings	Adjusted Therms Savings	Verified Therms Savings	Realization Rate
SSOP_82514	581	581	581	100.0%
SSOP_117689	3,373	3,373	7,386	219.0%
SSOP_82425	4,315	4,315	4,315	100.0%
SSOP_110087	15,352	15,352	15,241	99.3%
SSOP_80621	26,446	26,446	50,938	192.6%
Totals:	**50,066**	**50,066**	**78,461**	**156.7%**

5.2.5.5 Discussion of Non-100% Realization

- **SSOP_117689 –** Measured savings are higher than ex ante predictions.
- **SSOP_80621 –** Measured savings are higher than ex ante predictions.

Individual reports for each sampled site are included in Appendix C: Site-Specific Program Project Reports.

5.2.5.6 Verified Savings

The Site-Specific Program in total displays a realization rate of 154.9% with 91,963 Therms verified natural gas energy savings in the Washington service territory, as displayed in Table 5-24.

TABLE 5-24: SITE-SPECIFIC IMPACT SUMMARY

Expected Therms Savings	Adjusted Therms Savings	Verified Therms Savings	Realization Rate
59,354	59,354	91,963	154.9%

6 APPENDIX A: BILLING ANALYSIS RESULTS

6.1 Shell Program

The results of the billing analysis for the Shell program are provided below. Table 6-1 shows customer counts for customers considered for billing analysis (i.e. customers with single-measure installations) and identifies measures that met the requirements for a billing analysis. A billing analysis was completed for measures that had at least 75 customers with single-measure installations. This ensured that measures would have a sufficient sample size after applying PSM data restrictions (e.g. sufficient pre- and post-period data). The billing analysis included participants in Washington and Idaho service territories (439 total) to acquire the maximum number of customers possible. The billing analysis on individual measures did not find significant savings due to variability observed in the data. The results reported combine measures across Idaho and Washington to produce a statistically significant estimate. See Table 6-5 for the non-significant results for individual measures. The rest of the section reports the combined analysis.

TABLE 6-1: MEASURES CONSIDERED FOR BILLING ANALYSIS, SHELL PROGRAM

Measure	Measure Considered for Billing Analysis	Number of Customers w/ Isolated-Measure Installations*	Sufficient Participation for Billing Analysis
G Attic Insulation With Natural Gas Heat	✓	97*	✓
G Window Replc With Natural Gas Heat	✓	342*	✓
G Attic Insulation and G Window Replc With Natural Gas Heat	✓	439*	✓

*This count includes rebates from Washington and Idaho

The Evaluators were successful in creating a matched cohort for each of the measures with sufficient participation. Customers were matched on zip code (exact match) and their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household. The Evaluators were provided a considerable pool of control customers to draw upon, as shown in Table 6-2. Also shown in Table 6-2, are the impact of various restrictions on the number of treatment and control customers that were included in the final regression model. The "Starting Count" displays the beginning number of customers available prior to applying the data restrictions, while the "Ending Count" displays the number of customers after applying data restrictions and final matching.

TABLE 6-2: COHORT RESTRICTIONS, SHELL PROGRAM

Measure	Data Restriction	# of Treatment Customers	# of Control Customers
G Attic Insulation With Natural Gas Heat	Starting Count	357	7,286
	Install Date Range: January 1, 2023 to June 30, 2023	357	7,286
	Control Group Usage Outlier (>2X max treatment usage)	355	7,280
	Incomplete Post-Period Bills (<6 months)	107	6,945
	Incomplete Pre-Period Bills (<10 months)	103	6,012
	Ending Count (Matched by PSM)	97	97
G Window Replc With Natural Gas Heat	Starting Count	1,057	7,286
	Install Date Range: January 1, 2023 to June 30, 2023	1,057	7,286

	Control Group Usage Outlier (>2X max treatment usage)	1,040	7,281
	Incomplete Post-Period Bills (<6 months)	356	6,946
	Incomplete Pre-Period Bills (<10 months)	351	6,013
	Ending Count (Matched by PSM)	342	342

Figure 6-1 and Figure 6-2 display the density of each variable employed in propensity score matching for the combined measures, before and after conducting matching.

For the combined measures, the covariate balance shows small differences between the treatment and control groups before and after matching.

FIGURE 6-1: COVARIATE BALANCE BEFORE MATCHING, SHELL ATTIC INSULATION AND SHELL WINDOW REPLACEMENT, WASHINGTON AND IDAHO

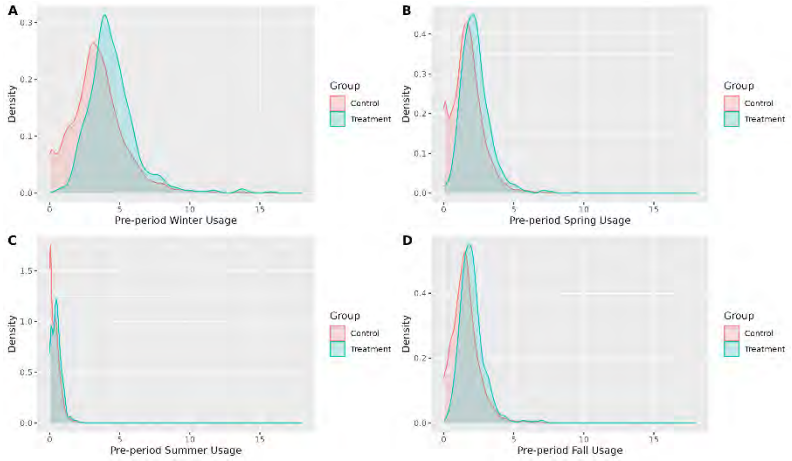
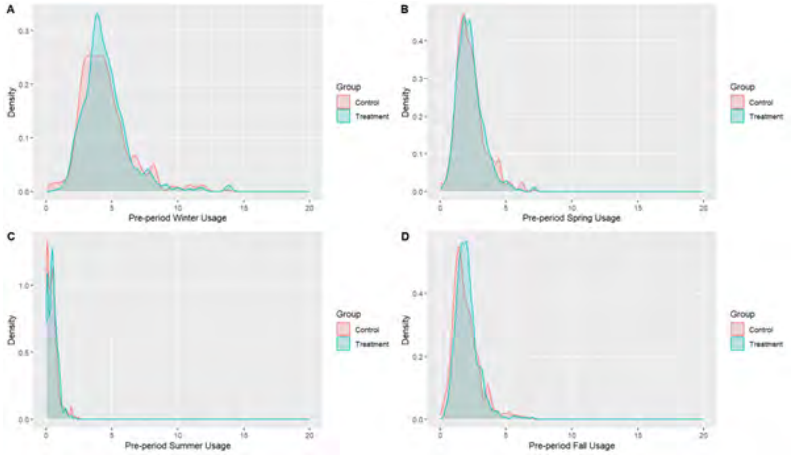


FIGURE 6-2: COVARIATE BALANCE AFTER MATCHING, SHELL ATTIC INSULATION AND SHELL WINDOW REPLACEMENT, WASHINGTON AND IDAHO



The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure. The t-test displayed no statistically significant differences at the 95% level in average daily consumption between the treatment and control groups for any month in the pre-period.

Table 6-3 -provides results for the *t*-test on pre-period usage between the treatment and control groups after matching for the Shell program. The P-Value is over 0.05 for each month, meaning pre-period usage between treatment and control groups is similar at the 95% confidence level.

TABLE 6-3: PRE-PERIOD USAGE T-TEST FOR ATTIC INSULATION AND WINDOW REPLACEMENT WASHINGTON AND IDAHO, SHELL PROGRAM

Month	Average Daily Usage (Therms), Control	Average Daily Usage (Therms), Treatment	T Statistic	Std Error	P-Value	Reject Null?
Jan	2.227	2.296	-1.059	0.046	0.290	No
Feb	2.222	2.290	-1.053	0.046	0.293	No
Mar	2.218	2.294	-1.182	0.046	0.237	No
Apr	2.199	2.285	-1.334	0.046	0.183	No
May	2.213	2.288	-1.151	0.046	0.250	No
Jun	2.204	2.281	-1.196	0.046	0.232	No
Jul	2.202	2.288	-1.342	0.046	0.180	No
Aug	2.202	2.290	-1.350	0.046	0.177	No
Sep	2.203	2.290	-1.347	0.046	0.178	No
Oct	2.217	2.286	-1.059	0.046	0.290	No
Nov	2.218	2.284	-1.013	0.046	0.311	No
Dec	2.215	2.288	-1.114	0.046	0.265	No

Table 6-4 provides customer counts for customers in the final regression model by assigned weather station ID for each measure. In addition, TMY HDD and CDD from the nearest available TMY weather station is provided as well as the weighted HDD/CDD for each measure. The HDD and CDD was weighted by the number of treatment customers assigned to a weather station.

TABLE 6-4: TMY WEATHER, SHELL PROGRAM

Measure	USAF Station ID	# of Treatment Customers	TMY USAF ID	TMY HDD	TMY CDD	Weighted TMY HDD	Weighted TMY CDD
G Attic Insulation With Natural Gas Heat and G Window Replc With Natural Gas Heat	720322	2	726985	4207	245	6050	422
	726817	14	726985	4207	245	6050	422
	727827	7	727827	5301	724	6050	422
	727830	33	727830	5347	861	6050	422
	727834	68	727834	6773	343	6050	422
	727850	11	727850	6436	224	6050	422
	727855	4	727855	7224	437	6050	422
	727856	350	727856	6052	437	6050	422
	727857	40	727857	6322	265	6050	422
	727870	24	727857	6322	265	6050	422

Table 6-5 provides annual savings per customer for the Shell program for each measure and regression model. The PPR model was selected for ex post savings because it provided the best fit for the data (highest adjusted R-squared).

TABLE 6-5: MEASURE SAVINGS FOR ALL REGRESSION MODELS, SHELL PROGRAM

Measure	Model	# of Treatment Customers	# of Control Customers	Annual Savings/ Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared
G Attic Insulation and G Window Replc With Natural Gas Heat	Diff-in-diff	439	436	23.84*	0.00	85.89	0.61
	PPR	439	436	148.80	77.00	220.67	0.93
	Treatment Only (Gross)	439	436	69.44*	0.00	154.61	0.64

*Not statistically significant

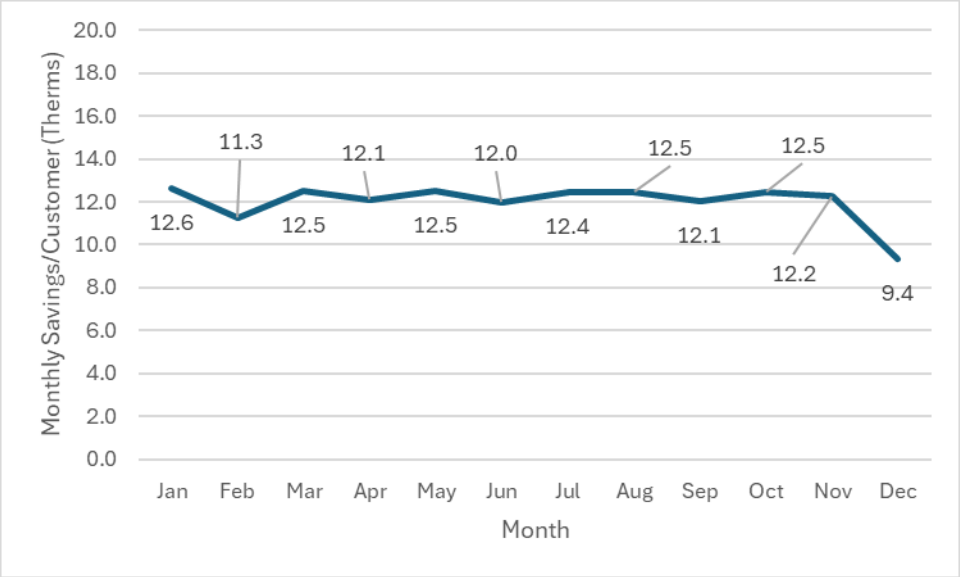
Savings are statistically significant at the 90% level for the combined measures and the adjusted R-squared shows the model provided an excellent fit for the data. The results of the billing analysis indicate no statistically significant savings were found for the window replacement measures.

TABLE 6-6: MEASURE SAVINGS, SHELL PROGRAM

Measure	Treatment Customers	Control Customers	Annual Savings per Customer (Therms)	90% Lower CI	90% Upper CI	Adjusted R-Squared	Model
G Attic Insulation and G Window Replc With Natural Gas Heat	439	436	148.80	77.00	220.67	0.93	Model 2: PPR

Figure 6-3 provides monthly TMY savings per customer for the Shell program. As expected for gas weatherization measures, the greatest savings occur during the winter months.

FIGURE 6-3: MONTHLY SAVINGS, SHELL PROGRAM



6.2 Low-Income Program

The Evaluators conducted a whole-home billing analysis for all the natural gas measures combined in order to estimate savings for the average household participating in the program, across all measures. The Evaluators successfully created a matched cohort for the natural gas measure households. Customers were matched on their average pre-period seasonal usage, including summer, fall, winter, and spring for each control and treatment household.

The Evaluators were provided a considerable pool of control customers to draw upon, as shown in Table 6-7. The Evaluators used propensity score matching. Also shown in Table 6-7, are the impact of various restrictions on the number of treatment and control customers that were included in the final regression model. The "Starting Count" displays the beginning number of customers available prior to applying the data restrictions, while the "Ending Count" displays the number of customers after applying data restrictions and final matching.

TABLE 6-7: COHORT RESTRICTIONS, LOW-INCOME PROGRAM

Measure	Data Restriction	# of Treatment Customers	# of Control Customers
Whole home natural gas	Starting Count	278	296
	Install Date Range: January 1, 2022 to Dec 31, 2022	278	296
	Control Group Usage Outlier (>2X max treatment usage)	223	287
	Incomplete Post-Period Bills (<6 months)	142	177
	Incomplete Pre-Period Bills (<10 months)	136	171
	Ending Count (Matched by PSM)	130	168

Figure 6-4 and Figure 6-5 display the density of each variable employed in propensity score matching for the combined natural gas measures before and after conducting matching.

The distributions prior to matching appear to be less similar in summer, with control customers averaging higher usage. However, after matching, the pre-period usage distribution in summer is more similar between the groups. The remaining pre-period seasons (winter, summer, fall), closely overlap before and after matching, indicating little differences exist on average between the groups prior to matching and validating the initial selection of control customers.

FIGURE 6-4: COVARIATE BALANCE BEFORE MATCHING, LOW INCOME GAS MEASURES

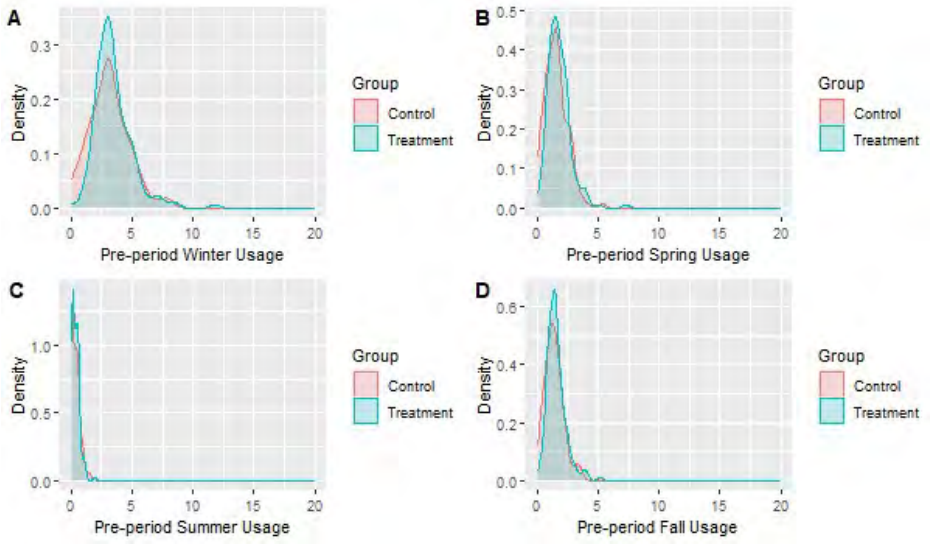
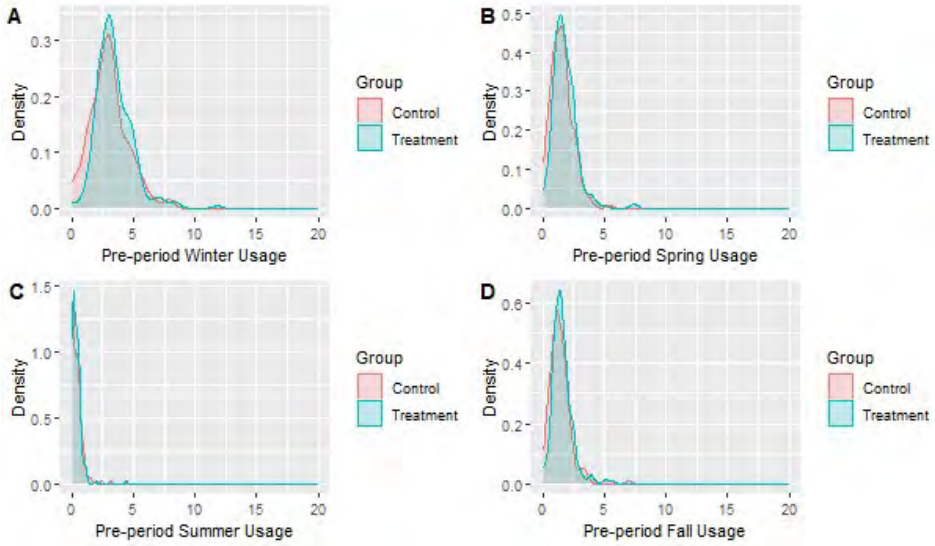


FIGURE 6-5: COVARIATE BALANCE AFTER MATCHING, LOW INCOME GAS MEASURES



The Evaluators performed three tests to determine the success of PSM:

1. *t*-test on pre-period usage by month
2. Joint chi-square test to determine if any covariates are imbalanced
3. Standardized difference test for each covariate employed in matching

All tests confirmed that PSM performed well for each measure. The t-test displayed no statistically significant differences at the 95% level in average daily consumption between the treatment and control groups for any month in the pre-period. In addition, the chi-squared test returned a p-value well over 0.05 for all measures, indicating that pre-period usage was balanced between the groups. Lastly, the standardized difference test returned values well under the recommended cutoff of 25, and always falling under 10, further indicating the groups were well matched on all included covariates.

Table 6-8 provides results for the *t*-test on pre-period usage between the treatment and control groups after matching for the Low-Income program. The P-Value is over 0.05 for each month, meaning pre-period usage between treatment and control groups is similar at the 95% confidence level.

TABLE 6-8: PRE-PERIOD USAGE T-TEST FOR GAS MEASURES, LOW-INCOME PROGRAM

Month	Average Daily Usage (Therms), Control	Average Daily Usage (Therms), Treatment	T Statistic	Std Error	P-Value	Reject Null?
Jan	3.07	3.60	-3.23	0.16	0.00	Yes
Feb	2.82	3.14	-2.18	0.15	0.03	Yes
Mar	2.20	2.39	-1.57	0.12	0.12	No
Apr	1.48	1.79	-3.32	0.09	0.00	Yes
May	0.73	1.00	-4.46	0.06	0.00	Yes
Jun	0.42	0.46	-1.19	0.04	0.23	No
Jul	0.32	0.26	2.07	0.03	0.04	Yes
Aug	0.30	0.25	1.94	0.03	0.05	No
Sep	0.38	0.40	-0.50	0.03	0.62	No
Oct	1.06	1.24	-2.87	0.06	0.00	Yes
Nov	2.47	2.66	-1.63	0.12	0.10	No
Dec	2.87	3.04	-1.27	0.13	0.20	No

Table 6-9 provides customer counts for customers in the final regression model by assigned weather station ID for each measure. In addition, TMY HDD and CDD from the nearest available TMY weather station is provided as well as the weighted HDD/CDD for each measure. The HDD and CDD was weighted by the number of treatment customers assigned to a weather station.

TABLE 6-9: TMY WEATHER, LOW-INCOME PROGRAM

Measure	USAF Station ID	# of Treatment Customers	TMY USAF ID	TMY HDD	TMY CDD	Weighted TMY HDD	Weighted TMY CDD
All Gas Measures	725895	3	725895	6853	238	5954	416
	725970	15	725970	4726	541	5954	416
	725975	6	725975	5778	329	5954	416
	726817	3	726985	4207	245	5954	416
	726886	1	726886	7130	247	5954	416
	726904	1	726904	4003	323	5954	416
	727830	2	727830	5347	861	5954	416
	727834	6	727834	6773	343	5954	416
	727850	2	727850	6436	224	5954	416
	727855	1	727855	7224	437	5954	416
	727856	112	727856	6052	437	5954	416
	727857	11	727857	6322	265	5954	416
	727870	5	727857	6322	265	5954	416

Table 6-10 provides annual savings/customer for the Low-Income program the program. Model 2 (PPR) was selected as the final model for the Low Income Program as it provided the highest adjusted R-squared among the regression models. Savings are statistically significant at the 90% level for all measures and the adjusted R-squared shows the model provided an excellent fit for the data (adjusted R-squared > 0.90).

TABLE 6-10: MEASURE SAVINGS FOR ALL REGRESSION MODELS, LOW-INCOME PROGRAM

Measure	Model	# of Treatment Customers	# of Control Customers	Annual Savings/ Customer	90% Lower CI	90% Upper CI	Adjusted R-Squared
All Electric Measures	Diff-in-diff	130	168	59.58*	0	164.49	0.55
	PPR	130	168	13.64*	0	31.23	0.92
	Treatment Only (Gross)	130	168	69.22*	0	242.63	0.60

*Not statistically significant

The results of the billing analysis indicate no statistically significant savings were found for the gas measures.

6.3 HVAC Program

Four gas measures met the inclusion criteria necessary for billing analyses. Key components of these inclusion criteria included having at least 75 customers who only installed a single measure, full details can be found in Section 2.2.3.5. These four measures were Smart Thermostat Contractor Install, Smart Thermostat Self Install, High Efficiency Natural Gas Furnaces, and Natural Gas Multi-Stage or Modulating Furnaces. The Evaluators employed a regression-based pre vs. post billing analysis methodology, as outlined in Section 2.2.3.6, to calculate the savings associated with thermostat installation. Of note, the PSM process to create matching control cohorts for these two thermostat measures involved a caliper of 0.2, a ratio of 1, and a "nearest" matching methodology. In contrast, the Evaluators used a heating load estimation methodology, as outlined in Section 2.2.3.10, to assess furnace savings. Heating load estimation only requires post-period billing data from treatment customers, so PSM was not necessary for this analysis.

As detailed in Section 2.2.3.6, the regression model with the highest adjusted R-squared was selected for reporting. For smart thermostats, as outlined in the table below, the PPR regression yielded the best fit.

TABLE 6-11: THERMOSTAT REGRESSION ADJUSTED R-SQUARED

Measure	DnD Adj R-squared	PPR Adj R-squared	Treatment Only Adj R-squared
Smart Thermostat Contractor Install	0.58	0.91	0.83
Smart Thermostat Self Install	0.59	0.93	0.83

Both smart thermostat regressions yielded statistically significant results, which suggests that both contractor and self-installed smart thermostats are associated with a decrease in customer gas usage. Full regression results for contractor and self-installed thermostats are outlined below in Table 6-12 and Table 6-13, respectively.

TABLE 6-12: CONTRACTOR INSTALLED THERMOSTAT PPR RESULTS

Metric	Value
Treatment sample population (*n*)	200
Control sample population (*n*)	200
Annual savings (Therms)	16.95
Pooled Standard Error	10.55
90% Confidence Interval	17.35
90% Relative Precision	1.02
P value	0.02

TABLE 6-13: SELF INSTALLED THERMOSTAT PPR RESULTS

Metric	Value
Treatment sample population (*n*)	356
Control sample population (*n*)	356
Annual savings (Therms)	29.46
Pooled Standard Error	6.80
90% Confidence Interval	11.19
90% Relative Precision	0.38
P value	< 0.01

Meanwhile, the heating load estimation methodology was used to calculate annual savings for High Efficiency Natural Gas Furnaces and Natural Gas Multi-Stage or Modulating Furnaces. Since this calculation methodology is based on a deemed savings algorithm (not a regression) it does not produce measures of goodness of fit or statistical significance. However, the Evaluators did calculate standard error, 90% confidence and precision metrics for this analysis. A full outline of the key billing analysis results associated with each HVAC furnace measure can be found below.

TABLE 6-14: NATURAL GAS FURNACE HEATING LOAD ESTIMATION RESULTS

Metric	Value
Treatment sample population (*n*)	109
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%[9]
Installed Furnace Efficiency	95%
Annual savings (Therms)	48.22
Pooled Standard Error	0.80
90% Confidence Interval	1.32
90% Relative Precision	0.03

TABLE 6-15: NATURAL GAS MULTI-STAGE OR MODULATING FURNACE HEATING LOAD ESTIMATION RESULTS

Metric	Value
Treatment sample population (*n*)	46.5[10]
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%
Installed Furnace Efficiency	95%
Annual savings (Therms)	48.25
Pooled Standard Error	1.88
90% Confidence Interval	3.10
90% Relative Precision	0.06

Of note, heating load estimation savings are highly dependent on the baseline used in calculations. The 88.5% baseline outlined in the Regional Technical Forum's gas furnace UES measure workbook represents a precise regional estimate. However, if the federal minimum standard of 80% was used in heating load calculations instead, estimated annual savings would reach 123 Therms for both Natural Gas Furnaces and Natural Gas Multi-Stage or Modulating Furnaces.

6.4 Water Heat Program

The only gas measure that met inclusion criteria for the Water Heat program was Natural Gas Tankless Water Heaters. The Tankless Water Heater cohort began with 187 treatment customers; however, after preprocessing, billing data from 129 customers was used in the regression analyses. As with smart thermostats, a caliper of 0.2, a ratio of 1, and a "nearest" matching methodology was used to develop a matched control cohort of non-participant customers. The Difference-in-Difference regression yielded an adjusted R-squared of 0.55, the PPR yielded an adjusted R-squared of 0.98, and the Treatment Only regression yielded an adjusted R-squared of 0.80. As such PPR was selected for reporting. The following table outlines the PPR results for Natural Gas Tankless Water Heater program.

[9] The Regional Technical Forum outlines current practice furnace efficiency as 88.5% as of the July 2021 publication of the Gas Furnace UES workbook version 1.1.

[10] Heating load estimation is calculated monthly, so 46.5 is the average customers included in each month of valid billing data in 2023.

TABLE 6-16: NATURAL GAS TANKLESS WATER HEATER PPR RESULTS

Metric	Value
Treatment sample population (*n*)	129
Control sample population (*n*)	129
Annual savings (Therms)	21.62
Pooled Standard Error	10.55
90% Confidence Interval	17.36
90% Relative Precision	0.80
P value	< 0.01

6.5 Midstream Program

The only billing analyses for the Midstream program that yielded valid results were for the Residential Furnace and Residential HVAC measures. While the Residential Heat Pump Water Heater and Residential Water Heater programs passed the PSM, they only had 7 and 4 treatment customers each, making the results of the regression analysis invalid due to such small sample sizes. As with the HVAC program, the heating load savings estimate methodology was employed for both of these space heating measures. Key savings results for the midstream residential furnace and HVAC measures are outlined below.

TABLE 6-17: MIDSTREAM RESIDENTIAL FURNACE HEATING LOAD ESTIMATION RESULTS

Metric	Value
Treatment sample population (*n*)	26.5[11]
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%
Installed Furnace Efficiency	95%
Annual savings (Therms)	47.43
Pooled Standard Error	1.14
90% Confidence Interval	1.88
90% Relative Precision	0.04

TABLE 6-18: MIDSTREAM RESIDENTIAL HVAC HEATING LOAD ESTIMATION RESULTS

Metric	Value
Treatment sample population (*n*)	13.4
Control sample population (*n*)	N/A
Baseline Furnace Efficiency	88.5%
Installed Furnace Efficiency	95%
Annual savings (Therms)	51.73
Pooled Standard Error	4.81
90% Confidence Interval	7.91
90% Relative Precision	0.15

[11] As above, heating load estimation is calculated monthly, so 26.5 represents the average customers included in each month of valid billing data in 2023.

7 APPENDIX B: SUMMARY OF SURVEY RESPONDENTS

This section summarizes additional insights gathered from the simple verification surveys deployed by the Evaluators for the impact evaluation of Avista's Residential and Low-Income Programs.

Survey respondents confirmed installing between one and three measures that were rebated by Avista, displayed in Table 7-1. This table is missing information from 29 low-income, CEEP, and MFDI survey respondents who did not indicate the number nor type of measures they received.

TABLE 7-1: TYPE AND NUMBER OF MEASURES RECEIVED BY RESPONDENTS

Measure Category	Total	Percent (n=305)
No Measures	304	13.8%
One Measure	1218	55.4%
Two Measures	440	20.0%
Three Measures	171	7.8%
Four Measures	47	2.1%
Five or more measures	20	0.9%
HVAC	289	13.1%
Water Heater	136	6.2%
Smart Thermostat	515	23.4%
Clothes Washer	297	13.5%
Clothes Dryer	189	8.6%

The Evaluators asked respondents to provide information regarding their home, as displayed in Table 7-2. Similar to previous impact evaluation findings, the majority of respondents noted owning a single-family home between 1,000-3,000 square feet with central air conditioning.

TABLE 7-2: SURVEY RESPONDENT HOME CHARACTERISTICS[12]

Question	Response	Percent
Do you rent your home? (n=755)	Own	93.8%
	Rent	1.9%
	Own and rent to someone else	1.3%
	I don't know	0.1%
	Prefer not to answer	2.9%
Which of the following best describes your home? (n=755)	Single-family house detached	86.0%
	Single-family house attached to one or more other houses	2.3%
	Mobile or manufactured home	8.2%
	Apartment with 2 to 4 units	0.8%
	Apartment with 5+ units	0.3%
	Other	1.4%
	I don't know	0.2%
	Prefer not to answer	0.7%
Does your home have central air conditioning? (n=755)	Yes	72.6%
About how many square feet is your home? (n=629)	Less than 1,000ft^2	6.6%
	1,000-1,999ft^2	42.4%
	2,000-2,999ft^2	32.3%
	3,000-3,999ft^2	13.5%
	4,000ft^2 or more	5.2%
When was your home built? (n=719)	Before 1950	20.0%
	1950 to 1959	10.3%
	1960 to 1969	6.6%
	1970 to 1979	15.3%
	1980 to 1989	7.7%
	1990 to 1999	15.3%
	2000 to 2009	13.2%
	2010 to 2019	4.7%
	2020 to Present	5.6%
	I don't know	1.1%
	Prefer not to answer	0.2%

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

8 APPENDIX C: SITE-SPECIFIC PROGRAM PROJECT REPORTS

This section displays site reports for each sampled project in the Site-Specific Program.

Project Number SSLP_71556

Project Background

The participant is a dry cleaner that received incentives from Avista for replacing steam traps in a 100psig system. The Evaluators verified the participant had installed:

- (25) steam traps

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation, assumed operating parameters. Savings for the lighting measures were calculated using industry standard steam trap algorithms:

Savings Algorithm

$$therm_{savings} = \frac{Q \times Steam\ Discharge\ Rate \times OpHours \times h_{fg} \times boiler\ efficiency}{100{,}000}$$

Where:

Q = measure quantity (25)

$Steam\ Discharge\ Rate$ = steam loss in lb/hour (15.6388)

$OpHours$ = annual hours the steam system is pressurized,

h_{fg} = latent heat of evaporation in Btu/lb (888.6443)

$boiler\ efficiency$ = combustion efficiency of the boiler (80.0%)

Savings Calculations

Using deemed values from the table above, the Evaluators calculated lighting savings as follows:

TABLE: STEAM TRAP SAVINGS CALCULATIONS

Quantity	Steam flow (lb/hr)	Heating hours	Latent heat of steam (BTU/lb)	Boiler Efficiency	Expected Therms Savings	Adjusted Therms Savings	Verified Therms Savings	Realization Rate
25	15.64	2,600	888.64	80.0%	12,208	11,292	11,292	92.5%

Results

For project # SSLP_71556 the Therms realization rate is 92.5%.

TABLE: VERIFIED GROSS SAVINGS, REALIZATION RATES, & ADJUSTMENTS

Measure	Expected Therms Savings	Adjusted Therms Savings	Verified Therms Savings	Realization Rate
Steam Trap Replacement	12,208	11,292	11,292	92.5%

Ex ante calculations used an approximation for latent heat of vaporization based on a gauge pressure of 5 psi. The verified gauge pressure is 100. Latent heat of vaporization was calculated using a saturated steam table.

Project Number SSLP_82019

Project Background

The participant is a religious gathering facility that received incentives from Avista for replacing two natural gas boilers.

- (2) natural gas 'indirect' water heaters

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment. The Evaluators also conducted an onsite visit to the facility to verify installation and operating as described Savings for the boiler measure was calculated using a weather-optimized billing analysis. The regression used one full year of pre-project natural gas billing data, one full year of post-project billing data and TM3 data, with HDD based on a fitted, optimized heating point (50 degrees).

Savings Calculations

Using data described above, the Evaluators calculated lighting savings as follows:

TABLE: HDD AND MODEL FIT

HDD base	'Pre' model R^2	'Post 'Model R^2
55	0.96	0.99

TABLE: PRE/POST USE AND THERMS SAVINGS

Expected Therms Savings	Annual Pre Usage (Therms)	Annual Post Usage (Therms)	Verified Therms Savings	Realization Rate
2,007	18,279	12,594	5,685	283.3%

Results

For project #82019 the Therms realization rate is 283.3%.

TABLE: VERIFIED GROSS SAVINGS, REALIZATION RATES, & ADJUSTMENTS

Measure	Verified Therms Savings	Therms Realization Rate	Therms Adjustments
Two (2) NG 'indirect' water heaters	5,685	283.3%	0
Totals:	**5,685**	**283.3%**	**0**

Measured savings are higher than ex ante predictions.

Project Number SSOP_80123

Project Background

The participant is automotive repair facility that received incentives from Avista for retrofitting high performance (better insulating) windows. The Evaluators verified the participant had installed:

- 109 Sq ft of new windows with a U value of .027

M&V Methodology

The Evaluators reviewed all project documentation including, plans, photos and invoices, as well as conducted on on-site visit to verify the installation of rebated equipment and total square footage installed. Expected savings calculations were examined and were found to be accurate with appropriate assumptions made. A regression analysis was conducted using metered billing data, however no statistically significant results could be obtained. The results that were obtained did corroborate claimed savings. The Evaluators compared claimed savings with a brief benchmark study of the same measure in similar buildings/climate zones, finding similar savings estimates.

Savings Calculations

TABLE: WINDOW RETROFIT THERMS SAVINGS CALCULATIONS

Measure	Total SqFt Replaced	Pre U-Value	Post U-Value	Pre SC	Post SC	Pre SHGC	Post SHGC	Expected Therms Savings	Verified Therms Savings	Realization Rate
High Efficiency Windows	109	1.00	0.27	0.87	0.35	0.87	0.30	132.45	132.45	100.0%

Results

For project # SSOP_80123, the Therms realization rate is 100.0%.

TABLE: VERIFIED GROSS SAVINGS & REALIZATION RATES

Measure	Verified Therms Savings	Adjusted Therms Savings	Realization Rate
High Efficiency Windows	132.45	132.45	100.0%

Project Number SSOP_81307

Project Background

The participant is a new primary school that received incentives from Avista for installing reduced power density lighting, (2) high efficiency boilers, and above code insulation. The Evaluators verified the participant had installed:

- (2) 2000 kBTU Arctic boilers
- Mass Wall Insulation: R13 batt and R10 continuous foam board
- Steel Framed Wall Insulation: R19 batt and R10 continuous foam board

M&V Methodology

The Evaluators reviewed all project documentation including plans, calculators, photos and invoices, to verify the installation of rebated equipment.

Boiler:

Savings for the boiler measure were calculated using eQuest modeling software. The evaluator examined the eQuest input files and determined that the high efficiency boiler measure was modeled correctly. Since there were no discrepancies in the model, the realization rate for the boiler measure is 100%.

The values used in calculating energy and demand savings are presented in the table below.

TABLE: EQUEST MODEL OUTPUTS - BOILERS

Measure	Baseline kBtu	Verified kBtu	kBtu Savings	Therms Savings
High Efficiency Boilers	1,936,759	1,422,728	514,031	5,140

Insulation:

Savings for the insulation measure were also calculated using eQuest modeling software. The evaluator examined the eQuest input files and determined that most of the insulation measure looks accurate, however, the post-install R value looked understated for the mass walls.

There was an R value increase of 6 for the upper section of the building which aligns with the new insulation on the steel framed walls. For the mass walls, the R value increases by only 0.5 for the first-floor exterior walls. It was difficult to determine the exact scope of the insulation measure given the information that was available to the evaluator for this site. It is quite possible that this was modeled correctly and there were on-site restrictions to what insulation could be installed in the mass-walls. If there is any discrepancy in the model and what was installed, I believe the model would be conservative.

TABLE: EQUEST MODEL OUTPUTS - INSULATION

Measure	Baseline kBtu	Verified kBtu	kBtu Savings	Therms Savings
High Efficiency Boilers	1,422,728	1,410,426	12,302	123

Results

For project SSOP_81307 the Therms realization rate is 100.0%.

TABLE: VERIFIED GROSS SAVINGS, REALIZATION RATES, & ADJUSTMENTS

Measure	Verified Therms Savings	Adjusted Therms Savings	Therms Realization Rate
Boilers	5,140.00	5,140.00	100.0%
Insulation	123.00	123.00	100.0%
Totals:	**5,263.00**	**5,263.00**	**100.0%**

8.1 Validity Testing

The tables below detail the average daily energy consumption differences and statistical significance between each cohort's treatment and control groups for each of the 12 months in the pre-period, relative to each

9 APPENDIX D: COST BENEFIT ANALYSIS RESULTS

The Evaluators estimated the cost-effectiveness for the Avista Residential and Low-Income Programs using evaluated savings results, economic inputs provided by Avista, and incremental costs and non-energy impacts from the RTF. The table below presents the cost-effectiveness results for the PY2023 portfolio.

TABLE 9-1: COST-EFFECTIVENESS RESULTS

Sector	TRC	UCT	RIM	PCT
Residential	2.21	1.32	0.07	8.22
Residential Low Income	0.13	0.14	0.14	N/A*
Nonresidential	1.57	2.36	2.36	0.41
Total	**1.62**	**1.09**	**0.08**	**N/A***
***Low Income is offered at no cost to participants; PCT is not calculable.**				

9.1 Approach

The tables below detail the average daily energy consumption differences and statistical significance between

The California Standard Practice Model was used as a guideline for the calculations. The cost-effectiveness analysis methods that were used in this analysis are among the set of standard methods used in this industry and include the Utility Cost Test (UCT)[13], Total Resource Cost Test (TRC), Ratepayer Impact Measure Test (RIM), and Participant Cost Test (PCT). All tests weigh monetized benefits against costs. These monetized amounts are presented as NPV evaluated over the lifespan of the measure. The benefits and costs differ for each test based on the perspective of the test. The definitions below are taken from the California Standard Practice Manual.

- The TRC measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs.
- The UCT measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the TRC benefits. Costs are defined more narrowly.
- The PCT is the measure of the quantifiable benefits and costs to the customer due to participation in a program. Since many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.
- The RIM test measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program. Rates will go down if the change in revenues from the program is greater than the change in utility costs. Conversely, rates or bills will go up if revenues collected after program implementation is less than the total costs incurred by the utility in implementing the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.

A common misperception is that there is a single best perspective for evaluation of cost-effectiveness. Each test is useful and accurate, but the results of each test are intended to answer a different set of questions. The questions to be addressed by each cost test are shown in the table below.[14]

[13] The UCT is also referred to as the Program Administrator Cost Test (PACT).
[14] http://www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf

TABLE 9-2: QUESTIONS ADDRESSED BY THE VARIOUS COST TESTS

Cost Test	Questions Addressed
Participant Cost Test (PCT)	■ Is it worth it to the customer to install energy efficiency?
	■ Is it likely that the customer wants to participate in a utility program that promotes energy efficiency?
Ratepayer Impact Measure (RIM)	■ What is the impact of the energy efficiency project on the utility's operating margin?
	■ Would the project require an increase in rates to reach the same operating margin?
Utility Cost Test (UCT)	■ Do total utility costs increase or decrease?
	■ What is the change in total customer bills required to keep the utility whole?
Total Resource Cost Test (TRC)	■ What is the regional benefit of the energy efficiency project (including the net costs and benefits to the utility and its customers)?
	■ Are all of the benefits greater than all of the costs (regardless of who pays the costs and who receives the benefits)?
	■ Is more or less money required by the region to pay for energy needs?

Overall, the results of all four cost-effectiveness tests provide a more comprehensive picture than the use of any one test alone. The TRC cost test addresses whether energy efficiency is cost-effective overall. The PCT, UCT, and RIM address whether the selection of measures and design of the program are balanced from the perspective of the participants, utilities, and non-participants. The scope of the benefit and cost components included in each test are summarized in the table below.[15]

[15] Ibid.

TABLE 9-3: BENEFITS AND COSTS INCLUDED IN EACH COST-EFFECTIVENESS TEST

Test	Benefits	Costs
PCT (Benefits and costs from the perspective of the customer installing the measure)	▪ Incentive payments ▪ Bill Savings ▪ Applicable tax credits or incentives	▪ Incremental equipment costs ▪ Incremental installation costs
UCT (Perspective of utility, government agency, or third party implementing the program	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	▪ Program overhead costs ▪ Utility/program administrator incentive costs
TRC (Benefits and costs from the perspective of all utility customers in the utility service territory)	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution ▪ Additional resource savings ▪ Monetized non-energy benefits	▪ Program overhead costs ▪ Program installation costs ▪ Incremental measure costs
RIM (Impact of efficiency measure on non-participating ratepayers overall)	▪ Energy-related costs avoided by the utility ▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	▪ Program overhead costs ▪ Lost revenue due to reduced energy bills ▪ Utility/program administrator installation costs

9.2 Non-Energy Benefits

Non-energy Benefits (NEBs) were sourced from the 2022 Annual Conservation Plan developed by Avista. NEBs avoided illness from air pollution, avoided calls to the utility, avoided fires/insurance damage, and other impacts relative to energy efficiency upgrades offered to customers in each of Avista's programs.

- Residential measures with NEBs included air source heat pumps, ductless heat pumps, windows, and insulation measures.
- Low Income NEBs included the NEBs described for Residential as well as a dollar-for-dollar benefit adder for health and safety spending.

9.3 Approach

The tables below detail the average daily energy consumption differences and statistical significance between

The Evaluators used the economic inputs provided by Avista for the cost benefit analysis. Avista provided the Evaluators with avoided costs on the following basis:

- Hourly avoided commodity costs
- Modifications for the Clean Premium
- Avoided capacity costs
- Avoided transmission
- 10% Conservation Adder
- Line losses
- Discount rate (after tax Weighted Average Cost of Capital)

The values were aggregated to provide a single benefit multiplier on a Therms basis for every hour of the year (8,760). Savings by measure were then parsed out to the following load shapes provided by Avista:

- Residential Space Heating
- Residential Air Conditioning
- Residential Lighting
- Residential Refrigeration
- Residential Water Heating
- Residential Dishwasher
- Residential Washer/Dryer
- Residential Furnace Fan
- Residential Miscellaneous

The Evaluators in addition created a Residential Heat Pump load shape by weighting the relative magnitude of cooling versus heating savings from a heat pump and assigning these to weight the Residential Space Heating and Residential Air Conditioning load shapes.

9.4 Results

The tables below outline the results for each test, for both the programs and the portfolio as a whole. Summations may differ by $1 due to rounding.

TABLE 9-4: COST-EFFECTIVENESS RESULTS BY SECTOR

Sector	TRC	UCT	RIM	PCT
Residential	2.21	1.32	0.07	8.22
Residential Low Income	0.13	0.14	0.14	N/A*
Nonresidential	1.57	2.36	2.36	0.41
Total	**1.62**	**1.09**	**0.08**	**N/A***
***Low Income is offered at no cost to participants; PCT is not calculable.**				

TABLE 9-5: COST-EFFECTIVENESS BENEFITS BY SECTOR

Program	TRC Benefits	UCT Benefits	RIM Benefits	PCT Benefits
Residential	$17,837,146	$8,114,762	$8,146,424	$56,432,313
Residential Low Income	$413,571	$365,170	$365,949	$1,823,260
Nonresidential	$2,294,105	$1,921,808	$1,925,794	$448,525
Total	**$20,544,822**	**$10,401,740**	**$10,438,166**	**$58,704,098**

TABLE 9-6: COST-EFFECTIVENESS COSTS BY SECTOR

Program	TRC Costs	UCT Costs	RIM Costs	PCT Costs
Residential	$8,063,506	$6,147,436	$123,024,780	$6,866,029
Residential Low Income	$3,140,095	$2,593,117	$2,593,117	$2,370,238
Nonresidential	$1,460,323	$815,547	$815,547	$1,093,301
Total	**$12,663,924**	**$9,556,100**	**$126,433,444**	**$10,329,568**

TABLE 9-7: COST-EFFECTIVENESS NET BENEFITS BY SECTOR

Program	TRC Net Benefits	UCT Net Benefits	RIM Net Benefits	PCT Net Benefits
Residential	$9,773,640	$1,967,326	($114,910,018)	$49,566,284
Residential Low Income	($2,726,524)	($2,227,948)	($2,227,948)	($546,978)
Nonresidential	$833,782	$1,106,261	$1,106,261	($644,776)
Total	**$7,880,898**	**$845,640**	**($116,031,704)**	**$48,374,530**

APPENDIX C – 2023 COST-EFFECTIVENESS TABLES

Electric

Electric Portfolio

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 56,561,179	$ 33,049,582	1.71
Utility Cost Test (UCT)	$ 48,730,709	$ 28,059,243	1.74
Participant Cost Test (PCT)	$ 66,993,212	$ 25,342,025	N/A
Ratepayer Impact (RIM)	$ $48,730,709	$ 76,529,253	0.64

Electric Portfolio (Without Low-Income)

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 54,022,296	$ 29,593,188	1.83
Utility Cost Test (UCT)	$ 47,832,797	$ 24,602,848	1.94
Participant Cost Test (PCT)	$ 64,688,039	$ 23,652,034	2.73
Ratepayer Impact (RIM)	$ 47,832,797	$ 72,302,775	0.66

Commercial/Industrial

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 44,039,335	$ 21,697,292	2.03
Utility Cost Test (UCT)	$ 40,035,598	$ 20,195,795	1.98
Participant Cost Test (PCT)	$ 56,829,729	$ 18,377,355	3.09
Ratepayer Impact (RIM)	$ 40,035,598	$ 60,869,227	0.66

Residential

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 9,982,961	$ 7,895,896	1.26
Utility Cost Test (UCT)	$ 7,797,199	$ 4,407,053	1.77
Participant Cost Test (PCT)	$ 7,858,310	$ 5,274,679	1.49
Ratepayer Impact (RIM)	$ 7,797,199	$ 11,433,548	0.68

Low-Income

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 2,538,883	$ 3,456,395	0.73
Utility Cost Test (UCT)	$ 897,912	$ 3,456,395	0.26
Participant Cost Test (PCT)	$ 2,305,173	$ 1,689,991	N/A
Ratepayer Impact (RIM)	$ 897,912	$ 4,226,478	0.21

Natural Gas

Natural Gas Portfolio

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 20,544,822	$ 12,663,924	1.62
Utility Cost Test (UCT)	$ 10,401,740	$ 9,556,100	1.09
Participant Cost Test (PCT)	$ 58,704,098	$ 10,329,568	N/A
Ratepayer Impact (RIM)	$ 10,438,166	$ 126,433,444	0.08

Natural Gas Portfolio (Without Low-Income)

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 20,131,251	$ 20,727,430	0.97
Utility Cost Test (UCT)	$ 10,036,570	$ 15,703,536	0.64
Participant Cost Test (PCT)	$ 56,880,838	$ 17,195,597	3.31
Ratepayer Impact (RIM)	$ 10,072,218	$ 249,458,224	0.04

Commercial/Industrial

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 2,294,105	$ 1,460,323	1.57
Utility Cost Test (UCT)	$ 1,921,808	$ 815,547	2.36
Participant Cost Test (PCT)	$ 448,525	$ 1,093,301	0.41
Ratepayer Impact (RIM)	$ 1,925,794	$ 815,547	2.36

Residential

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 17,837,146	$ 8,063,506	2.21
Utility Cost Test (UCT)	$ 8,114,762	$ 6,147,436	1.32
Participant Cost Test (PCT)	$ 56,432,313	$ 6,866,029	8.22
Ratepayer Impact (RIM)	$ 8,146,424	$ 123,024,780	0.07

Low-Income

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
Total Resource Cost (TRC)	$ 413,571	$ 3,140,095	0.13
Utility Cost Test (UCT)	$ 365,170	$ 2,593,117	0.14
Participant Cost Test (PCT)	$ 1,823,260	$ 2,370,238	N/A
Ratepayer Impact (RIM)	$ 365,949	$ 2,593,117	0.14

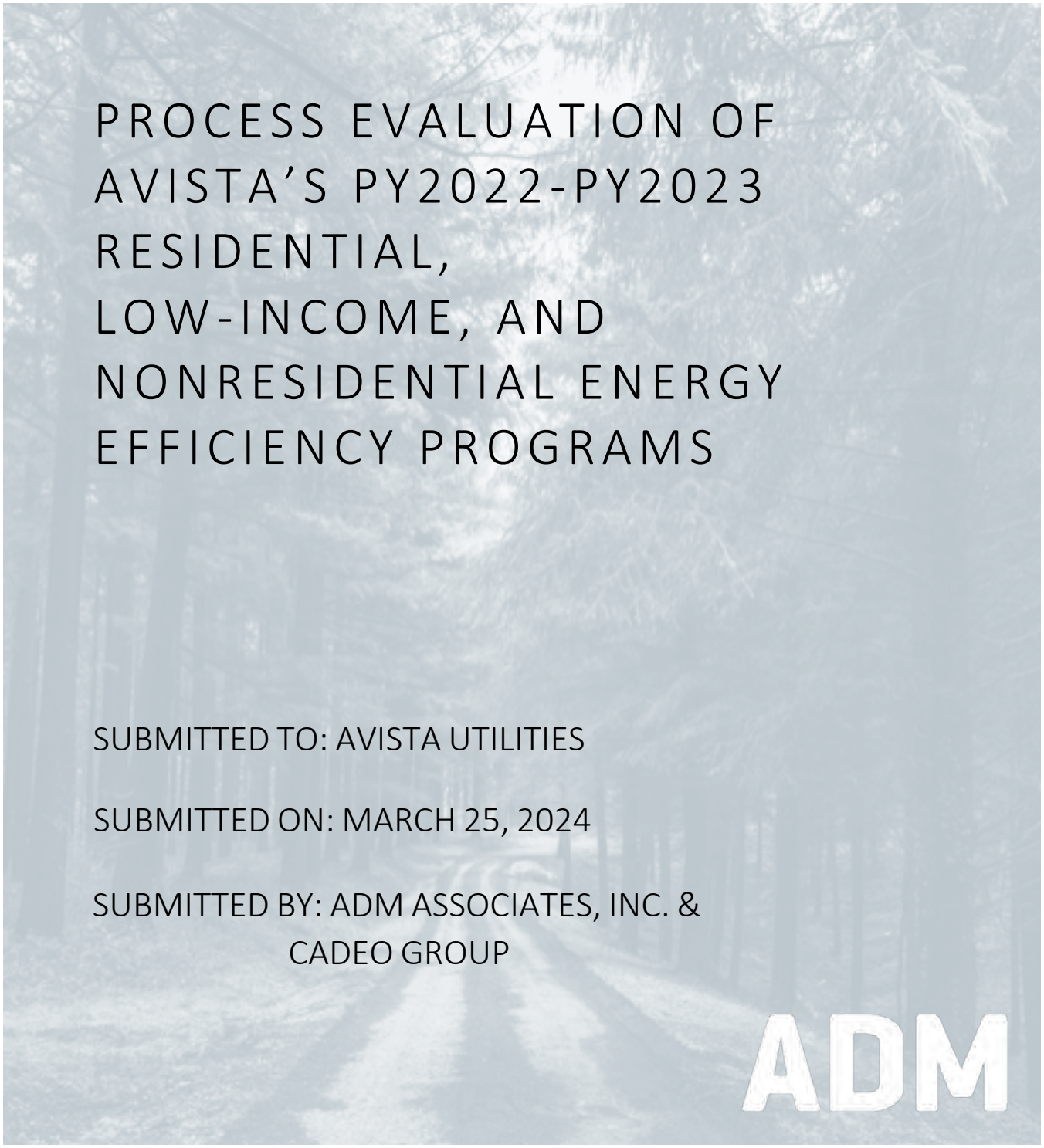
APPENDIX D – 2023 EXPENDITURES BY PROGRAM

Program	Electric	Natural Gas	Total
Energy Efficiency			
Low-Income/CEEP			
Low-Income	$ 729,693	$ 1,823,260	$ 2,552,953
Named Communities	$ 960,298	$ –	$ 960,298
Residential			
Water Heat	$ 20,000	$ 111,400	$ 131,400
HVAC	$ 196,570	$ 1,766,140	$ 1,962,709
Shell	$ 433,008	$ 2,105,163	$ 2,538,171
ENERGY STAR Homes	$ 32,000	$ 7,000	$ 39,000
MultiFamily/Small Home Weatherization	$ 133,204	$ 58,123	$ 191,327
Multifamily Direct Install	$ 579,862	$ 10,008	$ 589,870
Appliances	$ 80,492	$ 9,650	$ 90,142
Midstream	$ 310,700	$ 882,475	$ 1,193,175
Always on Home Energy Report	$ –	$ –	$ –
Commercial/Industrial			
Prescriptive Lighting	$ 3,228,853	$ –	$ 3,228,853
Small Business Lighting	$ 6,667,744	$ –	$ 6,667,744
HVAC	$ 64,500	$ 33,651	$ 98,151
Food Service Equipment	$ 1,230	$ 21,000	$ 22,230
Grocer	$ 2,300	$ –	$ 2,300
Shell	$ 35,599	$ 34,986	$ 70,585
Green Motors	$ 650	$ –	$ 650
Midstream	$ 28,698	$ 147,978	$ 176,676
Site-Specific	$ 6,846,285	$ 210,911	$ 7,057,196
Energy Efficiency Total	**$ 20,351,686**	**$ 7,221,744**	**$ 27,573,430**
Market Transformation			
Northwest Energy Efficiency Alliance	$ 1,314,078	$ 412,429	$ 1,726,507
Brio Eastside Market Transformation	$ 56,875	$ –	$ 56,875
Market Transformation Total	**$ 1,370,953**	**$ 412,429**	**$ 1,783,382**
Other Programs and Activities			
General Implementation	$ 1,869,198	$ 136,224	$ 2,005,422
Labor Costs	$ 5,480,033	$ 1,318,589	$ 6,798,622
Advertising and Outreach	$ 182,310	$ 20,448	$ 202,759
Third Party Implementation	$ 316,951	$ 47,481	$ 364,433
Pilot Programs	$ 41,433	$ 13,449	$ 54,882
EM&V/CPA	$ 259,549	$ 119,456	$ 379,004
Other	$ 8,142	$ –	$ 8,142
Other Programs and Activities Total	**$ 8,157,617**	**$ 1,655,648**	**$ 9,813,265**
Grand Total*	**$ 29,880,255**	**$ 9,289,821**	**$ 39,170,077**

* Totals may differ from tariff rider spend due to differences between vendor invoice cadence and ledger close dates.

APPENDIX E – 2023 ENERGY EFFICIENCY ACTIVITY BY PROGRAM

Energy Efficiency Program	Electric				Natural Gas			
	Participants		Evaluated Savings (kWh)	Utility Cost	Participants		Evaluated Savings (Therms)	Utility Cost
Low-Income								
Weatherization	169	Homes	112,300	$ 1,152,292	276	Homes	7,206	$ 1,022,002
HVAC	129	Units	338,714	$ 1,947,162	190	Units	7,001	$ 907,487
Water Heat	0	Units	0	$ 0	17	Units	543	$ 79,121
Lighting	30	Units	251	$ 2,636	0	N/A	0	$ 0
Health and Safety	65	HHS	0	$ 348,351	139	HHS	0	$ 584,507
ENERGY STAR Refrigerator	4	Units	156	$ 5,954	0	N/A	0	$ 0
Low-Income Total	**397**		**451,421**	**$ 3,456,395**	**622**		**14,750**	**$ 2,593,117**
Residential								
ENERGY STAR Homes	32	Homes	94,037	$ 165,072	7	Homes	469	$ 7,486
HVAC	440	Furnace, Tstat	465,360	$ 447,297	4,091	Furnace, Tstat	208,468	$ 2,093,390
Water Heat	44	Units	49,543	$ 41,891	277	Units	14,945	$ 134,714
Multifamily Direct Install	15,162	Units (Measures)	1,030,041	$ 1,035,076	810	Units (Measures)	2,586	$ 12,688
Shell	373	Windows, Insulation	315,829	$ 798,484	1,774	Windows, Insulation	87,129	$ 2,743,350
Appliances	1,132	Washer/ Dryer	177,085	$ 158,931	194	Washer/ Dryer	646	$ 10,303
Midstream	793	Units	1,552,940	$ 1,178,449	1,306	Units	114,505	$ 1,081,498
MultiFamily/Small Home Weatherization	231	Units (Measures)	385,783	$ 581,854	104	Units (Measures)	6,443	$ 69,605
Residential Total	**18,207**		**4,070,618**	**$ 4,407,054**	**8,563**		**435,191**	**$ 6,153,034**
Commercial/Industrial								
Grocer & Food Service Equipment	5	Projects	21,983	$ 4,824	14	Projects	10,258	$ 41,508
Variable Frequency Drive/HVAC	2	Projects	329,852	$ 85,738	35	Projects	9,987	$ 59,388
Shell	25	Projects	87,012	$ 48,236	14	Projects	4,263	$ 78,265
Green Motors	1	Motor Rewind	4,535	$ 910	0	N/A	0	$ 0
Prescriptive Lighting	1,327	Projects	11,810,424	$ 4,261,489	0	N/A	0	$ 0
Site-Specific	54	Projects	12,272,916	$ 8,138,928	9	Projects	91,963	$ 438,269
Midstream	38	Projects	58,291	$ 34,376	64	Projects	21,368	$ 198,080
Small Business Lighting	47,210	Units	10,922,204	$ 7,621,294	0	N/A	0	$ 0
Commercial/ Industrial Total	**48,662**		**35,507,217**	**$ 20,195,795**	**136**		**137,839**	**$ 815,510**
Energy Efficiency Total	**67,266**		**40,029,256**	**$ 28,059,244**	**9,321**		**587,780**	**$ 9,561,661**



PROCESS EVALUATION OF AVISTA'S PY2022-PY2023 RESIDENTIAL, LOW-INCOME, AND NONRESIDENTIAL ENERGY EFFICIENCY PROGRAMS

SUBMITTED TO: AVISTA UTILITIES

SUBMITTED ON: MARCH 25, 2024

SUBMITTED BY: ADM ASSOCIATES, INC. &
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1 EXECUTIVE SUMMARY

This report is a summary of the Residential, Low-Income, and Nonresidential Electric and Natural Gas Evaluation Process evaluation effort for the 2022 and 2023 program years (PY2022 and PY2023) portfolio of programs for Avista Corporation (Avista) in the Washington and Idaho service territory. The evaluation was administered by ADM Associates, Inc. and Cadeo Group, LLC (herein referred to as the "Evaluators").

1.1 RESEARCHABLE ISSUES

This report addresses research issues established for this evaluation, which include the following:

- **Understanding:** Establish a general understanding of the utility's current and past experience with the Residential, Low-Income, and Nonresidential electric and natural gas programs
- **Communication/Awareness:** Characterize how customers first learned about the program and the best channels to use to reach these customers
- **Point of Entry:** Identify ease of application process, barriers to participation, and put together suggestions to encourage participation in all programs
- **Participation Experience:** Identify customers' and market actors' level of satisfaction with services received, participation drivers, timeliness, suggestions for improvement, customer preference for online tracking and other potential program features
- **Impact/Effectiveness:** Identify satisfaction with program outcome, savings, other benefits customers perceive from participation
- **Additional Offerings:** Establish suggestions for program or service improvement to encourage customers to meet ongoing energy management needs

In the course of developing the final evaluation research plan, the following additional research issues applicable to all the Avista programs were identified:

- Is there a consistent and recognized branding across programs?
- Are there programs or program elements that are working at cross-purposes with each other?
- Are there significant overlaps across programs?
- Are the programs reaching all customer types, and if not, what additional steps or approaches may be required to reach them?
- Are important segments of the residential population not participating in any program?
- Are there elements of programs that can become more standardized and efficient?
- What are the growth areas within the residential market and residential efficiency potential, and how can the current programs address these areas of growth?
- How are the programs performing as determined by their POPMs?
- What information should be routinely tracked in order to measure progress relative to the Program Performance Metrics (PPMs) established for these programs?

Additional research issues for specific programs are included as part of the discussion of the individual program results. These research issues formed the basis evaluation. All of the data collection and analysis activities were designed to address them.

1.2 Data Collection and Analysis Methods

The evaluation utilized several data collection and analysis methods:

- **Web surveys:** For programs with data that included valid email addresses and customer names, the Evaluators fielded a web-based survey to collect information on multiple topics related to the process evaluation research issues discussed above. A total of 2,905 participant web surveys were completed. Further detail of the precision is summarized in Section 3.3.1.
- **In-depth interviews:** In addition to the web surveys, the Evaluators completed in-depth interviews of key market actors involved with the programs, including program staff, trade allies, builders, and distributors. The in-depth interviews were less structured than the web surveys; however, this more flexible approach allowed the interviewer to ask follow up questions and collect additional detail on important evaluation topics. A total of 61 in-depth interviews were completed, in addition to interviews with Avista program and management personnel. Further detail of the precision is summarized in Section 3.5.2.

Table 1-1 summarizes the electric programs offered to residential and low-income customers in the Washington Avista service territory in PY2022-PY2023 as well as the Evaluators' evaluation tasks and impact methodology for each program.

Table 1-1: Process Evaluation Activities by Program and Sector

Sector	Program	Participant/ Non-participant Surveys	Contractor Interviews	Staff Interviews
Residential	Water Heat	✓	✓	✓
Residential	HVAC	✓	✓	✓
Residential	Shell	✓	✓	✓
Residential	ENERGY STAR® Homes	✓		✓
Residential	Small Home & MF Weatherization	✓	✓	✓
Residential	Appliances	✓	✓	✓
Residential	AeroBarrier	✓		✓
Residential	Multi-family Direct Install	✓		✓
Residential	Midstream		✓	✓
Low-Income	Low-Income	✓	✓	✓
Low-Income	Community Energy Efficiency Program (CEEP)	✓		✓
Nonresidential	Lighting	✓	✓	✓
Nonresidential	HVAC	✓	✓	✓
Nonresidential	Food Service Equipment	✓		✓
Nonresidential	Grocer	✓		✓
Nonresidential	Shell	✓		✓
Nonresidential	Midstream		✓	✓
Nonresidential	Green Motors	✓		✓
Nonresidential	Site-Specific	✓	✓	✓

1.3 Conclusions and Recommendations

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

1.3.1 Conclusions

1.3.1.1 Portfolio-Wide

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

1. **Satisfaction –** Across all programs, satisfaction among participants and trade allies was high. Respondents appreciate the assistance provided by Avista and the assistance and other program measures encouraged energy efficient equipment purchases and behavior changes. The most common reasons for dissatisfaction included insufficient incentives amounts and confusing program requirements, including the conversion from downstream prescriptive rebates to a midstream delivery channel.
2. **Program Awareness & Marketing –** Among non-participants in both the residential and commercial sectors, program awareness was low. Avista should consider increasing and modifying marketing efforts to better reach currently underserved populations. Moreover, responding trade allies in both sectors desire more co-branded marketing materials for program promotion.
3. **Midstream program –** Confusion regarding the new midstream program exists across customers, trade allies, and distributors. Avista should consider increased training and promotional campaigns related to the new midstream model.
4. **Barriers to Engagement –** The upfront cost of energy efficient equipment was the largest barrier to program engagement for both residential and nonresidential customers, followed by confusion around specific requirements to meet program criteria to redeem incentives.

1.3.1.2 Program-Level

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

1.3.1.2.1 Residential Prescriptive Programs

5. **Program awareness –** Contractors and retailers and the Avista website were the most popular sources of program awareness for respondents from both the appliance rebate and weatherization programs.
6. **Program motivation –** About 50-60% of survey respondents from both the appliance rebate and weatherization programs were very or moderately interested in upgrading equipment in their homes for health and safety reasons, improving comfort, and increasing energy efficiency.
7. **Popular measures –** Among survey respondents, smart thermostats (n=497) and windows (n=463) were the most popular measures received through the residential single-family homes program.
8. **Experience with contractor –** Among the respondents who confirmed their use of a contractor to install their equipment (appliance rebate=551, weatherization=232), the majority of these respondents were satisfied with the work completed by their contractor. Previous experience with the contractor or a personal referral were the most popular ways respondents found contractors across both the programs. Few respondents indicated that their contractor provided them recommendations for other energy efficient upgrades (appliance=90, weatherization=35)
9. **Satisfaction –** In general, respondents were satisfied with all aspects of the appliance rebate and weatherization programs. The most common reasons for dissatisfaction were related to

insufficient rebates and a lack of transparency regarding program requirements and eligibility criteria.

10. **Program tenure –** Program tenure varied across the trade allies and midstream distributors interviewed. Some (n=15) of the interviewed trade allies had been engaged with the program for multiple years, while the midstream distributors were all new due to the infancy of the Midstream Program, which launched in the summer of 2023.
11. **Program promotion** – More than half of the weatherization and appliance rebate focused trade allies were not aware of Avista sponsored marketing materials (n=14). Across all the trade allies in both downstream and midstream models, trade allies completed the lion's share of program marketing and lead generation on their own, relying heavily on word of mouth.
12. **Program process** – Midstream distributors highlighted some issues with the website and general application flow of the midstream program, but noted that the program is new. Some appliance rebate trade allies also cited confusion over the new midstream program and how that might impact their work and program application processing moving forward.
13. **Barriers to energy efficient upgrades** – Both groups of trade allies cited upfront costs and low incentive rates as key barriers for customer engagement and program participation.

1.3.1.2.2 Multi-Family Direct Install

1. **Program Suspension –** The challenges caused by the COVID-19 pandemic forced the program staff to suspend the program in March of 2020. The program was then relaunched in April of 2022 (several months in during the 2022-2023 evaluation year). Despite this challenge, the program implementer, SBW, continued to operate the program with adjustments to its operational procedures.
2. **Program Satisfaction –** The property managers of the participating multi-family buildings expressed high satisfaction with the program. The program started with a high rate of participation (an average of 3,000 measures installed per month), but participation had greatly declined by the end of 2023 (an average of 1,000 measure installs per month). The program staff assessed the market is on the diminishing curve of opportunity.

1.3.1.2.3 Low-Income

1. **Program Implementation** – The Low-Income Program continues to effectively leverage existing CAP agency weatherization program infrastructure. Program integration has allowed the CAP agencies to take a holistic approach to deep energy efficiency upgrades and expand the measures available to customers.
2. **Program Satisfaction** – Most survey respondents expressed satisfaction with the program overall and reported increased satisfaction with Avista as a result of program participation. Despite mostly high satisfaction rates, some respondents expressed dissatisfaction with the quality of work performed by the CAP agencies.
3. **Program Challenges –** CAP agencies struggle to recruit and retain qualified crew members and subcontractors that meet prevailing wage requirements. Moreover, many income-qualified customers remain underserved due to a lack of funding committed to addressing expensive pre-weatherization health and safety repairs and long application wait times.

1.3.1.2.4 Home Energy Audit

1. **Program Engagement –** Despite a program pause during 2020-2021 due to the COVID-19 pandemic, the program has experienced significant attention and customer interest. Between 2022 and 2023, home audits nearly quadrupled, increasing from 121 in PY2022 to 463 in PY2023. This increase in program popularity has resulted in a lengthy waitlist with customers having to wait 5-6 months to receive an audit.
2. **Program Impact –** Survey respondents suggested that as result of the program, they are more interested in energy saving behaviors and in making energy efficient equipment improvements. Some respondents noted that they engaged in other Avista energy efficiency programs following their home energy audit, indicating that the HEA program is fueling interest in other offerings.
3. **Program Experience** – In general, survey respondents were satisfied with the HEA program. The area with the most dissatisfaction was the amount of time to receive the audit.

1.3.1.2.5 On Bill Repayment

1. **Marketing** – The OBR program has gained traction through effective marketing campaigns targeted at customers and trade allies.
2. **Increases Energy Efficient Equipment Purchases** – Most OBR survey respondents (69%) reported that they were unlikely to have purchased the energy efficient equipment without the OBR program assistance, and 85% of respondents indicated that the financing helped them make these improvements sooner.
3. **Program Satisfaction** – Survey respondents were generally satisfied with the OBR program and likely to recommend it to others.

1.3.1.2.6 Always On

1. **Program motivation –**About half of respondents were very or extremely interested in additional home improvements that would improve their health and safety, improve their comfort, and increase their home's overall energy efficiency.
2. **Program participation –** More than half of respondents remembered receiving an email alert from the Always On Program (61.3%, n=106). The majority of these respondents noted that when they receive the email they at least skim through the content (90.6%, n=96). Most respondents are satisfied with the number of updates provided through the program (68.2%, n=118).
3. **Website engagement –** Among the 100 respondents who read at least part of the email alert, more 16.0% (n=16) visited Avista's website to learn more about "always on" load. Of these, all but two found the tips Avista provides on the website to be at least somewhat helpful (n=14).
4. **Desired information –** Respondents indicated that they are interested in learning about other energy usage and reduction tips for a variety of equipment types including water heating, space heating, and space cooling.
5. **Change in bill –** Perceived changes in respondents' utility bill amounts varied. About one-quarter explained their bill remained the same (26.0%, n=45) while 12.7% (n=22) noted their bill decreased and 13.9% (n=24) indicated their bill increased; 47.4% (n=82) could not speak to changes in their bill.

1.3.1.2.7 Residential Non-Participants

1. **Program Awareness –** Most of the non-participant respondents were not aware of Avista's energy efficiency rebates and program (67.1%, n=94). Among those respondents who were aware of Avista programs (32.9%, n=46), messages on utilities bill and utility emails were the most common sources of program awareness. Additionally, respondents who were aware of Avista's programs were most familiar with the appliance rebates program and less similar with home energy audit offering and new construction rebates.
2. **Energy efficiency familiarity –** Just under one-third of non-participant respondents had received a home energy assessment, purchased new equipment, or had an equipment tune up in the past three years (32.1%, n=45).
3. **Interest in Avista programming** -- More than one-third of respondents were somewhat or very interested in participating in Avista programs. Respondents were most interested in learning more about the weatherization program (25.0%, n=35) and water heater incentives (23.6%, n=33).

1.3.1.2.8 Commercial Rebates (Prescriptive Lighting, Appliances, Small Business Direct Install, Site Specific)

1. **Program Awareness –** Across the various pathways, survey respondents most commonly learned about the rebate offerings from contractors, equipment vendors, and/or energy consultants. Survey respondents indicated email is the most effective way to communicate with them about rebate opportunities.
2. **Marketing Materials –** Half of the interviewed trade allies did not know about Avista's program-specific marketing materials (n=12), but agreed these resources would be useful to have.
3. **Barriers to Engagement –** The upfront cost of energy efficient equipment was the largest barrier to program engagement. Survey and interview respondents explained that firms are motivated to buy energy efficient equipment for the cost savings potential, but often lack the upfront capital to do so.
4. **Prior Energy Efficient Equipment Experience –** About half of the survey respondents across the various pathways noted that they had previously installed energy efficient equipment in their facilities.
5. **Program Experience –** Survey and interview respondents tended to be satisfied with all aspects of the program. Areas of dissatisfaction for both survey respondents and interviewed trade allies included difficulty finding necessary information on Avista's website and the range of eligible equipment.
6. **Site Specific Program Experience –** Interviewed trade allies reported the most challenges with the site-specific pathway offered through the program. These respondents cited confusion over the general process and frustration with the length of time required by the M&V review period.

1.3.1.2.9 Midstream

1. **Program process** – Midstream distributors highlighted some issues with the website and general application flow of the program, but noted that the program is new.

1.3.1.2.10 Non-Residential Non-participant

1. **Program Awareness –** About half of all respondents (53.6%, n=30) were aware of Avista's non-residential focused incentive programs, however a quarter of respondents explained that they

did not take advantage of Avista's incentives because they did not have enough information about the offerings (26.7%, n=24).

2. **Energy efficiency familiarity –** Almost half of respondents did not replace or upgrade electrical appliances in the last three years (48.2%, n=27). Among the 24 respondents who did replace and/or upgrade equipment in the last three years, lighting (29.6%, n=16) and HVAC equipment (22.2%, n=12) were the most common.
3. **Interest in Avista programming** -- All but two respondents indicated they were at least somewhat interested in Avista's incentive programs.

1.3.2 Recommendations

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

1.3.2.1 Portfolio-Wide

The Evaluators offer the following recommendations regarding Avista's portfolio of programs:

1. **Program requirements –** Consider enhancing website and marketing materials to make program eligible measures, eligibility requirements, and required documentation clearer and more transparent for each of the offered programs.
2. **Support staff training and trade ally development** – Staff should consider developing and providing vetted lists of qualified trade ally contractors that are willing to work with CAP agencies and incorporate OBR training to contractors to encourage customers to take advantage of financing opportunities. Additionally, Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.
3. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment, nor offered home energy audits. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience. Continue to deploy customer-focused promotional and marketing campaigns through email communication, as customers identified this as the most favorable method of communication. Increased focus should be placed on the weatherization and appliance, furnace, HVAC, and water heating rebate offerings as respondents expressed the most interest in those offerings. Continue to promote the OBR program through various channels, such as bill inserts, newsletters, and trade ally networks, to maintain and increase customer awareness and participation. Consider a wide distribution of Avista-branded marketing materials to trade allies so that the trade allies can better promote and explain the program to their customers.
4. **Other programs follow-on activities** – Increase coordination with other the Avista energy efficiency programs to increase the rates of actions taken on customer-level recommended improvements. Specifically, program staff should share participant information with other programs' staff and suggest they follow up directly to assist with the auditor recommendations specific to the audited household.

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

1.3.2.1.1 Commercial Non-Participant

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment nor did they feel they had enough information about the offerings to make informed decisions for improving the energy efficiency of their facility. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience for non-residential program participation.

1.3.2.1.2 Always On

1. **Expand content provided in alerts –** Consider including other energy saving tips and recommendations in the email alerts and website, aside from information regarding always on load. Topic areas of interest include information regarding energy efficient equipment as well as other behavior changes customers can make to reduce their energy usage.

1.3.2.2 Program-Level

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

1.3.2.2.1 Residential Prescriptive Rebate Programs

1. **Promotional campaigns –** Consider increasing promotional campaigns that highlight the impact energy efficient equipment can have on customers' home safety, comfort, energy bills, and overall energy efficiency.
2. **Contractor training and cobranded marketing materials –** Contractors serve as the backbone of the residential prescriptive rebate programs, serving as the primary awareness source and marketing avenue. Consider offering contractors more training opportunities to educate them about the program, as well as providing them co-branded marketing materials to increase legitimacy and program recognition. During training, encourage contractors to help customers identify other areas of the home in need of improvement to maximize customers' benefit and lead to deeper energy retrofits.
3. **Increase training opportunities –** Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.
4. **Program requirements –** Consider enhancing website and marketing materials to make program eligible measures, eligibility requirements, and required documentation clearer and more transparent.

1.3.2.2.2 Multi-Family Direct Install

1. **Customer Recruitment –** If Avista funds a similar program targeting multi-family buildings in the future, recruitment of property managers who are willing to cooperate and provide time – as experienced by the program particularly during the post-pandemic period – is anticipated to be a major hurdle. The program should develop a thoughtful outreach and marketing approach that leverages motivation and interest to most building owners and property managers (tenants' satisfaction, increased home security and home comfort, values of upgrades, and convenience of program participation) in addition to the bill reduction benefits designed for tenants.

1.3.2.2.3 Low-Income

1. **Support staff training and trade ally development** – A lack of trained crew members and willing subcontractors in which to partner has reduced CAP agencies' ability to complete projects in a timely fashion and has resulted in a long wait list for the program. Avista should consider sponsoring more Building Performance Center training opportunities for more CAP agencies. Additionally, staff should consider developing and providing vetted lists of qualified trade ally contractors that are willing to work with CAP agencies in their areas. Expanding the trade ally network, may also reduce the travel burden for existing trade allies, as CAP agencies are only able to reimburse travel if five or more projects are scheduled.
2. **Establish funding that supports pre-weatherization repairs** – Continue to develop a deferral maintenance program that assists homes in need of pre-weatherization repairs. Once this deferral maintenance program is rolled out, staff should monitor its usage and determine the level of funding needed in the long term.
3. **Investigate dissatisfied customers due to work quality** – Consider working with CAP agencies to investigate projects of customers who expressed dissatisfaction with the quality of work and equipment installations conducted by the CAP agencies and their subcontractors.

1.3.2.2.4 Home Energy Audit

1. **Address the backlog issue** – Program staff should continue to prioritize resolving the pending application backlog to reduce wait times and improve customer satisfaction. Recommendations include hiring additional auditors or streamlining the auditing process to lessen burdens on participating customers.
2. **Provide a list of recommended contractors** – Consider providing a list of vetted contractors to customers to help them make the recommended improvements more actionable for homeowners interested in completing the recommended energy efficiency upgrades.
3. **Other programs follow-on activities** – Increase coordination with other the Avista energy efficiency programs to increase the rates of actions taken on the recommended improvements. Specifically, program staff should share participant information with other programs' staff and suggest they follow up directly to assist with the auditor recommendations specific to the audited household.
4. **Track the HEA referral process**– Although it is still too early to analyze the effect of the HEA program in terms of subsequent participation in other Avista programs, as more than half of the survey respondents noted they are still planning to implement the audit recommendations, Avista should develop a system to easily track HEA program participants' participation in other programs.

1.3.2.2.5 On Bill Repayment

1. **Education and training of contractors** – Provide more education and training to contractors about the OBR financing process to minimize payment confusion and improve the customer experience.
2. **Online billing information** – Enhance Avista's online billing website to clearly separate the OBR repayment portion from the total billed amount, allowing customers to better understand their actual energy costs as well as remaining financed amounts.
3. **Increased promotion** – Continue to promote the OBR program through various channels, such as bill inserts, newsletters, and trade ally networks, to maintain and increase customer awareness and participation.

1.3.2.2.6 Always On

2. **Expand content provided in alerts –** Consider including other energy saving tips and recommendations in the email alerts and website, aside from information regarding always on load. Topic areas of interest include information regarding energy efficient equipment as well as other behavior changes customers can make to reduce their energy usage.

1.3.2.2.7 Residential Non-Participant

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment, nor offered home energy audits. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience. Increased focus should be placed on the weatherization and appliance, furnace, HVAC, and water heating rebate offerings as respondents expressed the most interest in those offerings.
2. **Expand energy efficient tips circulation –** Consider expanding the pool of people who receive tips on how to save energy through various behavioral changes, or expand on behavioral additional energy conservation habits on Avista website. Introducing customers to the concept of energy efficiency may increase future buy-in for equipment purchases and tune ups.

1.3.2.2.8 Commercial Rebates (Prescriptive Lighting, Appliances, Small Business Direct Install, Site Specific)

1. **Program marketing –** Continue to deploy customer-focused promotional and marketing campaigns through email communication, as customers identified this as the most favorable method of communication. Consider a wide distribution of Avista-branded marketing materials to trade allies so that the trade allies can better promote and explain the program to their customers.
2. **Eligible Equipment –** Consider expanding equipment eligible for rebates based on trade ally recommendations. Trade ally respondents had more difficulties with the site-specific program than the midstream, prescriptive lighting, appliance rebate, and direct install programs. Integrating more measures into these midstream and downstream rebate pathways may alleviate pressure put on the site-specific pathway.

1.3.2.2.9 Midstream

1. **Increase training opportunities –** Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

1.3.2.2.10 Commercial Non-Participant

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment nor did they feel they had enough information about the offerings to make informed decisions for improving the energy efficiency of their facility. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience for non-residential program participation.

2 INTRODUCTION

ADM evaluated Avista's portfolio of energy efficiency programs for PY2022 and PY2023 combined. This work was completed in conjunction with the impact evaluation for Avista's portfolio, summarized in separate impact evaluation reports.

This report focuses on the process evaluation of Avista's PY2022-PY2023 portfolio in the state of Washington and Idaho for the electric and natural gas programs and pilots offered through Avista. This report identifies opportunities and offers recommendations to improve the effectiveness of each the design, implementation, enrollment process, marketing and outreach, quality assurance process, along with other elements, for all of the programs offered to Avista's customers through its energy efficiency portfolio.

2.1 SUMMARY OF EVALUATION

The Evaluators tailored their evaluation questions and activities by program for Avista's portfolio of programs. However, many of the data collection activities were similar. The main activities the Evaluators conducted were:

- Database and records review for quality assurance and quality control (QA/QC)
- Participant web surveys
- Non-participant web surveys
- Stakeholder interviews
- Trade ally interviews
- Distributor interviews

The following table lists the evaluation activities conducted for each program during the evaluation period. A full list of survey instruments is provided in Appendix A of this process evaluation report and the interview guides displayed in Appendix B of this report.

Table 2-1: Residential Process Evaluation Activities by Program

Program	Process Evaluation Activity				
	Participant Survey	Non-participant Survey	QA/QC Review	Staff Interview	Trade Ally Interview
Water Heat	X	X	X	X	X
HVAC	X	X	X	X	X
Shell	X	X	X	X	X
ENERGY STAR Homes	X	X	X	X	X
Small Home & MF Weatherization	X	X	X	X	X
Appliances	X	X	X	X	X
AeroBarrier	X	X	X	X	X
Multi-family Direct Install	X	X	X	X	X
Low-Income	X	X		X	X
Prescriptive Lighting	X	X		X	X
Prescriptive HVAC	X	X		X	X
Prescriptive Food Service Equipment	X	X		X	X
Prescriptive Grocer	X	X			X
Prescriptive Shell	X	X		X	X
Prescriptive Green Motors	X	X		X	X
Site-Specific	X	X		X	X

2.2 Organization of the Report

This report includes the process evaluation findings across all programs in the portfolio-wide assessment[1]. This section examines the portfolio's overall participant feedback, marketing and outreach, energy efficiency attitudes and behaviors, and participant decision-making across programs.

Each program is assessed in more detail in the individual chapters that follow. Program chapters contain a summary of the collected data and evaluation of program-level achievements and barriers. Chapters are organized according to sector (Residential and Nonresidential).

3 Process Evaluation Methods and Data Collection

The Evaluators performed a process evaluation on each of the programs summarized in Table 1-1. Our approach to the process evaluation was to:

- Gain in-depth understanding of program operations, challenges, and evaluation needs through Avista and implementation contractor key staff interviews at both the beginning and end of the evaluation cycle, complemented with program documentation review.
- Update assessment of Avista success in achieving the goals and objectives.

[1] The impact evaluation findings, conclusions, and recommendations for this evaluation period are reported in a separate impact evaluation report.

- Report findings on customer experiences with the program and demographic characteristics collected as part of survey efforts.
- Collect feedback from program participants and non-participants.

Process evaluations in general assess organizational and procedural aspects of programs to provide feedback on aspects of programs that are functioning well and contribute recommendations when areas of improvement are identified. The Evaluators completed the above process tasks for projects completed in the Washington and Idaho electric and natural gas Avista service territory.

The process activities are cross-cutting across programs; however, some program-specific research objectives are explored for certain programs. The objectives are determined by Avista evaluation goals as well as the relative contribution of a given program to the overall energy efficiency impacts. The Evaluators kept data collection instruments, calculation spreadsheets, and monitored/survey data available for Avista records.

3.1 Summary of Approach

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

Our general approach for this evaluation considers the cyclical feedback loop among program design, implementation, and process evaluation. Our activities during the evaluation identifies barriers to program participation or satisfaction as well as characterizes whether a program is meeting its goals. These activities are aimed to provide guidance for continuous program improvement and program operations effectiveness for the 2022 and 2023 program years.

3.2 Database Review

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

To prepare for and understand program design and delivery, the Evaluator reviewed program materials and documentation provided by Avista. This included detailed program descriptions, program hand-out materials, and the Avista website. Additionally, the program team reviewed program tracking data to understand how the program tracks and documents program participation and key variables.

3.3 Sampling Methodology

The Evaluators deployed participant and non-participant surveys for each program.

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

Equation 3-1: Sample Size for Infinite Sample Size

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

Equation 3-2: Sample Size for Finite Population Size

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

Where,

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

For a sample that provides 90/10 precision, *Z* = 1.645 (the critical value for 90% confidence) and *d* = 0.10 (or 10% precision). The remaining parameter is *CV*, or the expected coefficient of variation of measures for which the claimed savings may be accepted. A *CV* of .5 was assumed for residential programs due to the homogeneity of participation[2], which yields a sample size of 68 for an infinite population. Sample sizes were adjusted for smaller populations via the method detailed in Equation 3-2.

3.3.1 Sampling Plan

The Evaluators deployed surveys for each of the Residential and Nonresidential programs offered through Avista in PY2022 and PY2023. The primary purpose of conducting these surveys is to gather information about customer satisfaction, customer feedback, and to confirm that the measure was installed and is still currently operational.

The Evaluators summarize the final sample sizes shown in Table 3-1 for the each of the programs in Washington and Idaho for both the electric and natural gas fuels. The Evaluators developed a sampling plan that achieved a sampling precision of ±1.58% at 90% statistical confidence for participant responses and ±4.84% at 90% statistical confidence for the non-participant responses at the measure type- level during web-based survey verification.

[2] Assumption based off California Evaluation Framework:

https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/EE_and_Energy_Savings_Assist/CAEvaluationFramework.pdf

Table 3-1: PY2022-PY2023 Survey Sample and Precision by Program

Sector	Program	Contacts	Responses	Percent of Contacts	Precision
Residential & Low Income	Single Family Home - Weatherization	5,281	648	12.27%	90% ± 3.03%
	Single Family Home - Appliances	3,226	1,291	40.02%	90% ± 1.77%
	Low Income	692	108	15.61%	90% ± 7.28%
	Home Energy Audit	1,252	97	7.75%	90% ± 8.02%
	On Bill Repayment Program	187	27	14.44%	90% ± 14.68%
	Always On Pilot Program	50,060	173	0.35%	90% ± 6.24%
	Non-Participants	1,395	145	10.39%	90% ± 6.47%
Non-Residential	Prescriptive Lighting, Appliances, Small Business Direct Install	6,839	266	3.89%	90% ± 4.94%
	Site Specific	82	6	7.32%	90% ± 32.53%
	Non-Participants	1,141	144	12.62%	90% ± 6.41%
Total	**Participants**	**67,619**	**2,616**	**3.87%**	**90% ± 1.58%**
	Non-participants	**2,536**	**289**	**11.40%**	**90% ± 4.56%**

3.4 Web Surveys

The Evaluator administered participant surveys to samples of program participants to collect data on the participant experience with the program to inform the process evaluation. The Evaluator administered a survey to participants in the residential and non-residential programs throughout 2022 and 2023 in waves based on customers' participation date. As a key evaluation activity, the Evaluator also conducted web-based surveys with Avista customers who did not participate in the residential and non-residential programs in 2022 and 2023.

3.4.1 Survey Administration Procedures

Respondents with available emails were sent an invitation to the survey. Non-respondents were then sent up to two reminder emails. Customers were offered a $20 visa gift card to complete the survey.

3.5 In-Depth Interviews

This section summarizes the Evaluators' approach to conducting in-depth interviews for program staff, trade allies, builders, and distributors.

3.5.1 Program Staff Interviews

The Evaluator completed 13 interviews with program staff to understand any changes made to the programs and any key successes and challenges. These interviews were qualitative, loosely structured, and exploratory in nature.

The Evaluators completed interviews with utility staff for each program in Avista's portfolio. The staff interviews addressed the following topics:

- The historical context of the energy efficiency programs;
- Program design and qualification requirements;
- Processes for recruiting customers into the programs;
- Data management and tracking processes and issues;
- Issues or challenges staff face in delivering the energy efficiency programs; and
- Planned or desired changes in program administration in the future.

The Evaluators spoke with six utility staff in 2022 and seven utility program staff in 2023 to better understand their role and responsibility for the various programs. In general, the purpose of these interviews was to understand program goals, customer needs, program performance in meeting customer needs, and other feedback that they have on the program delivery, process, integration of previous evaluation recommendations, and planned program changes in the near future.

3.5.2 Stakeholder Surveys and Interviews

The Evaluators completed 61 surveys and interviews with various stakeholders engaged in Avista's programs (Table 3-2). Respondents were provided a $50 incentive to complete the interview. These interviews provided an opportunity to collect additional in-depth qualitative information on stakeholders' experiences with the programs and the impact its availability has had on them. The interviews were designed to be completed within 30 minutes.

Table 3-2: Summary of Stakeholder Interviews and Surveys

Group	Contacts	Responses	Percent of Contacts
Residential trade allies	358	24	6.7%
Commercial trade allies	232	22	9.5%
Midstream distributors	8	5	62.5%
Property Managers	48 Firms, 176 Buildings	10	20.8% (Firms)
Total	**646**	**61**	**9.4%**

4 RESIDENTIAL PROGRAMS PROCESS EVALUATION RESULTS

The Evaluators summarize the program-specific and measure-specific process analysis activities, results, conclusions, and recommendations for the Residential programs in the section below.

4.1 Residential Prescriptive Programs

Avista provides residential customers living in single family, manufactured, and multi-family homes with a variety of rebates and incentives that encourage the purchase of energy efficient equipment. Avista residential programs offer rebates for appliance related measures, such as smart thermostats, HVAC systems, water heaters, clothes washers and dryers, and refrigerators and freezers, as well building shell and weatherization related measures including windows, doors, duct sealing, and ceiling insulation.

4.1.1 Data Collection Activities

The process evaluation of the Residential Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed six utility staff in 2022 and seven utility program staff in 2023. Staff were involved in the administration of the Single-Family Homes Rebates Program. These interviews collected information from program staff about program design, administration, marketing, and stakeholders.
- *Program Participant Surveys.* The Evaluators conducted surveys with a series of program participants. These surveys covered a range of topics, including program awareness, participation, and satisfaction.
- *Trade Ally Interview.* The Evaluators surveyed trade allies who participated in the Residential Prescriptive Rebates programs.

4.1.2 Staff Interview

Evaluators interviewed two Avista program staff involved in the implementation and administration of the Residential Prescriptive Rebate program. Staff included the residential program manager as well as the AeroBarrier pilot program manager. Interviewees participated in two interviews: one in the summer of 2022 and one in the summer of 2023. During the interviews, staff discussed program design and implementation, as well as any changes that were made to the program between 2022 and 2023. The following summary focuses on the Residential Prescriptive Rebates programs in general, with specific summaries of the AeroBarrier pilot and new midstream program included in Sections 4.1.4 and 4.1.6, respectively.

4.1.2.1 Program Design

In 2022 the residential program followed a mostly prescriptive program model, with some measures transitioning to a midstream model in 2023. The goal of the program is to help customers achieve energy savings through various energy efficiency retrofits to their existing homes or receive incentives for purchasing and building energy efficient new construction homes. Program-specific goals are based on energy savings; there are no measure-specific or participation-level goals. The program's target audience is customers living in single-family, multi-family, and manufactured homes and contractors who install equipment in these homes. Specifics of the multi-family direct installation program are expanded upon in the next chapter in this report.

4.1.2.2 Program Administration

The Residential Prescriptive Rebates programs are self-implemented and include a team of Avista staff responsible for processing applications and answering customer inquiries. Avista uses iEnergy software to track applications and project statuses. Staff reported mixed experiences with the iEnergy platform. Approximately 70-75% of customers and trade allies submit their rebate applications through the web-based platform. However, staff have received some complaints regarding the software's customer

interface and overall user-friendliness. Staff have fixed some of the issues identified, but some customers and contractors still prefer to submit paper applications instead. Staff explained that typically the customer submits the application themselves, but in some instances, the contractor will submit the application on the customer's behalf. Staff prefer iEnergy to paper applications because the software platform streamlines and automates savings calculations in an organized structure.

In 2022, program staff extended the rebate timeframe from 90 days to 120 days to account for supply chain issues; this change continued through 2023. Between 2022 and 2023 HVAC and water heating measures shifted to a midstream model. Although incentive amounts vary between Washington and Idaho due to differing cost-effectiveness models, staff strive to keep the programs as similar as possible to reduce confusion among customers, market actors, and program staff.

4.1.2.3 Marketing and Outreach

Staff employ a variety of marketing techniques including email blasts, bill inserts, and social media advertisements. Staff had stopped contractor focused training events during the pandemic but started offering them again in 2022.

Staff explained that they have not seen increased interest in program engagement as a result of increased incentives. Therefore, they are instead exploring other outreach and marketing strategies to increase engagement moving forward.

4.1.2.4 Aero-Barrier Pilot

The Aero-Barrier pilot program was active between 2021 and June 2022. The program sought to improve the energy efficiency of building shells, with a strong focus on air sealing. Incentives were based on the homes ACH (air changes per hour) and square footage. The pilot targeted builders involved in new home construction but struggled to attract builders. Staff noted that builders did not consider the incentive lucrative enough to compel engagement. Ultimately, the pilot was discontinued due to a lack of interest as well as cost-effectiveness issues. Moving forward, staff are considering ways to increase air sealing offerings for retrofit programs but do not foresee bringing back Aero-Barrier incentives for new construction.

4.1.2.5 Residential Midstream Program

Beginning in 2023, HVAC and water heating measures were transitioned from the traditional residential rebate program to a residential midstream program. Avista's motivation for the switch to midstream delivery mechanism was to achieve high saving goals and minimize customer confusion regarding these equipment types. Staff explained that the midstream model reduces the paperwork burden for customers and allows for more market transformation by focusing efforts on equipment distributors rather than end users.

For residential measures, distributors must pass incentives through to customers. In general, despite a slow start to the program, staff have appreciated the midstream model, explaining that it is more efficient and allows for faster rebate processing. At the time of the 2023 interview, staff noted they had engaged eight distributors across both states, with plans to bring on three more distributors by end of 2023. Staff explained that the biggest pain point of the program is explaining to staff and customers why the incentive is no longer being offered directly to the customers.

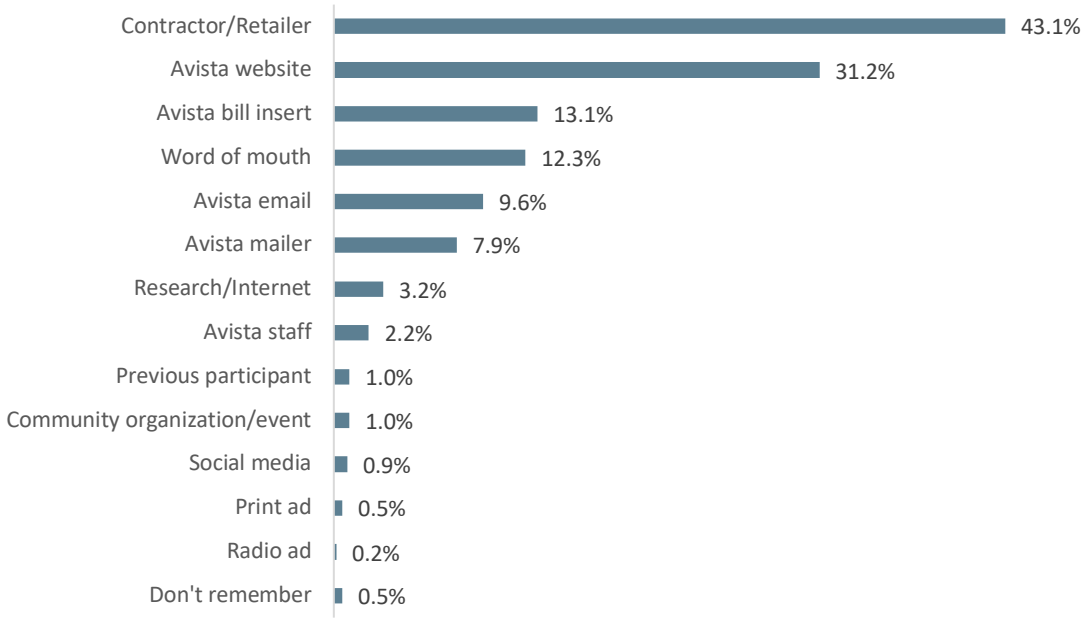
4.1.3 Appliance, Furnace, HVAC, and Water Heat Rebate Program Participant Survey Results

Evaluators conducted a survey of appliance, HVAC, and water heat rebate programs participants to gather feedback about customers' engagement with and experience of the program. Participants were contacted via email a total of three times and asked to complete a survey. In total, 1,291 participants who received rebates for energy efficient appliances in 2022 or 2023 responded to survey efforts.

4.1.3.1 Program Awareness

Respondents learned about the program through a variety of avenues, most commonly through their contractor or retailer (43.1%, n=557) and Avista's website (31.2%, n=403) (Figure 4-1).

Figure 4-1: Program Awareness (n=1,270)



About half of respondents were motivated to participate in the program to reduce their monthly utility bills (48.1%, n=619) and about one-third were motivated to help the environment (36.3%, n=460) (Figure 4-2). When deciding on what equipment to purchase, respondents relied on a variety of sources, including contractors, word of mouth, and personal research (Table 4-1).

Figure 4-2: Factors Influencing Participation (n varies)

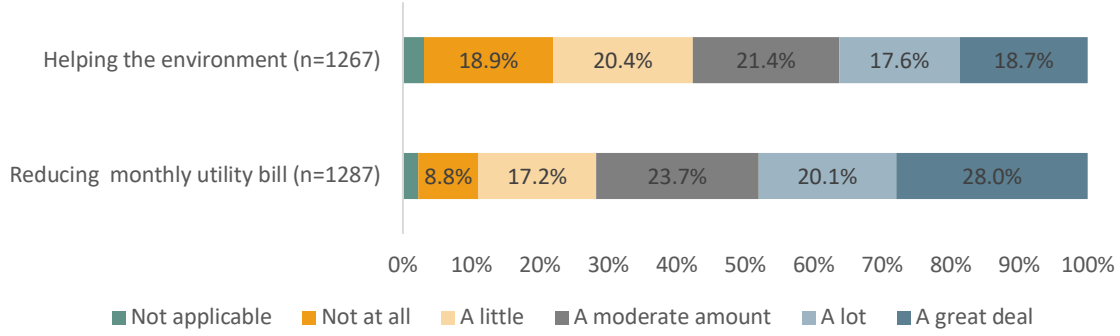
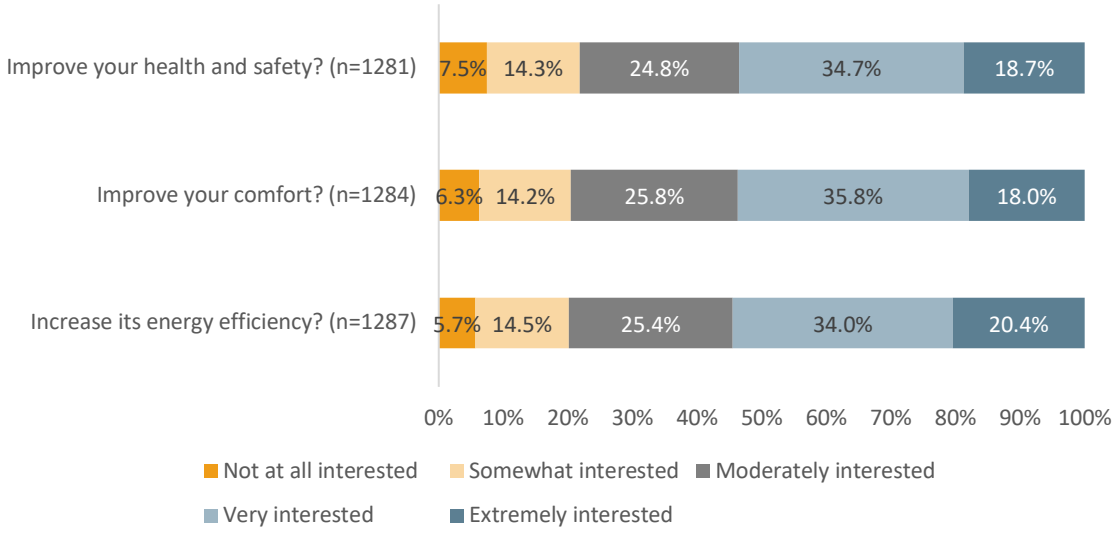


Table 4-1: Source of Information (n=1,291)

Source	%	n
Contractor	38.7%	500
Word of mouth	19.5%	252
Personal research	12.9%	166
Desired features	2.4%	31
Price	2.4%	31
Brand reliability	2.3%	30
Retailer	1.5%	20
Not sure	21.8%	281

A little more than half of respondents were very or extremely interested in additional home improvements that would improve their health and safety (53.5%, n=685), improve their comfort (53.7%, n=690), and increase their home's energy efficiency (54.5%, n=701) (Figure 4-3). More than one-quarter of respondents indicated they would be very or extremely likely to install insulation themselves if a rebate was available without having to use a contractor (28.9%, n=371).

Figure 4-3: Interest in home improvements that would… (n varies)



More than half of respondents did not know anything about Avista's Home Energy Audit Program (61.3%, n=784). Similarly, among those respondents who had not participated in the On Bill Repayment Program (n=740), the vast majority were not familiar with Avista's financing programs (81.6%, n=604).

4.1.3.2 Program Participation

Respondents received rebates for a variety of energy efficient equipment, most notably smart thermostats, clothes washers, and furnaces (Table 4-9).

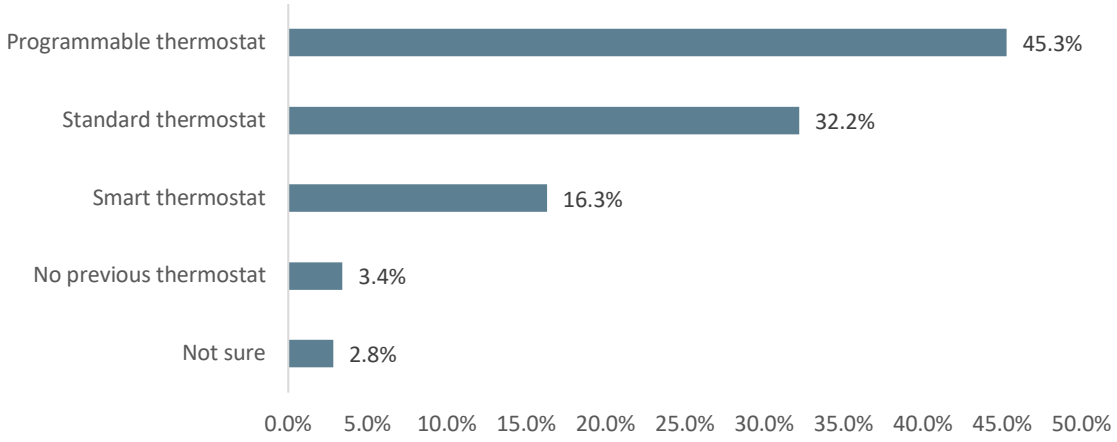
Table 4-2: Type and Number of Measures Received (n=1,291)

Measure Category	Installed
Smart Thermostat	497
Furnace	286
Clothes Washer	281
Refrigerator-Freezer Combo	217
Clothes Dryer	178
Water Heater	144
Heat Pump	90
Energy Star doors	59
Stand-Alone Freezer	38

4.1.3.2.1 Smart Thermostat

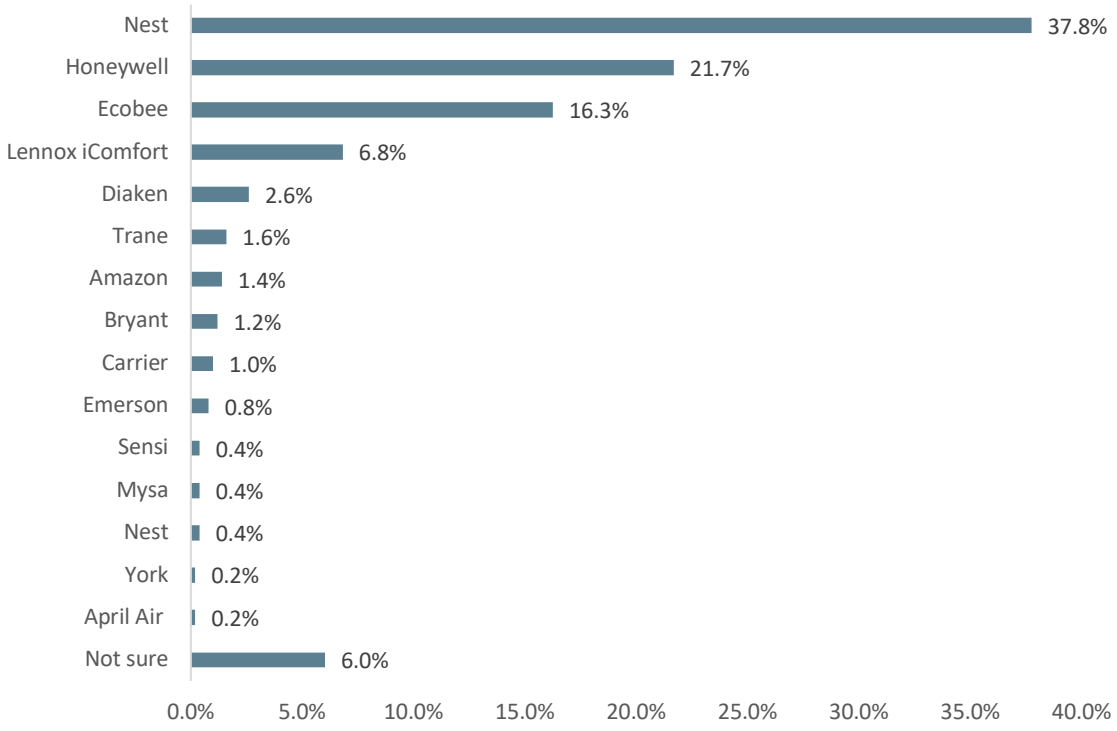
Smart thermostat rebate recipients replaced a variety of thermostat equipment (Figure 4-4), most commonly a programmable thermostat (45.3%, n=225). Among the 160 previous standard thermostat owners, 81.3% (n=130) would adjust their thermostat when they left the house or before going to bed. Two-thirds of smart thermostat rebate recipients had a contractor install their new thermostat for them (66.5%, n=336). The majority of smart thermostat recipients confirmed the smart thermostat was connected to the internet (88.2%, n=439).

Figure 4-4: Thermostat Replacement (n=497)



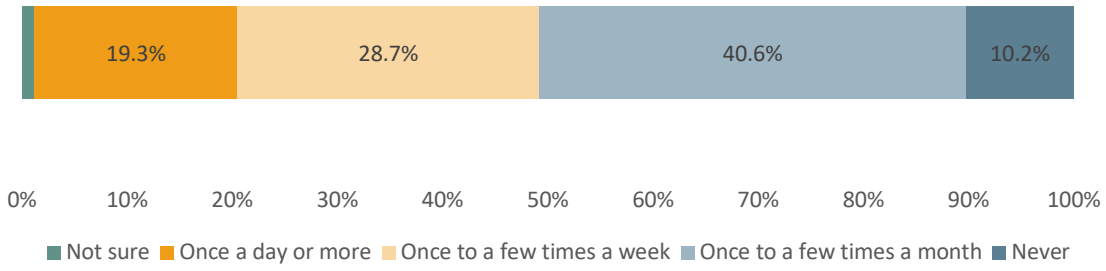
Respondents purchased smart thermostats from a variety of brands, most commonly Nest and Honeywell (Figure 4-5).

Figure 4-5: Smart Thermostat Brand (n=498)



Three-quarters of smart thermostat recipients program their new thermostat to change temperature at different times of the day (75.7%, n=377) and more than two-thirds program the thermostat to adjust the temperature automatically (69.7%, n=347). About half of respondents only adjust their thermostat settings less than a few times a month (50.8%, n=253) (Figure 4-6). More than half of respondents set their thermostat to "away mode" when they are not home (61.5%, n=306). The majority of respondents indicated that their smart thermostat controls both their heating and cooling systems (91.0%, n=453) and that their previous thermostat was working at the time of replacement (93.4%, n=435).

Figure 4-6: Frequency of Smart Thermostat Adjustments (n=498)



4.1.3.2.2 Furnace, Heat Pump, and Water Heater Specifics

In general, the most popular factor respondents considered when choosing their furnace, heat pump, and water heater was based on their contractor's recommendation (Table 4-3). Other population considerations included rebate availability, lower operating cost, and desired features.

Table 4-3: Considerations for New Equipment (n varies)

Considerations	Furnace (n=286)		Water Heater (n=144)		Heat Pump (n=90)	
	%	n	%	n	%	n
Contractor recommendation	72.4%	207	61.8%	89	52.2%	47
Rebate availability	41.6%	119	37.5%	54	7.8%	7
Lower operating cost	40.2%	115	38.9%	56	14.4%	13
Good price	37.4%	107	22.9%	33	6.7%	6
Desired features	26.2%	75	47.2%	68	16.7%	15
ENERGY STAR label	23.8%	68	26.4%	38	5.6%	5
Good for environment	23.4%	67	25.7%	37	4.4%	4
Brand	8.0%	23	7.6%	11	5.6%	5
Only option	4.5%	13	3.5%	5	10.0%	9
Right size/color	4.2%	12	9.7%	14	5.6%	5
Replacing broken equipment	1.0%	3	0.7%	1	0.0%	0

Two-thirds of furnace rebate recipients (66.1%, n=189) and just under three-quarters of water heater rebate recipients (72.2%, n=104) replaced functional equipment. Across both measure types, natural gas was the most popular fuel source for the old and new equipment (Table 4-4).

Table 4-4: Equipment Fuel Type (n varies)

Equipment Fuel Type	Furnace (n=286)				Water Heater (n=144)			
	Old		New		Old		New	
	%	n	%	n	%	n	%	n
Natural Gas	87.4%	250	94.8%	271	68.8%	99	86.8%	125
Electricity	5.2%	15	4.5%	13	23.6%	34	11.8%	17
Oil	1.4%	4	0.0%	0	0.7%	1	0.0%	0
Not sure	1.0%	3	0.7%	2	2.1%	3	1.4%	2
New construction	4.9%	14			4.9%	7		

About half of the 90 heat pump rebate recipients replaced a previous heating and cooling system (51.1%, n=46), the remaining respondents replaced a heating system only (34.4%. n=31), a cooling system only (2.2%. n=2), or were part of a new construction project (11.1%, n=10). One respondent was not sure what type of system the heat pump replaced.

Almost three-quarters of the heating related heat pump rebate recipients had not previously had a heat pump at their facility (72.7%, n=56). Among those 17 respondents who had a heating-related heat pump, just under-half were replacing a functional unit (47.01%, n=8).

4.1.3.2.3 Clothes Washer/Dryer

A little less than half of respondents had ENERGY STAR rated washers and dryers before purchasing new equipment through the Avista program (Table 4-5). Most respondents replaced working washers (64.8%, n=151) and dryers (71.2%, n=104).

Table 4-5: Washer and Dryer Type (n varies)

Type of Equipment	Washer (n=281)		Dryer (n=178)	
	%	n	%	n
ENERGY STAR rated	45.6%	128	47.8%	85
Standard efficiency	28.5%	80	25.3%	45
A different machine type	8.9%	25	9.0%	16
Not sure	9.6%	27	10.1%	18
I did not have a clothes washer/dryer	7.5%	21	7.9%	14

4.1.3.2.4 Combination Refrigerator-Freezer and Stand-Alone Freezer

The majority of combination refrigerator-freezer rebate recipients were replacing existing equipment (81.1%, n=176). Among these respondents, about half were replacing a standard efficiency combination refrigerator-freezer (49.4%, n=87) (Table 4-5). About two-thirds of the refrigeration equipment being replaced was working at the time of replacement (68.2%, n=120).

Table 4-6: Previous Refrigerator-Freezer Type (n=176)

Equipment Type	%	n
Standard efficiency	49.4%	87
ENERGY STAR rated	39.2%	69
Stand-alone refrigerator	2.3%	4
Different type of refrigerate-freezer	9.1%	16

Almost forty percent (39.5%, n=15) of stand-alone freezer rebate recipients did not have a stand-alone freezer prior to participating in the program. Among those who did (n=22), there was an almost even split between respondents who had standard efficient (n=10) and ENERGY STAR efficient (n=12) freezers. More than half of respondents with an existing stand-alone freezer were replacing working equipment (59.1%, n=13).

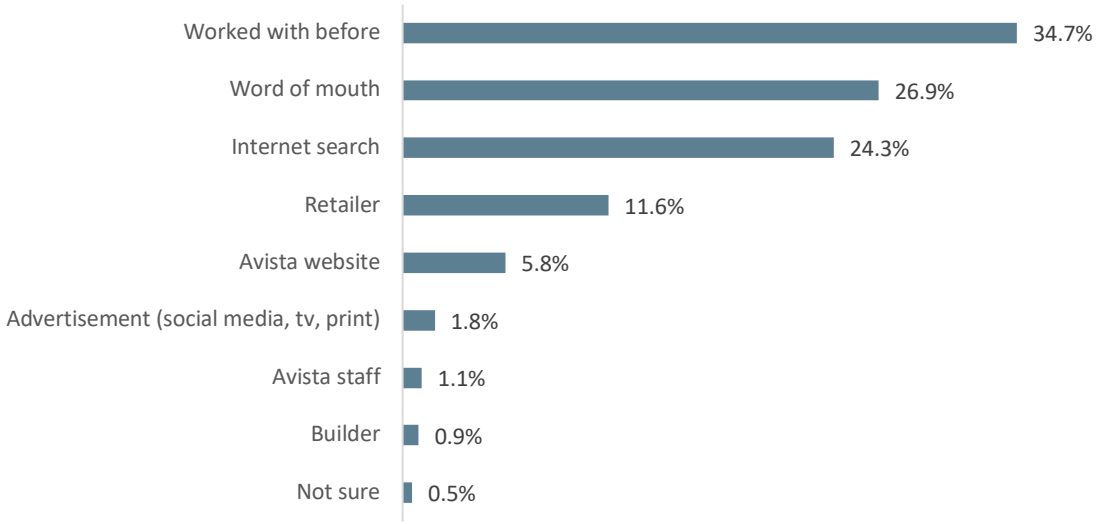
4.1.3.2.5 ENERGY STAR Doors

Among the 59 respondents who received a rebate for ENERGY STAR DOORS, a little less than half were replacing standard efficiency doors (47.5%, n=28); the remaining respondents were replacing ENRGY STAR doors (27.2%, n=16) or were not sure of the type of door they previously had (25.4%, n=15).

4.1.3.3 Contractor

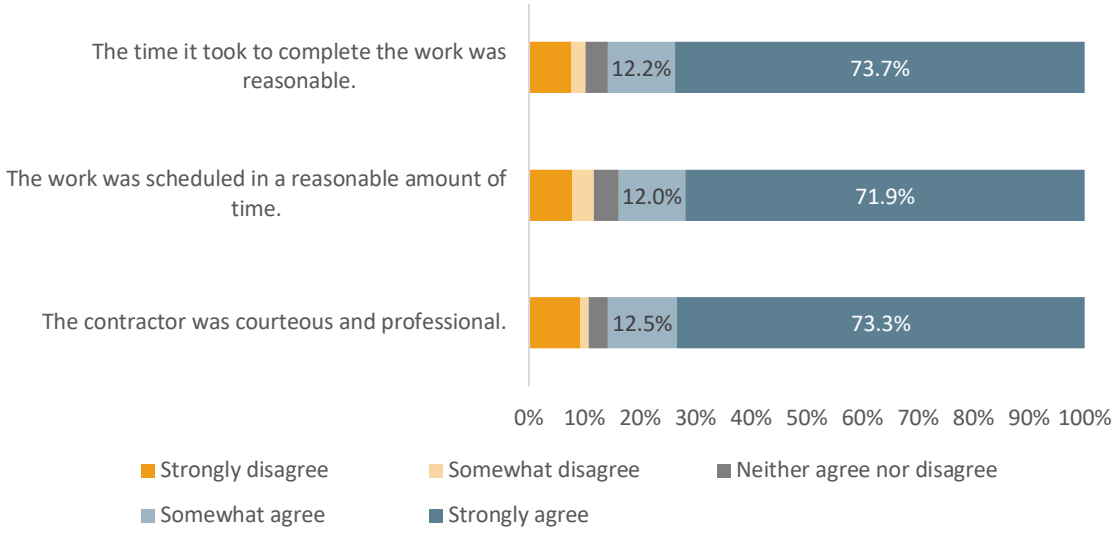
Five hundred and fifty-one respondents indicated they used a contractor to install their equipment (42.7). About one-third these respondents used a contractor they had worked with before (34.7%, n=191) while just over one-quarter of respondents found their contractor through word of mouth (26.9%, n=148) (Figure 4-7). A little more than half of respondents confirmed their contractor showed them the discount they would be receiving on their equipment (54.6%, n=301).

Figure 4-7: Contractor Awareness (n=316)



In general, respondents believed their contractor scheduled and completed the work in a reasonable amount of time and was courteous and professional (Figure 4-8).

Figure 4-8: Contractor Behaviors (n=551)



Sixteen percent of respondents (16.3%, n=90) remember their contractor providing recommendations for other energy saving equipment upgrades. Specific recommendations included insulation, windows, and heating and cooling equipment, among others (Table 4-7); seven respondents also noted that their contractors recommended regular maintenance and behavior changes.

Table 4-7: Recommended Equipment Upgrades (n=90)

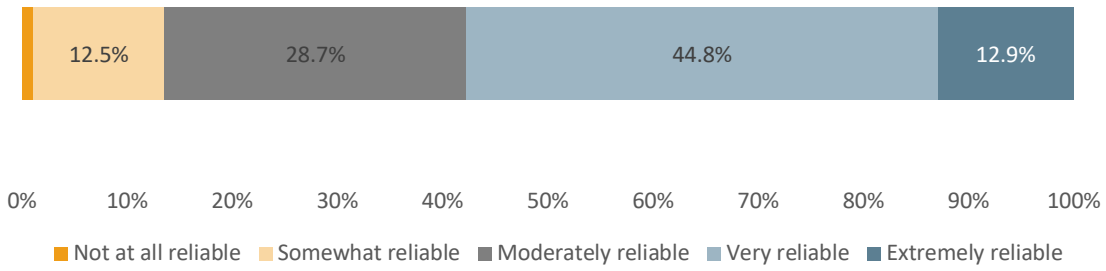
Measure	n
Insulation	14
Windows	14

Heat pump	13
Water heater	13
Furnace	12
Programmable or smart thermostat	9
Air conditioner	8
LEDs	2
Solar panels	2
Low-flow showerhead	1
Refrigerator	1
Gas range	1

4.1.3.4 Satisfaction

More than half of respondents considered Avista a very or extremely reliable source of information regarding energy efficiency (57.7%, n=745) (Figure 4-9). Twelve percent of respondents (12.2%, n=158) contacted Avista staff while participating in the program. In general, these respondents were satisfied with how long it took staff to answer their questions (88.0%, n=139) and how thoroughly staff addressed their questions (89.9%, n=142).

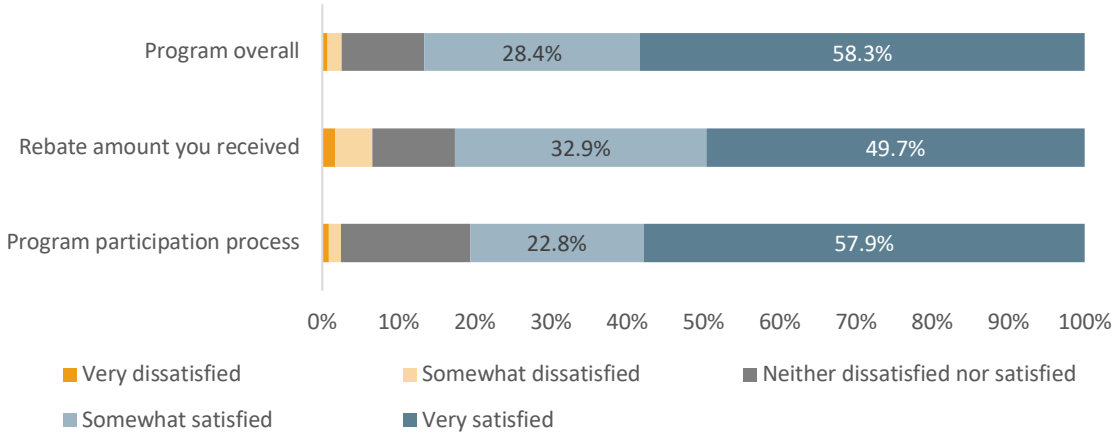
Figure 4-9: Avista as Reliable Source of Information (n=1,291)



In general, respondents were satisfied with the program overall, the amount of rebate they received, and the program participation process (Figure 4-10). One hundred and ten respondents (8.5%) expressed some level of dissatisfaction with the program. Reasons for dissatisfaction included insufficient rebate (n=59), lack of transparency regarding program requirements (n=21), negligent contractor (n=14), equipment issues (n=14) and slow processing times (n=5).

Just over half of respondents indicated they were somewhat or very likely to have participated in the program if the rebate was 75% of the value provided to them (54.4%, n=702).

Figure 4-10: Program Satisfaction (n=1291)



Three-quarters of respondents are satisfied with Avista as their service provider (74.4%, n=960) and half of respondents indicated that participation in the program increased their satisfaction with Avista (51.4%, n=663). Three-quarters of respondents indicated they were likely to recommend the rebate program to others (72.0%, n=930).

4.1.3.5 Demographics

Table 4-8 describes the demographics of survey respondents.

Table 4-8: Demographics (n=1,291, unless otherwise indicated)

Answer	%	Count
Homeownership		
Own	93.5%	1,207
Rent	2.1%	27
Own and rent to someone else	1.2%	15
I don't know	0.1%	1
Prefer not to answer	3.2%	41
Building Age (n=1222)		
Before 1950	17.9%	219
1950 to 1959	8.7%	106
1960 to 1969	6.1%	75
1970 to 1979	14.1%	172
1980 to 1989	6.3%	77
1990 to 1999	16.0%	196
2000 to 2009	16.0%	195
2010 to 2019	6.7%	82
2020 to Present	7.2%	88
I don't know	0.7%	9
Prefer not to answer	0.3%	3
Heating Fuel Type		
Natural Gas	66.3%	856
Electricity	28.1%	363
Wood	2.2%	29
Propane	2.1%	27
Pellet	0.8%	10
Prefer not to answer	0.5%	6

Oil	0.4%	5
Hydrothermal	0.2%	2
Not sure	0.2%	3
Air Conditioning		
Yes	78.3%	1,011
No	19.9%	257
I don't know	1.5%	19
Prefer not to answer	0.3%	4
Water Heater Fuel Type		
Natural Gas	55.8%	720
Electricity	39.3%	508
Not sure	2.8%	36
Propane	1.6%	21
Hydrothermal	0.1%	1
None	0.1%	1
Prefer not to answer	0.5%	7
Home Type		
Single-family house detached	88.8%	1,147
Duplex, condo, townhome	2.9%	38
Mobile or manufactured home	6.0%	77
Apartment with 2 to 4 units	0.8%	10
Apartment with 5+ units	0.3%	4
Not sure	0.3%	4
Prefer not to answer	0.9%	11
Household Size (n=1277)		
1 person	14.3%	182
2 people	50.0%	638
3 people	14.6%	186
4 people	12.4%	158
5 people	4.6%	59
6 people	1.0%	13
7 people	0.3%	4
8 or more people	0.3%	4
Prefer not to answer	2.6%	33
Age		
18 to 24	0.7%	9
25 to 34	8.6%	111
35 to 44	14.8%	191
45 to 54	14.6%	189
55 to 64	19.9%	257
65 to 75	27.1%	350
75 or older	7.6%	98
Prefer not to answer	6.7%	86
Household member is 65+ years old		
Yes	53.0%	684
Household income		
Less than $10,000	1.1%	14
$10,000 to $19,999	1.0%	13
$20,000 to $29,999	2.9%	38
$30,000 to $39,999	4.7%	60

$40,000 to $49,999	6.6%	85
$50,000 to $74,999	14.8%	191
$75,000 to $99,999	12.2%	158
$100,000 to $ 149,999	14.3%	185
$150,000 to $199,999	6.0%	77
$200,000 or more	5.6%	72
Prefer not to answer	30.8%	398
Education		
Associates degree (or similar)	0.8%	10
Four-year college degree	10.6%	137
Graduate or professional degree	29.3%	378
High school graduate	28.7%	371
Did not graduate high school	21.9%	283
Prefer not to answer	8.7%	112

4.1.4 Weatherization and Shell Measures – Participant Survey Results

The Evaluators conducted a survey with weatherization and shell measure participants to gather feedback about customers' engagement with and experience of the program. Participants were contacted via email up to three times and asked to complete a survey. In total, 648 participants who received weatherization and/or shell measures in 2022 or 2023 responded to survey efforts.

4.1.4.1 Program Participation

Respondents received a variety of different measures through the program (Table 4-9), with windows being the most common measure received by respondents.

Table 4-9: Type and Number of Measures Received (n=648)

Measure Category	Total	Percent
Window Replacement	463	71.5%
Attic Insulation	133	20.5%
Wall Insulation	43	6.6%
Floor Insulation	18	2.8%
AeroBarrier Insulation	3	0.5%

Across the different measure types, the majority of respondents planned to install the new equipment before they learned about Avista's rebate offerings (Table 4-10).

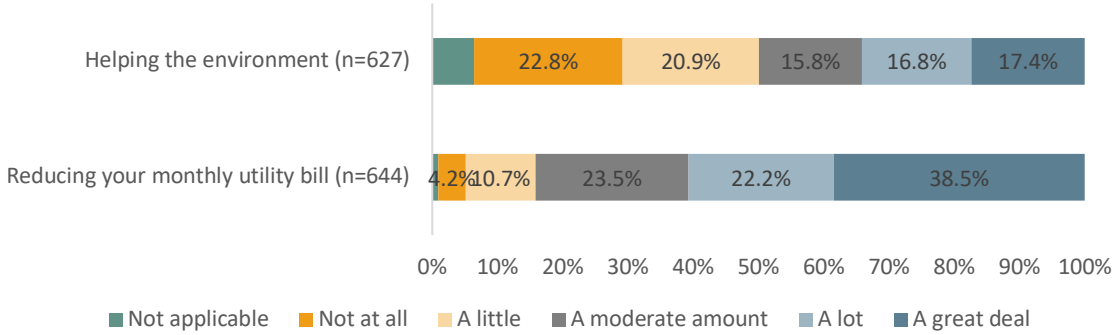
Table 4-10: Planned to Install Measures Prior to Program Enrollment (n=648)

Measure Category	Total (n)	Planned to Install	
		%	n
Window Replacement	463	79.1%	366
Attic Insulation	133	62.4%%	83
Wall Insulation	43	69.8%	30
Floor Insulation	18	66.7%	12
AeroBarrier Insulation	3	100.0%	3

When deciding on what type of energy efficient equipment to install, respondents often relied on recommendations from their contractor (53.7%, n=348), personal contact (23.5%, n=137), or the utility

(21.1%, n=137). Over half of respondents were highly motivated to participate in the program to reduce their monthly utility bills (Figure 4-11). Other reasons respondents indicated they were interested in installing energy efficient equipment included improving the home's temperature control (n=112), upgrade equipment (n=87), increase home's value and improve aesthetics (n=50), save money (n=42), reduce noise (n=14), and safety concerns (n=8).

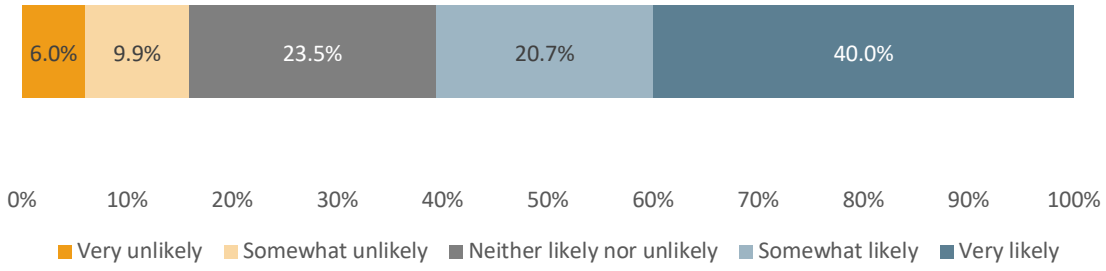
Figure 4-11: Motivations for Installing Energy Efficient Equipment (n=varies)



About one quarter of respondents (n=159, n=24.5%) contacted Avista staff regarding questions about their projects and twenty-four respondents received an in-home inspection after their project was completed (3.7%, n=24).

More than half of respondents indicated they would have made the energy efficient upgrades even if the rebate provided was 75% of what they received (Figure 4-12).

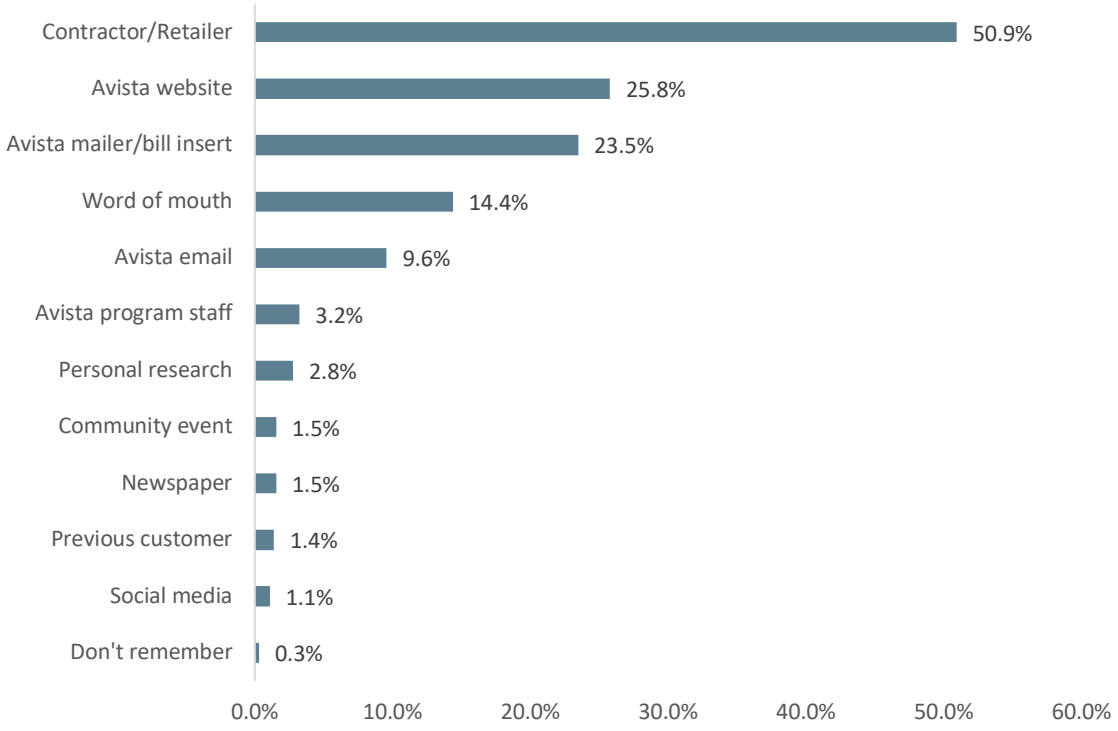
Figure 4-12: Willingness to Pay (n=648)



4.1.4.2 Program Awareness

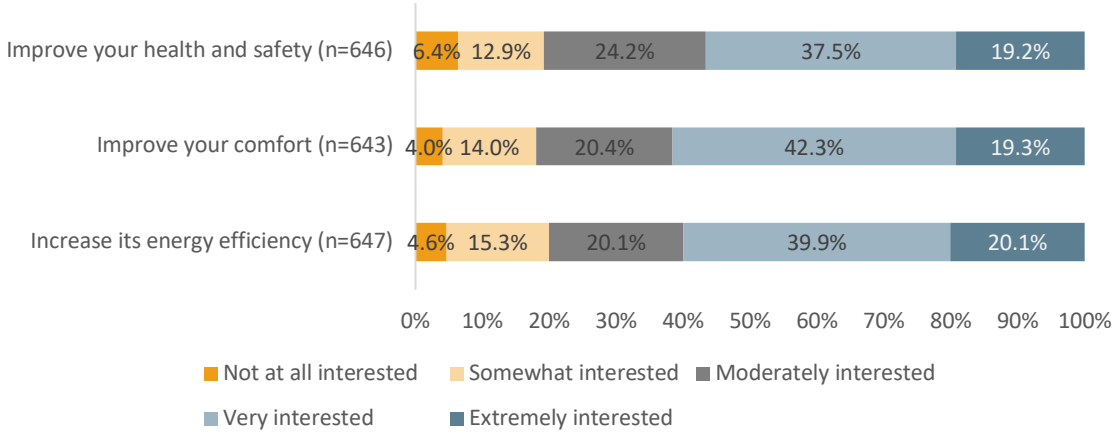
Respondents most commonly learned about the residential program through a contractor or retailer communication (Figure 4-13).

Figure 4-13: Program Awareness (n=648)



More than half of survey respondents are interested in making additional energy efficiency improvements that would improve their comfort (61.6%, n=396), increase energy efficiency (60.0%, n=388), and improve health and safety (56.7%, n=366) (Figure 4-14).

Figure 4-14: Interest in Additional EE Upgrades (n=varies)

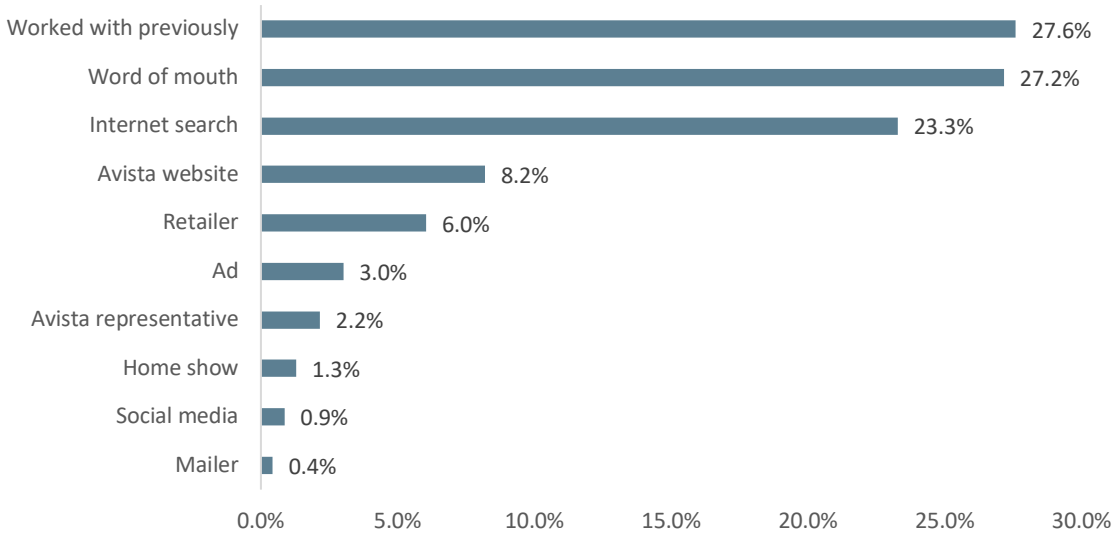


4.1.4.3 Contractor

According to tracking data, 232 respondents used a contractor for their equipment installations (35.8%). Of these respondents, about one quarter had used a contractor they had worked with before (27.6%,

n=64), while half of respondents found the contractor through word-of-mouth (27.2%, n=63) or an internet search (23.3%, n=54) (Figure 4-15).

Figure 4-15: Finding a Contractor (n=232)



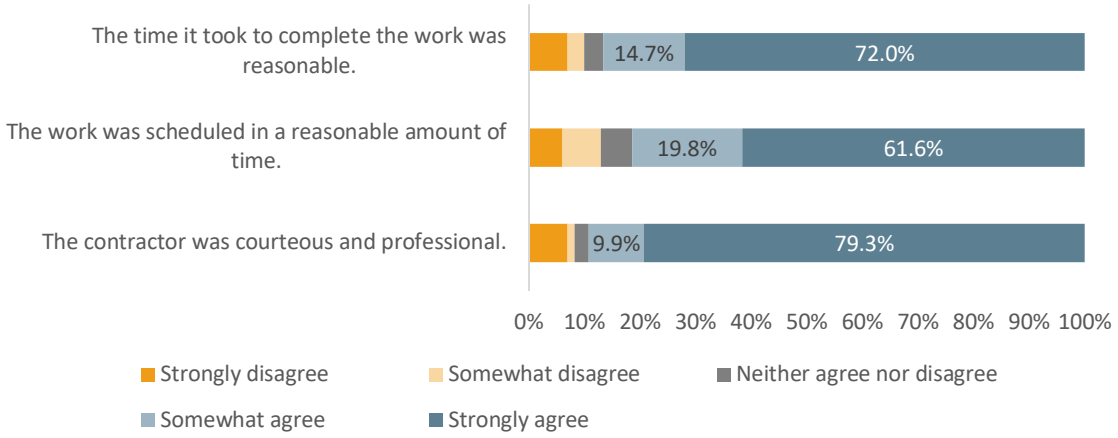
Less than half of the respondents who used a contractor indicated their contractor showed them the discount they would be receiving (41.4%, n=96). Fifteen percent of respondents indicated that their contractor made recommendations about other energy efficient equipment their home could benefit from (15.1%, n=35). The most common contractor recommendations included insulation (n=12) and windows (Figure 4-15).

Table 4-11: Contractor Recommendations (n=35)

Recommendations	n
Insulation	12
Windows	11
Doors	7
HVAC	4
Appliance	2
Solar	1
Siding	1

Most respondents were satisfied with their contractor citing their professionalism and courteousness (Figure 4-16).

Figure 4-16: Contractor Satisfaction (n=232)



4.1.4.4 Program Satisfaction

Program participants are generally satisfied with the program (Figure 4-17) and Avista as their energy service provider. Among the 77 respondents (11.9%) who expressed some dissatisfaction, low rebate amounts were the most popular reason for dissatisfaction (Table 4-12).

Figure 4-17: Program Satisfaction (n=648)

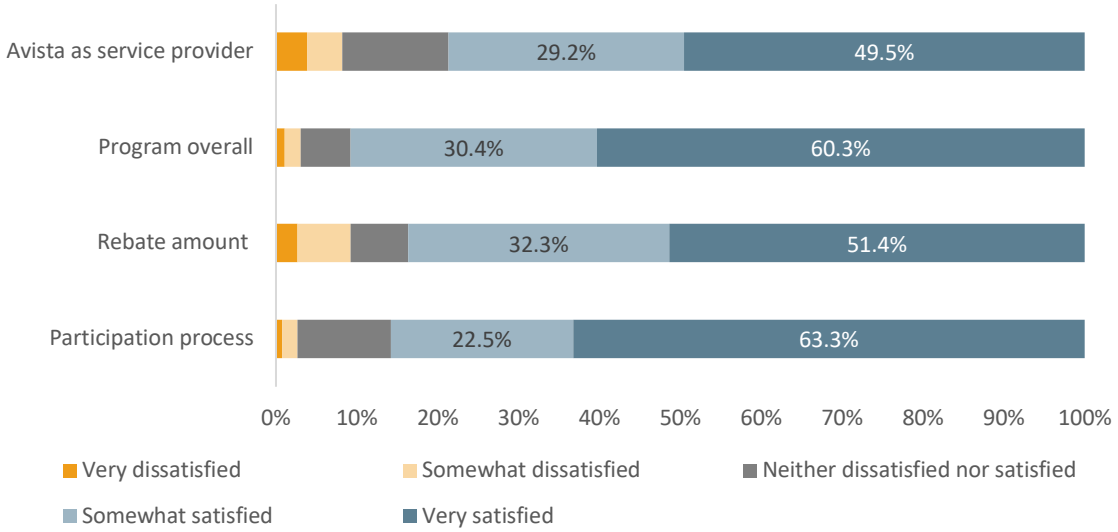


Table 4-12: Reasons for Dissatisfaction (n=77)

Response	Total	Percent
Insufficient rebate	47	61.0%
Application process	18	23.4%
Faulty equipment	8	10.4%
Program requirements	2	2.6%
Poor communication with staff	2	2.6%

More than half of survey respondents reported that participating in the residential program has

improved their satisfaction with Avista (57.9%, n=375) (Figure 4-18) and 85.5% (n=520) consider Avista a reliable source for information on saving energy (Figure 4-19). Most respondents (80.1%, n=519) are likely to recommend the residential program to others.

Figure 4-18: Program Participation's Impact on Satisfaction with Avista (n=648)

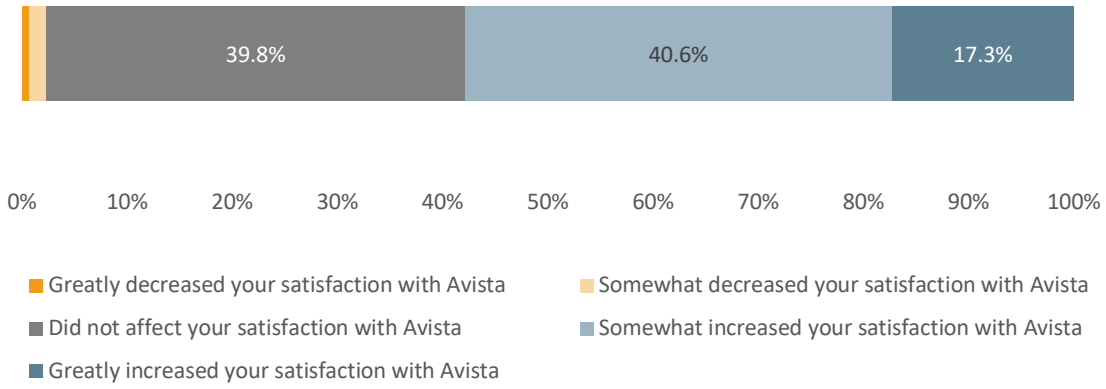
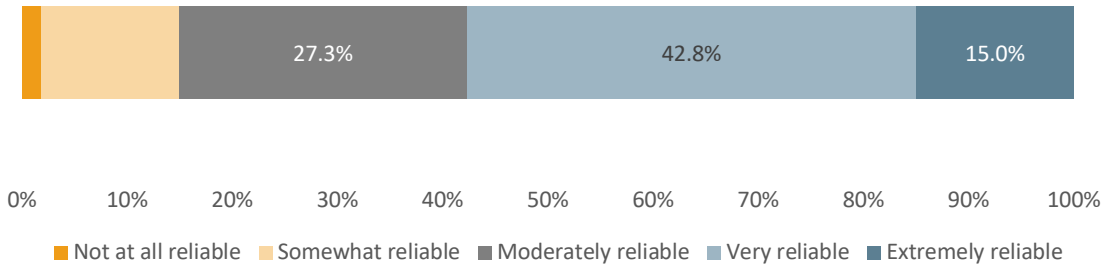


Figure 4-19: Avista as a Reliable Source of Information (n=648)



4.1.4.5 Respondent Demographics and Home Characteristics

Table 4-13 presents respondents' demographic and residence characteristics.

Table 4-13: Residence Characteristics and Respondent Demographics (n=varies)

Response	Percent
Homeownership Status (n=610)	
Own	94.0%
Own and rent to someone else	0.6%
Rent	2.6%
I don't know	0.3%
Prefer not to answer	2.5%
Housing Type (n=610)	
Single-family house detached	88.0%

Response	Percent
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	3.7%
Mobile or manufactured home	5.4%
Apartment with 2 to 4 units	1.5%
Apartment with 5+ units	0.5%
I don't know	0.2%
Prefer not to answer	0.8%
Central A/C Status (n=648)	
Yes	66.2%
Home Fuel Type (n=610)	
Natural Gas	63.7%
Electricity	28.7%
Wood	2.2%
Propane	1.9%
Oil	1.2%
Pellets	0.6%
Gas and electric	0.5%
Prefer not to answer	0.8%
Water Heater Fuel Type (n=648)	
Natural Gas	47.5%
Electricity	48.1%
Propane	1.2%
Gas and electric	0.6%
None	0.0%
I don’t know	2.0%
Prefer not to answer	0.5%
Home Size (sq ft) (n=555)	
Less than 1,000ft^2	6.7%
1,000-1,999ft^2	43.4%
2,000-2,999ft^2	30.8%
3,000-3,999ft^2	12.8%
4,000ft^2 or more	5.4%
Housing Age (n=648)	
Before 1950	23.8%
1950 to 1959	14.1%
1960 to 1969	8.5%
1970 to 1979	17.3%
1980 to 1989	9.1%
1990 to 1999	15.7%
2000 to 2009	9.3%
2010 to 2019	0.5%
2020 to Present	0.8%
I don’t know	1.1%
Number of people in Home (n=607)	
1 person	18.3%
2 people	48.7%

Response	Percent
3 people	13.0%
4 people	10.1%
5 people	3.6%
6 people	2.5%
7 people	0.9%
8 or more people	0.3%
Prefer not to answer	2.6%
Age (years) (n=610)	
18 to 24	0.5%
25 to 34	6.2%
35 to 44	14.0%
45 to 54	13.7%
55 to 64	22.8%
65 to 75	26.9%
75 or older	11.0%
Prefer not to answer	4.9%
Anyone in home 65 years or older (n=648)	
Yes	57.1%
Annual Household Income (n=648)	
Less than $10,000	0.9%
$10,000 to $19,999	2.2%
$20,000 to $29,999	3.7%
$30,000 to $39,999	6.6%
$40,000 to $49,999	5.6%
$50,000 to $74,999	17.9%
$75,000 to $99,999	11.1%
$100,000 to $149,999	15.1%
$150,000 to $199,999	6.2%
$200,000 or more	3.6%
Prefer not to answer	27.2%
Education (n=610)	
Did not graduate high school	1.2%
High school graduate	14.2%
Associates degree, vocation/ technical school, or some college	28.9%
Four-year college degree	26.1%
Graduate or professional degree	22.7%
Prefer not to answer	6.9%

4.1.5 Residential Prescriptive Programs Trade Ally Interview Results

The Evaluators conducted phone interviews with 24 residential trade allies who participated in the Residential Prescriptive programs in 2022 and 2023. A total of 358 contacts were identified and each trade ally was contacted at least one time via email or phone.

4.1.5.1.1 Background and Program Tenure

Responding trade allies represented a variety of specialties and service territories (Table 4-14).

Table 4-14: Respondent Background (n=24) (multiple selections allowed)

Background	n
Contractors/installers	23
Designers/engineers	2

Half of the responding trade allies (n=12) specialize in building shell or weatherization services, such as windows, doors, insulation, and air sealing. Other specialties included HVAC equipment (n=12), solar equipment (n=1), and lighting equipment (n=1). Fourteen of the responding trade allies serve customers in both Idaho and Washington, while six work exclusively in Washington and two work exclusively in Idaho.

Program tenure varied between the respondents. More than half of responding trade allies have engaged with the program for multiple years (n=15), while two trade allies noted this was their first year participating. Four trade allies did not know how long their companies had been participating for.

4.1.5.1.2 Engaging Customers

Respondents' target customers varied; thirteen respondents exclusively serve residential customers, while 12 serve both residential and commercial customers. More than half of respondents noted they promote the program and acquire jobs on their own and indicated they were not familiar with Avista-provided marketing materials (n=14). In general, respondents indicated they rely on word-of-mouth (n=13), digital and radio advertising (n=4), tables or booths at shows, expos, fairs, and events to engage customers (n=2), referrals (n=1), and door-to-door sales teams (n=1). Six respondents indicate they use Avista's marketing materials and four receive leads directly from Avista.

More than half of the responding trade allies (n=16) identified barriers or challenges that prohibit customers from participating in the program. Key barriers and challenges include upfront costs (n=7), don't qualify for rebates (n=6), confusion over the application process (n=2), skepticism about the program (n=1), fear of natural gas (n=1), strict eligibility requirements specifically related to window U-factor requirements and insulation R-value requirements (n=1), and customer does not own the home (n=1).

4.1.5.1.3 Application Process and Program Incentives

Ten trade allies complete and submit the rebate applications on behalf of their customers; seven trade allies indicated their customers or distributors (n=2) complete the application, while three said it varies based on customer capabilities. The remaining nine respondents did not comment on their application process. Less than half of the trade allies (n=7) identified challenges with the application process. Challenges included confusion over program design and requirements (n=3), unclear program language and terminology (n=2), customers not having computers (n=2), and portal glitches and errors (n=1).

The responding trade allies did not agree on their perspective of current incentive levels provided by Avista. Three respondents believed the incentives are generous, while three others desired higher incentives (Table 4-15); 19 respondents did not comment on the incentives.

Among the respondents working in both Idaho and Washington three did not believe the incentive levels varied considerably, while three explained incentives are higher in Washington than Idaho. One respondent explained they have more Washington customers than Idaho customers and attributed this difference to varying incentive amounts. However, all three of these respondents noted that Avista

incentive amounts are higher than those of other Idaho utilities. More than half of the responding trade allies proposed additional measures be included in the program (Table 4-15).

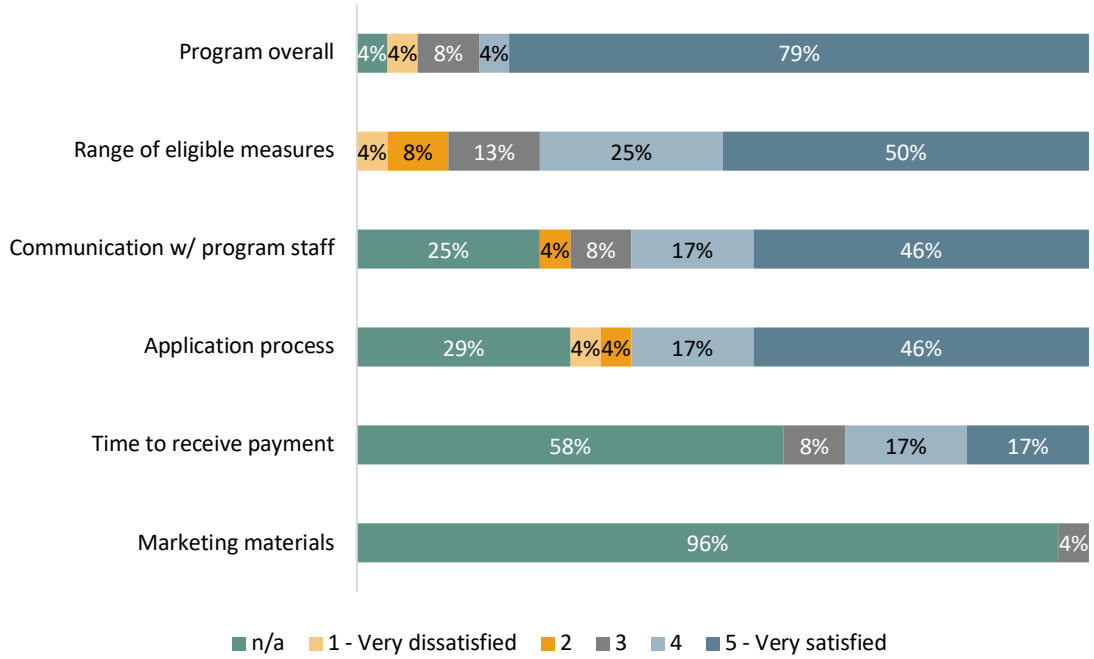
Table 4-15: Incentive Recommendations

Measures	n
Incentives too low to encourage adoption (n=3)	
A/C units	1
All incentives	1
Higher SEER-rated heat pumps	1
Proposed additions (n=16)	
AeroBarrier	1
Aero seal	1
External insulation (e.g. panel insulation)	1
External doors	1
Gas furnaces	1
Gas tankless water heaters	1
SEER 95 furnaces	1
Air purifiers	1
Ductless split system in (ID)	1
Gas incentives	1
Heat pumps (ID)	1
Vinyl	1
Expand window options	1
Expand insulation options	1

4.1.5.1.4 Program Satisfaction and Recommended Improvements

Responding trade allies were most satisfied with the program overall and least satisfied with the range of eligible measures (Figure 4-20). Some respondents commended the program for its lucrative incentives (n=3) and ease of participation (n=1).

Figure 4-20: Program Satisfaction (n=24)



The most significant challenge responding trade allies face when participating in the program is the application process (n=8); specifically navigating the website and application portal (n=3); obtaining customer account information (n=2); time required to fill out the paperwork (n=2); gathering the separate documents to submit as one file (n=1); and the new guidelines regarding midstream distributors introduced in 2023 (n=2). One trade ally elaborated on this issue, explaining that while previously they submitted rebates on behalf of their customers on a rolling basis, distributors are now responsible for processing the rebates. Because contractors often buy equipment upfront, before they have an interested customer, they now submit their rebates retroactively and thus there are delays in payment which results in accounting issues. This challenge has become so cumbersome for this trade ally that they are disengaging from the program.

Other challenges include incentive level discrepancies between Idaho and Washington (n=2), discrepancies between lump sum and itemized pricing (n=1), obtaining every tenant's signature for multi-family projects, as well as poor communication with Avista staff (n=4). Two of the four respondents who mentioned poor communication cited the new program design as the reason they now have limited communication with program staff, indicating that distributors are now their point of contact rather than Avista staff.

Eleven trade allies provided recommendations for program improvement (Table 4-16).

Table 4-16: Recommendations for Improvement (n=8)

Recommendations	n
Co-branding opportunities	4
Discontinue midstream program	2
Focus on fewer measures and increase incentive amounts rather than spreading funds across multiple measure categories	1

Scale window rebates based on price and quality	1
More transparency on program duration and available funds	1
Improved marketing materials	1
Digitizing applications	1
Standardizing incentives across states	1
Drug screening for approved contractors	1

4.1.6 Midstream Trade Ally Interview Results

The Evaluators conducted phone interviews with five participating midstream distributors. Avista's midstream program encompasses residential and commercial measures; these interviews represent responses from distributors across both sectors. Eight distributors participated in Avista's midstream program in 2023. All eight distributors were invited to participate in an interview; distributors were contacted up to three times via phone and email.

4.1.6.1.1 Respondent Background

Responding distributors sell HVAC, plumbing, mechanical equipment, and food service equipment. All five respondents supply the greater Avista service area in Idaho and Washington; one respondent also sells equipment to national and international customers. In general, the responding distributors learned about Avista's midstream program through Avista staff and their customers.

4.1.6.1.2 Customer Engagement

All five respondents sell exclusively to contractors rather than end-use customers. Two of the responding distributors explained that they only sell equipment to licensed contractors to minimize liability issues and reduce competition between the distributors and their contractor-customers, explaining that selling directly to the end-users would take jobs away from their contractors.

The distributors mentioned using a variety of marketing strategies to engage their customers in the Avista program. Strategies include an active sales team and targeted marketing materials, app-based advertisements, and word of mouth. Three of the responding distributors also utilize Avista provided marketing materials.

4.1.6.1.3 Program Satisfaction and Recommended Improvements

Due to the infancy of the program, distributors noted that it is too soon to tell what, if any, impact the program has had on their business.

Responding distributors identified program challenges and participation barriers. These challenges mostly relate to administrative challenges including determining equipment eligibility (n=2), contractor reluctance (n=2), equipment availability (n=1), and application tracking (n=1). The distributors explained that some contractors were wary of the program and the related upfront costs. Previously, contractors received rebates directly from Avista, but now the rebates are routed through the distributors and thus contractors do not receive a rebate until paperwork is processed by both the distributors and Avista.

In general, respondents were satisfied with the program. Four of the five responding distributors provided recommendations for program improvement (Table 4-17).

Table 4-17: Recommendations for Improvement

Recommendation	n
Increased engagement between Avista and contractors. Specifically, more guidance on program structure and the benefits of engagement.	3
Quarterly check-ins to track progress, ask questions, and share updates.	1
Enhance program requirements to further promote efficient equipment.	1
Customer referrals or project leads.	1

4.1.7 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.1.7.1 Conclusions

The following conclusions represent key findings from the appliance rebate and weatherization survey:

1. **Program awareness –** Contractors and retailers and the Avista website were the most popular sources of program awareness for respondents from both the appliance rebate and weatherization programs.
2. **Program motivation –** About 50-60% of survey respondents from both the appliance rebate and weatherization programs were very or moderately interested in upgrading equipment in their homes for health and safety reasons, improving comfort, and increasing energy efficiency.
3. **Popular measures –** Among survey respondents, smart thermostats (n=497) and windows (n=463) were the most popular measures received through the residential single-family homes program.
4. **Experience with contractor –** Among the respondents who confirmed their use of a contractor to install their equipment (appliance rebate=551, weatherization=232), the majority of these respondents were satisfied with the work completed by their contractor. Previous experience with the contractor or a personal referral were the most popular ways respondents found contractors across both the programs. Few respondents indicated that their contractor provided them recommendations for other energy efficient upgrades (appliance=90, weatherization=35)
5. **Satisfaction –** In general, respondents were satisfied with all aspects of the appliance rebate and weatherization programs. The most common reasons for dissatisfaction were related to insufficient rebates and a lack of transparency regarding program requirements and eligibility criteria.

The following conclusions represent key findings from the appliance, furnace, HVAC, water heat, and weatherization rebate program trade ally and distributor interviews.

6. **Program tenure –** Program tenure varied across the trade allies and midstream distributors interviewed. Some (n=15) of the interviewed trade allies had been engaged with the program for multiple years, while the midstream distributors were all new due to the infancy of the Midstream Program, which launched in the summer of 2023.
7. **Program promotion** – More than half of the weatherization and appliance rebate focused trade allies were not aware of Avista sponsored marketing materials (n=14). Across all the trade allies in both downstream and midstream models, trade allies completed the lion's share of program marketing and lead generation on their own, relying heavily on word of mouth.

8. **Program process** – Midstream distributors highlighted some issues with the website and general application flow of the midstream program, but noted that the program is new. Some appliance rebate trade allies also cited confusion over the new midstream program and how that might impact their work and program application processing moving forward.
9. **Barriers to energy efficient upgrades** – Both groups of trade allies cited upfront costs and low incentive rates as key barriers for customer engagement and program participation.

4.1.7.2 Recommendations

Based off of the above conclusions, the Evaluators suggest the following recommendations for the Residential Prescriptive Rebate programs moving forward.

1. **Promotional campaigns –** Consider increasing promotional campaigns that highlight the impact energy efficient equipment can have on customers' home safety, comfort, energy bills, and overall energy efficiency.
2. **Contractor training and cobranded marketing materials –** Contractors serve as the backbone of the residential prescriptive rebate programs, serving as the primary awareness source and marketing avenue. Consider offering contractors more training opportunities to educate them about the program, as well as providing them co-branded marketing materials to increase legitimacy and program recognition. During training, encourage contractors to help customers identify other areas of the home in need of improvement to maximize customers' benefit and lead to deeper energy retrofits.
3. **Increase training opportunities –** Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.
4. **Program requirements –** Consider enhancing website and marketing materials to make program eligible measures, eligibility requirements, and required documentation clearer and more transparent.

4.2 MULTI-FAMILY DIRECT INSTALL PROGRAM

The Multi-family Direct Install Program (MFDI) is administered by SBW Consulting, Inc (SBW). This program provides direct installation and audits for customers to install direct install measures, such as screw-in LEDs and water saving measures, as well as identifies additional energy efficiency opportunities customers can pursue. This program is available to customers who receive electric service from Avista and live in a five-unit or more multi-family property. The program serves Avista's low- and limited-income population, a traditionally hard-to-reach customer segment and. Originally launched in 2015 with a focus on small businesses, MFDI sunset at the end of December 2023. In this report, we have separated the MFDI process evaluation results due to large differences between the Residential Prescriptive programs and the MFDI energy savings delivery methods.

4.2.1 Data Collection Activities

The process evaluation of the MFDI program included the following data collection activities:

- *Avista and SBW Program and Implementation Staff Interviews.* The Evaluators interviewed two staff at Avista involved in the administration of the MFDI Program in 2022 and 2023. These

interviews were to collect information from program staff about program design, administration, marketing, and stakeholders.

- *Property Manager Surveys.* The Evaluators surveyed property managers representing buildings that participated in the program. These interviews covered a range of topics, including program awareness, participation, and satisfaction.

4.2.2 Staff Interview

ADM conducted in-depth interviews with program staff in 2022 and 2023. Interviewees included Avista's MFDI program manager (August 2022 and 2023) and the lead contact of the implementation contractor, SBW (September 2022 and December 2023).

4.2.2.1 Program Objectives and Design

MFDI's primary goals are to achieve savings and help customers in the multi-family market reduce their energy bills. MFDI was developed to provide additional assistance to multi-family tenants who are often difficult for utilities to reach given dynamic and transitional living patterns. Through collaborative efforts with property management firms and housing authorities, the program offers an easy and accessible way for multi-family complexes to enroll in the program and receive energy-saving measures.

Participants of the program receive a variety of high efficiency direct install measures, as well as building audits to identify opportunities for replacing inefficient common area and exterior lighting with more efficient options. Though the MFDI program tracked participation of complexes in named communities and with higher concentration of tenants that are energy burdened to assure equitable distribution of energy benefits, the program serves across market-rate and income-eligible properties. All residential buildings with five or more units are eligible to participate.

Since its inception in 2015, the MFDI program has undergone several changes and adaptations, most notably the temporary suspension of its operations in March of 2020 in response to the COVID-19 pandemic. Between March 2020 and April 2022, the program attempted alternative methods of engagement such as socially distanced events and drop-offs, with modest success. In April 2022 the program was able to fully relaunch by adopting new health and safety protocols to ensure the safety of both staff and participants in light of the COVID-19 pandemic. During the suspension and phased restart, the program maintained its commitment to serving its customers, albeit with adjustments to its operational procedures.

4.2.2.2 Program Administration and Staffing

The MFDI program had the same program manager and implementer (SBW) from inception to sunset. As the primary implementation contractor, SBW is responsible for project recruitment and installation. SBW contracted with five different lighting subcontractors, located in Spokane and a few other locations for rural reach associated with the supplemental lighting component. Throughout 2022-2023, program staff reported staffing challenges which impacted program performance (one key staff extended absence for medical leave and loss of subcontractors due to the COVID-19 disruption).

4.2.2.3 Marketing and Outreach

In 2022-2023, the MFDI program relied on phone outreach based on Avista lists to fill project pipelines. Program staff reported the program had high participation rates throughout 2018 and 2019, but by the end of 2023 the program was "on the diminishing curve of opportunity," even though the market had

not yet reached saturation. Staff attributed recruitment challenges to post pandemic changes in staffing practices (property managers, facility or maintenance staff going remote) at multi-family complexes which increased the rate of flake-out, no show, last-minute cancellation, or unwillingness to show up on site. In response, the program increased attempts of staff visits at complexes to follow up on calls with limited success. Program staff reported finding property/facility managers who are interested and can make themselves available for walk-through and installation was one of the main challenges for the MFDI program.

4.2.2.4 Implementation and Delivery

After obtaining an approval from a property owner, the program provides advanced notice to building's tenants and an option to opt out. SBW installation staff is accompanied by buildings property or facility managers to go into willing tenant units to conduct simple direct installation of energy efficiency measures (screw-in LEDs, aerator, showerhead, and leaving behind materials). For the supplemental lighting component, SBW installation staff conducts an audit of the facility during the direct install visit. SBW's lighting subcontractors then go into those buildings with high saving potential to complete a full audit. Upon SBW's approval, these subcontractors proceed with installation, free for the property owners. SBW tracks a detailed database of measures installed, and reports to Avista each month with extracted progress summary and invoice. Avista reported that these implementation and delivery processes are working well and praised the work of SBW.

Program staff mentioned that MFDI experienced a supply chain challenge, especially noting significant price increases of lighting fixtures and some other equipment during the evaluation years.

4.2.3 Property Manager Survey Results

Since the program did not track the tenants, whose units were treated by the program, the Evaluators surveyed contacts of property management firms of 10 randomly selected unique multi-family buildings that participated in Avista's MFDI program in programs years 2022 and 2023. The Evaluators conducted the survey by email and phone. Between 2022 and 2023, the program treated a total of 176 multi-family buildings which were represented by 48 property management firms.

4.2.3.1 Awareness and Motivation

Most property manager contacts (n=7) indicated they first learned about the program opportunity directly from program staff (Avista or SBW) and most of them said program staff were the most influential source of information to their participation decision. A few contacts also reported that they heard about the program from their contractors (n=2) and through other word-of-month (n=2).

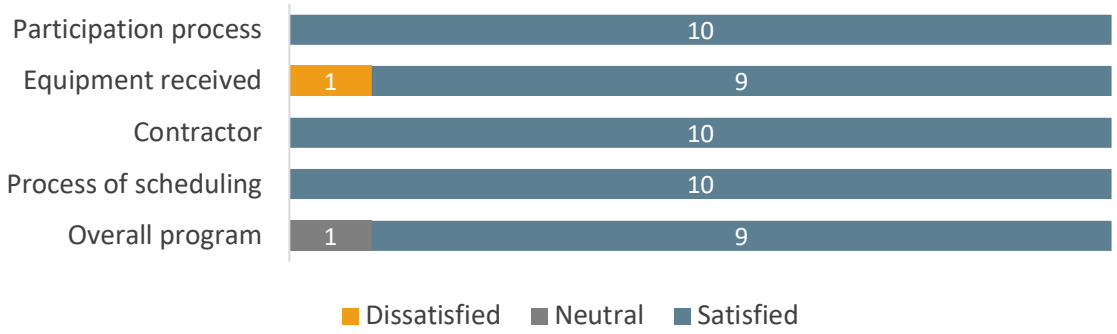
While the majority of these contacts reported bill reduction and environmental benefits greatly contributed to their participation decisions (70% and 90% said "a lot"- "a great deal"), more than half of these property managers also mentioned they were motivated by other practical benefits such as tenants' satisfaction, increased security, values of upgrades, and convenience of program participation.

4.2.3.2 Program Satisfaction

In general, responding property managers were satisfied with the MFDI program (Figure 4-21). All but one of the 10 contacts indicated they were satisfied with the program overall. The one dissatisfied property manager indicated dissatisfaction with the quality of the equipment installed, saying they

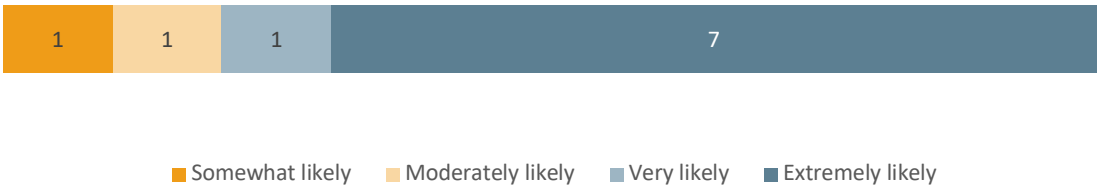
received some complaints from their tenants about the quality of the light bulbs and faucet aerators the program installed.

Figure 4-21: Program Satisfaction (n=10)



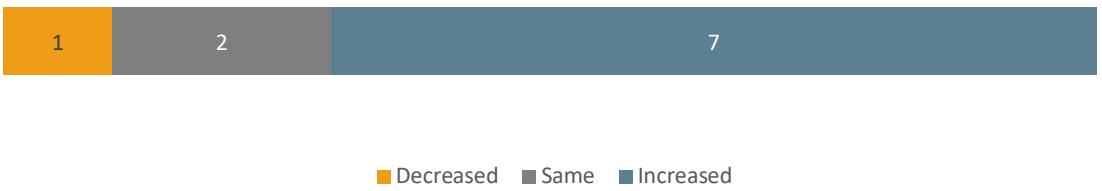
As a result of their high satisfaction with the program, a majority of the property managers (8 of 10) said they are 'very' or 'extremely' to recommend the Avista program to othes.

Figure 4-22: Likelihood to Recommend Avista Program (n=10)



Additionally, most surveyed property managers (7 of 10) noted that participation in the program increased their satisfaction with Avista.

Figure 4-23. Change in Satisfaction with Avista (n=10)



4.2.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations.

4.2.4.1 Conclusions

The following conclusions represent key findings from the Multi Family Direct Install program survey:

1. **Program Suspension –** The challenges caused by the COVID-19 pandemic forced the program staff to suspend the program in March of 2020. The program was then relaunched in April of 2022 (several months in during the 2022-2023 evaluation year). Despite this challenge, the program implementer, SBW, continued to operate the program with adjustments to its operational procedures.
2. **Program Satisfaction –** The property managers of the participating multi-family buildings expressed high satisfaction with the program. The program started with a high rate of participation (an average of 3,000 measures installed per month), but participation had greatly declined by the end of 2023 (an average of 1,000 measure installs per month). The program staff assessed the market is on the diminishing curve of opportunity.

4.2.4.2 Recommendations

Based off of the above conclusions, the Evaluators suggest the following recommendations:

1. **Customer Recruitment –** If Avista funds a similar program targeting multi-family buildings in the future, recruitment of property managers who are willing to cooperate and provide time – as experienced by the program particularly during the post-pandemic period – is anticipated to be a major hurdle. The program should develop a thoughtful outreach and marketing approach that leverages motivation and interest to most building owners and property managers (tenants' satisfaction, increased home security and home comfort, values of upgrades, and convenience of program participation) in addition to the bill reduction benefits designed for tenants.

4.3 Low-Income Program

The Low-Income Program delivers energy efficiency measures to low-income residential customers in Avista's Washington and Idaho service territory via a partnership with eight Community Action Agencies ("CAP agencies") and one tribal weatherization organization. The CAP agencies qualify customers based on income and several home characteristics and then in-house or contracted crews install approved program measures. In addition to Avista funds, the agencies have access to other monetary resources which allow them to weatherize a home or install additional energy efficiency measures. The Evaluators report process-level findings for the Low-Income Program separately from the Residential and MFDI Programs due to large differences in program operations, goals, and target community.

4.3.1 Data Collection Activities

The process evaluation of the Low-Income Program included the following data collection activities:

- *Staff Interviews*. The Evaluators conducted in-depth interviews with program staff in August 2022 and 2023. Interviewees included Avista's Low-Income program managers and representatives from six of the Community Action Partnership (CAP) agencies that implement the program. Interviews occurred in November-December 2022 and October-November 2023.
- *Customer Surveys.* The Evaluators surveyed customers who participated in the program during 2022-2023. Surveys covered a range of topics, including program awareness, participation, and satisfaction.

4.3.2 Staff Interview

This section summarizes the Evaluators findings from the Low-Income program manager in-depth interviews.

4.3.2.1 Program Design

The Low-Income program was designed to help fund pre-existing weatherization programs operated by Community Action Partnership (CAP) agencies. It leverages the infrastructure CAP agencies already have for income qualifying participants and implementing weatherization projects. CAP agencies have a list of pre-approved measures they can implement for reimbursement. Washington state also has its own list of pre-approved measures. Avista expands on these lists by offering additional measures that are pre-approved for reimbursement funding through Avista with a goal of delivering additional energy savings and reducing energy burdens for its low-income customers.

The program allows CAP agencies to take a holistic approach to energy efficiency upgrades, including making health and safety improvements to homes, as up to 30% of a project's budget can go towards health and safety repairs. Most CAP agencies praised Avista for allowing funds to be used flexibly and appreciated their expansive measure list.

Program staff and CAP agencies addressed several challenges with the current program model:

- The program struggles with lower rates of energy savings as the estimated savings often do not materialize due to the low energy usage starting point, typical of low-income customers. This baseline also leads to lower cost-effectiveness than desired, making significant energy savings challenging to achieve.
- Many CAP agencies mentioned a desire to waive or incorporate flexible income requirements in order to expand the program's reach, however, doing so would mean forgoing federal funding, which has implications for the program's funding model.
- Reaching rental customers through the program is challenging as renters worry their property managers might use upgrades to increase rent, thus resulting in more benefits for the landlords than the tenants.

4.3.2.2 Program Administration and Staffing

The Low-Income program experienced a staff transition between 2022 and 2023 when the longstanding program manager retired. The staff indicated that this program manager transition went smoothly.

Avista works with eight Community Action Agencies (“CAP agencies”) and one tribal weatherization organization who implement the programs in their designated counties or tribal communities in Washington and Idaho. CAP agencies organize their staff similarly; they have in-house administrative staff and weatherization crew members, as well as auditors and inspectors (who are often members of their crew). CAP agencies also subcontract for HVAC, electrical, and plumbing work for other specialty areas that exceed their technical capacity.

CAP agencies highlighted a variety of staffing challenges that impact their programs. Most CAP agencies shared their struggles with recruiting and retaining qualified crew members, especially among CAP agencies that serve in rural areas. This issue is often related to their lack of workforce development resource (cost of travel, mileage reimbursement, and per diem, etc.). In response to this issue, Avista started a new initiative in 2023 in which they contracted the Building Performance Center to travel to

rural areas and provide training. CAP agencies in rural areas also consistently cited challenges findings subcontractors who are willing to work with them due to prevailing wage documentation requirements.

Interviewed CAP agencies expressed high satisfaction with Avista, citing positive personal relationships with Avista staff and responsiveness to their concerns and challenges.

4.3.2.3 Marketing and Outreach

Interviewed CAP agencies reported that most of their energy bill assistance customers are asked if they are interested in weatherization services as well and that this cross-program promotion is their top referral pathway.

CAP agencies cited additional outreach methods including flyers, newspaper ads, outreach through food banks, and door-to-door outreach in targeted neighborhoods. Most agencies explained that they do not need to do much marketing or outreach as they have long wait lists from the bill assistance referral system.

4.3.2.4 Implementation and Delivery

CAP agencies handle most of the day-to-day implementation, while Avista supports through measure approvals, rebates and incentives, and data tracking support.

CAP agencies handle the application process and verify applicants' income eligibility. Agencies send their auditor to assess customer's home to identify weatherization repair needs. Auditors determine the home's weatherization and repair needs and then create a scope of work, pulling from federal, state, and Avista-approved measures. CAP agencies complete the weatherization work using a mix of in-house crews and subcontractors. In-house crews often handle insulation, air sealing, and basic HVAC while contractors are brought in for specialized work such as electrical or plumbing. Upon completion of the project, an inspector conducts a final inspection quality check.

CAP agencies collect required documentation and report project completions to Avista for reimbursement. Avista also provides some CAP agencies access to their iEnergy tracking system to streamline this process.

CAP agencies and Avista staff identified a variety of implementation challenges including deferrals, supply chain and inflation, wait times, and service territory boundaries (Table 4-18).

Table 4-18: Implementation Challenges

Challenge	Description
Deferrals	CAP agencies often have to walk away from potential projects due to necessary pre-weatherization repairs (roof repair is among the most commonly mentioned repairs) because the federal, state, or Avista funds currently do not support these pre-weatherization repairs. One CAP agency mentioned they defer about 50% of homes assessed due to this problem. In response to this recurring issue, Avista staff shared that a deferral maintenance pilot program is in development that is designed to assist homes needing pre-weatherization repairs by setting aside funds that is specifically intended to address this issue.

Supply chain and inflation	General issues impacting the construction industry are also affecting CAP agencies and their ability to stretch dollars to serve more customers. One CAP agency cited 20-30% cost increase for equipment and material compared to a few years ago.
Wait times	The long wait times are a persistent challenge for most interviewed CAP agencies for delivering timely weatherization assistance to customers in need. One agency estimated the wait time was at a minimum of three years and noted 95% of them are income-qualified.
Service territory	A few CAP agencies expressed that they want to understand Avista's service territory more accurately and easily to help with their outreach and project planning and thought a detailed map that shows its electric and gas service areas would be useful.

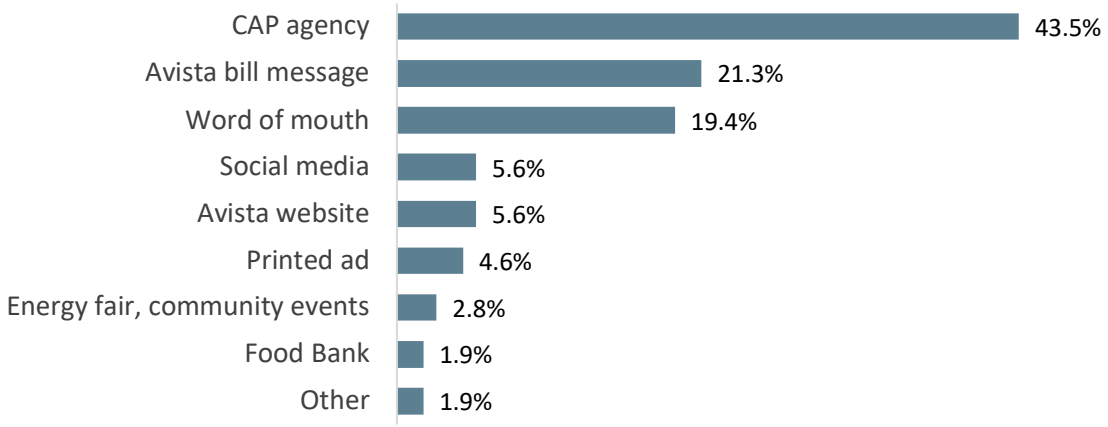
4.3.3 Program Participant Survey Results

The Evaluators surveyed 108 unique customers that participated in Avista's Low-Income program in October 2023 and in March 2024 using an email survey approach. Customers with a valid email were sent the survey via an email invitation. The Evaluators completed 29 surveys from participants in PY2022 and 79 surveys from participants in PY2023.

4.3.3.1 Program Information Sources

Respondents learned about the low-income program through a variety of sources including directly from the CAP agencies, Avista's bill messages, and word of mouth (Figure 4-24).

Figure 4-24: Information Source about the program (n=108)



4.3.3.2 Participation Motivation

Respondents indicated they consider a number of factors when deciding to engage with the program. More than 70% of respondents consider health and safety, savings on energy bill, improving the energy efficiency of their home, and improving their comfort as very or extremely important reason for participating in the program (Figure 4-25). Fewer respondents (42%) mentioned environmental benefits

and other benefits like the opportunity to update their home, replace failed equipment, reduce, and address needs for disabilities.

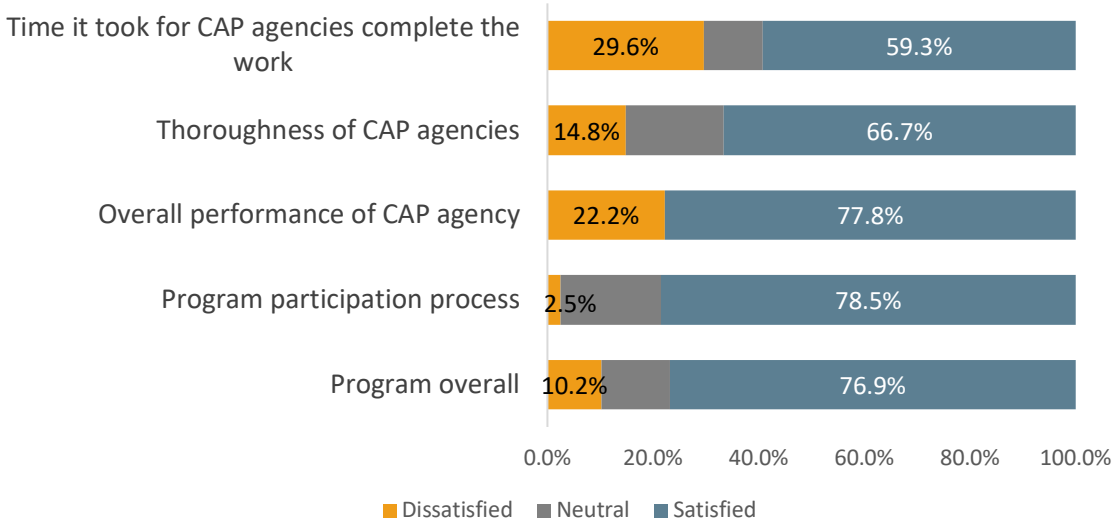
Figure 4-25: 'Very'-'Extremely' Important Reasons for Participation (n=108)

4.3.3.3 Program Satisfaction

Most surveyed program participants (76.9%) reported they were satisfied with the program overall, but 10.2% expressed dissatisfaction (Figure 4-26). Reasons for dissatisfaction included poor quality of work, such as inadequate installation of windows, furnaces, fans, and weather-stripping materials, failed equipment upgrades, discomfort in their home following the upgrades, long wait times, as well as energy bill increases. Very few participants (2.5%) expressed dissatisfaction with the program participation process.

More than three-quarters of respondents (77.8%) were satisfied with the overall performance of the CAP agency. Among the respondents who expressed dissatisfaction with the CAP agencies, most were dissatisfied with the time it took to complete the work.

Figure 4-26: Program Satisfaction (n=108)



The majority of respondents indicated they were likely to recommend the program to others (Figure 4-27). Moreover, about two-thirds of the respondents (64.8%) said their participation in the program increased their satisfaction with Avista (Figure 4-28).

Figure 4-27: Likelihood to Recommend Avista Program (n=108)

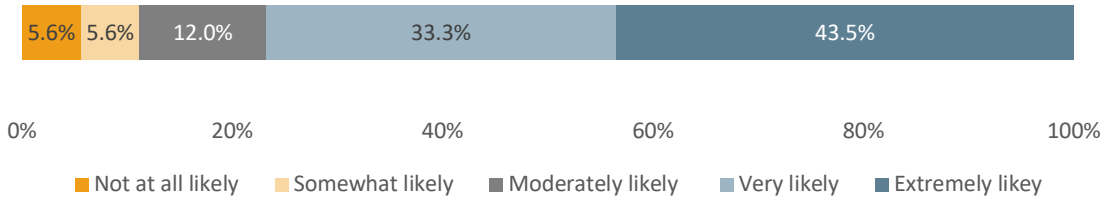
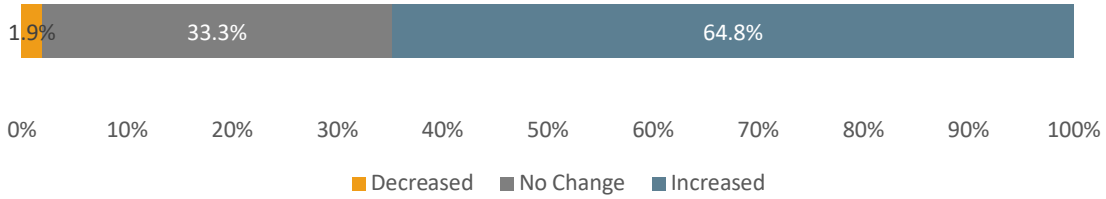


Figure 4-28: Change in Satisfaction with Avista (n=108)



4.3.3.4 Respondent Demographics and Home Characteristics

In this section, the Evaluators present the demographic and home characteristic results from the responding Low-Income Program customers. Table 4-19 presents respondents' demographic and residence characteristics.

Table 4-19: Residence Characteristics and Respondent Demographics (n=varies)

Response	Percent
Homeownership Status (n=108)	
Own	86.1%
Rent	10.2%
Own and rent to someone else	0.0%
I don't know	0.0%
Prefer not to answer	3.7%
Housing Type (n=108)	
Single-family house detached	56.5%
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	0.9%
Mobile or manufactured home	39.8%
Apartment with 2 to 4 units	0.0%
Apartment with 5+ units	0.0%
Other, please specify	2.8%
I don't know	0.0%

Response	Percent
Central A/C Status (n=108)	
Yes	49.1%
Home Fuel Type (n=108)	
Electricity	33.3%
Natural Gas	62.0%
Propane	0.0%
Other, please specify	4.6%
I don't heat my home	0.0%
I don't know	0.0%
Prefer not to answer	0.0%
Water Heater Fuel Type (n=108)	
Natural Gas	40.7%
Electricity	53.7%
Propane	0.0%
Other, please specify	0.9%
None	0.0%
I don't know	4.6%
Prefer not to answer	0.0%
Home Size (sq ft) (n=70)	
Less than 1,000ft^2	30.3%
1,000-1,999ft^2	51.5%
2,000-2,999ft^2	15.2%
3,000-3,999ft^2	0%
4,000ft^2 or more	3.0%
Housing Age (n=108)	
Before 1950	35.5%
1950 to 1959	12.9%
1960 to 1969	5.4%
1970 to 1979	28.0%
1980 to 1989	7.5%
1990 to 1999	2.2%
2000 to 2009	4.3%
2010 to 2019	0.0%
2020 to Present	0.0%
I don't know	4.3%
Number of people in Home (n=108)	
1 person	32.4%
2 people	30.6%
3 people	15.7%
4 people	10.2%
5 people	4.6%
6 people	1.9%
7 people	0.9%
8 or more people	3.7%
Prefer not to answer	0.0%
Age (years) (n=108)	

Response	Percent
18 to 24	0.0%
25 to 34	7.4%
35 to 44	19.4%
45 to 54	15.7%
55 to 64	13.9%
65 to 75	27.8%
75 or older	13.0%
Prefer not to answer	2.8%
Anyone in home 65 years or older (n=108)	
Yes	54.6%
Annual Household Income (n=108)	
Less than $10,000	8.3%
$10,000 to $19,999	24.1%
$20,000 to $29,999	25.0%
$30,000 to $39,999	14.8%
$40,000 to $49,999	8.3%
$50,000 to $74,999	5.6%
$75,000 to $99,999	0.9%
$100,000 to $149,999	0.9%
$150,000 to $199,999	0.0%
$200,000 or more	0.0%
Prefer not to answer	12.0%
Education (n=108)	
Did not graduate high school	0.9%
High school graduate	26.9%
Associates degree, vocation/ technical school, or some college	48.1%
Four-year college degree	13.0%
Graduate or professional degree	6.5%
Prefer not to answer	4.6%

4.3.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.3.4.1 Conclusions

The following conclusions represent key findings from the Low-Income program survey:

1. **Program Implementation** – The Low-Income Program continues to effectively leverage existing CAP agency weatherization program infrastructure. Program integration has allowed the CAP agencies to take a holistic approach to deep energy efficiency upgrades and expand the measures available to customers.
2. **Program Satisfaction** – Most survey respondents expressed satisfaction with the program overall and reported increased satisfaction with Avista as a result of program participation. Despite mostly high satisfaction rates, some respondents expressed dissatisfaction with the quality of work performed by the CAP agencies.

3. **Program Challenges –** CAP agencies struggle to recruit and retain qualified crew members and subcontractors that meet prevailing wage requirements. Moreover, many income-qualified customers remain underserved due to a lack of funding committed to addressing expensive pre-weatherization health and safety repairs and long application wait times.

4.3.4.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for the Low-Income program moving forward.

1. **Support staff training and trade ally development** – A lack of trained crew members and willing subcontractors in which to partner has reduced CAP agencies' ability to complete projects in a timely fashion and has resulted in a long wait list for the program. Avista should consider sponsoring more Building Performance Center training opportunities for more CAP agencies. Additionally, staff should consider developing and providing vetted lists of qualified trade ally contractors that are willing to work with CAP agencies in their areas. Expanding the trade ally network, may also reduce the travel burden for existing trade allies, as CAP agencies are only able to reimburse travel if five or more projects are scheduled.
2. **Establish funding that supports pre-weatherization repairs** – Continue to develop a deferral maintenance program that assists homes in need of pre-weatherization repairs. Once this deferral maintenance program is rolled out, staff should monitor its usage and determine the level of funding needed in the long term.
3. **Investigate dissatisfied customers due to work quality** – Consider working with CAP agencies to investigate projects of customers who expressed dissatisfaction with the quality of work and equipment installations conducted by the CAP agencies and their subcontractors.

4.4 Home Energy Audit Program

The Residential Home Energy Audit program (HEA) offers customers a comprehensive in-home energy evaluation at no cost to customers. Certified third-party contractors conduct audits that identify areas of concern and make personalized recommendations to improve customer homes' overall efficiency, comfort, and health. Table 4-20 summarizes HEA program activities in 2022 and 2023.

Table 4-20: Summary of HEA projects

State	2022	2023
WA	97	376
ID	24	87
Total	**121**	**463**

4.4.1 Data Collection Activities

The process evaluation of the HEA program included the following data collection activities:

- *Staff Interviews*. The Evaluators conducted in-depth interviews with program staff in August 2022 and 2023.
- *Customer Surveys.* The Evaluators surveyed customers who participated in the program during 2022-2023. Surveys covered a range of topics, including program awareness, participation, and satisfaction.

4.4.2 Staff Interview

This section summarizes the findings from the HEA program in-depth staff interviews.

4.4.2.1 Program Design

The HEA program is designed to educate and generate interest in energy efficiency in general and, more specifically, in Avista's portfolio of residential energy efficiency and renewable-energy programs. Following a successful pilot effort in 2019, Avista received approval to expand the HEA pilot to full program status in both Washington and Idaho in early 2020. Avista, however, had to suspend the program's launch due to the COVID-19 pandemic. Although Avista conducted some virtual audits in the peak of the pandemic, the majority of interested customers opted to wait for an in-person audit. Following the peak of the pandemic, the program experienced an increase in HEA requests in late 2022.

4.4.2.2 Program Administration and Staffing

Avista contracts with a third-party energy auditor in Spokane with a background in professional home inspections. This auditor employs a few additional crew members to help with the program; they are also considering contracting with another company based in the southern region of the states to better meet program needs. Program staff explained that following a lull in program interest during the pandemic, there was an influx of requests in late 2022 resulting in a backlog of customers. At the time of the staff interview in August 2023, program staff reported that managing this backlog had been one of the program's biggest challenges, noting that customer wait times can range from five to six months.

4.4.2.3 Marketing and Outreach

Program staff reported that the aforementioned influx of HEA applications occurred without any advertisements aside from an update on the Avista website in 2022. The staff speculated that the surge of applications related to the time of year when heating bills increase, and customers were looking for solutions. Program staff said they are not planning any advertisements or outreach campaigns until the program resolves the pending application backlog.

4.4.2.4 Implementation and Delivery

Program staff streamlined the program process in 2022 by administering an web-based program application form. Once an interested customer completes the online form, a job is created and Avista staff can confirm their qualifications, obtain the necessary customer data (including two years of billing data), and set up a customer job using the "Snugg Pro" reporting system. Once the job is created in Snugg Pro, the auditor receives the application, reaches out to the customer, and conducts the audit. During the audit, the auditor inspects the customer's entire home – from crawl space to attic including appliances, mechanical systems, air leak detection with an infrared scan, and health and safety inspection – and, with customer's approval, installs direct install equipment like LED lightbulbs and water saving measures. Following the audit, the auditor details what occurred into the Snugg Pro system, including photos taken and findings and recommendations provided. The system then produces a report which is sent to both Avista and the customer.

Program staff estimated this process – from the time of online application submission to an audit visit – takes approximately two weeks without a backlog.

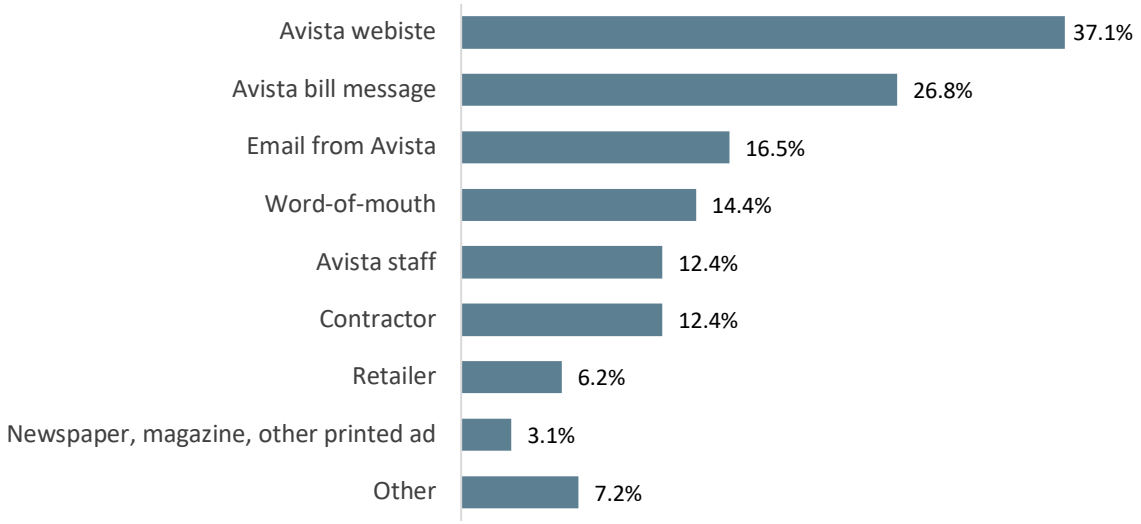
4.4.3 Program Participant Survey Results

Evaluators surveyed 97 unique customers that participated in Avista's HEA program in 2022-2023. Participants were invited to complete a survey via email; contacts received one initial invitation and two reminder emails.

4.4.3.1 Awareness and Motivation

The most popular avenue for program awareness was the Avista website, follow by a bill message (Figure 4-29).

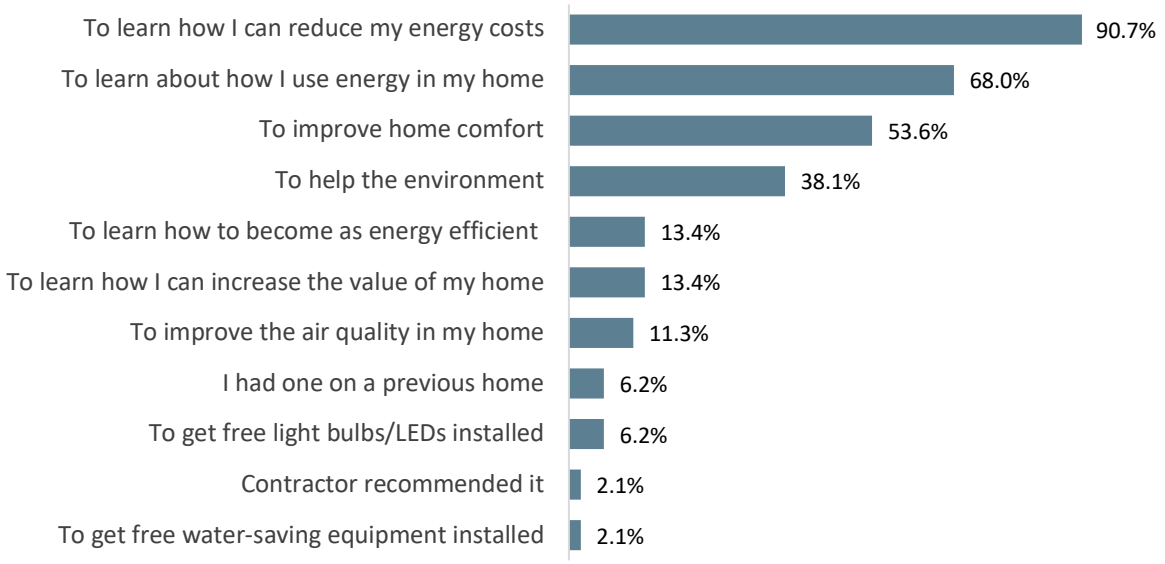
Figure 4-29: Information Source about Avista Programs (n=97, multiple responses allowed)



Across survey respondents who did not participate in the Home Energy Audit program (n=21102), more than half did not know anything about the program (60.3%, n=1,267).

Respondents cited a variety of reasons that impacted their decision to request a Home Energy Audit, most notably a desire to reduce energy costs, to understand their home energy usage, to improve comfort, and to help the environment (Figure 4-30).

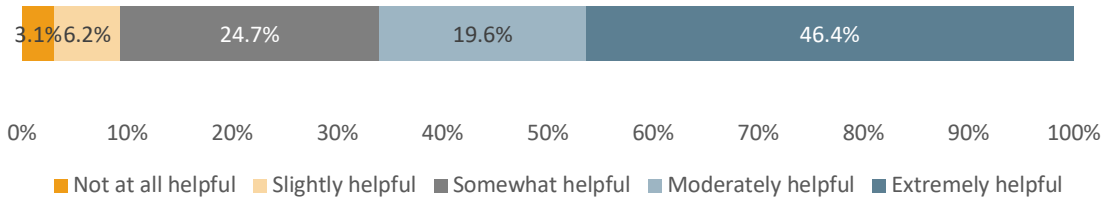
Figure 4-30: Important Reasons to get HEA (n=97)



4.4.3.2 Efficacy of HEA

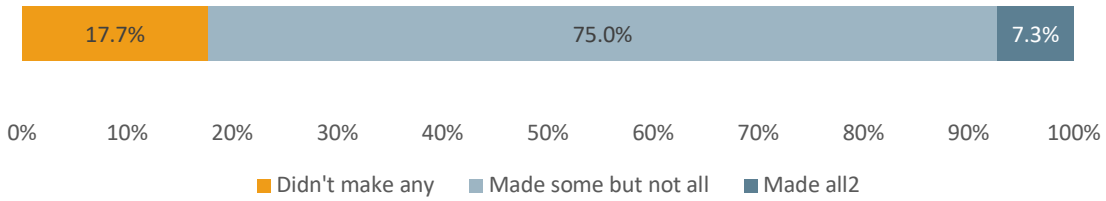
The majority of respondents (90.7%) reported the information they received from the audit was at least 'somewhat' helpful, with almost half (46.4%) rating it 'extremely' helpful. (Figure 4-31).

Figure 4-31: Helpfulness of HEA Recommendations (n=97)



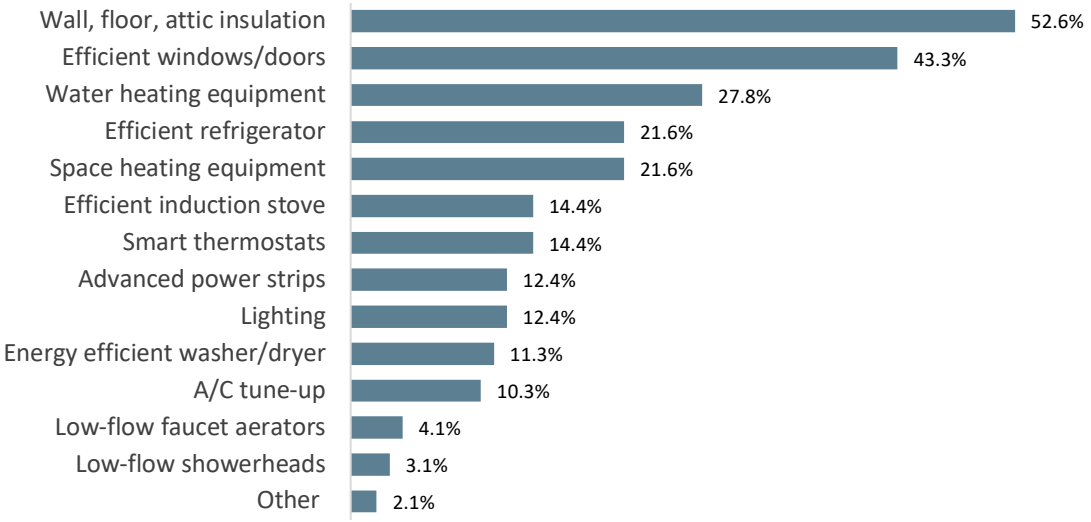
Since engaging in the program, 82.3% of respondents reported that they acted on at least some of the audit recommendations (Figure 4-32). Moreover, more than half of the respondents reported they have plans to make improvements based on the recommendations in the future. Notably, 23% of the surveyed HEA participants reported they have participated in other Avista energy efficiency programs since receiving HEA. Half of these respondents (50%) said HEA recommendations were 'somewhat' to 'extremely' influential in their decisions to do so.

Figure 4-32: Recommended Improvements Made Since HEA (n=97)



Among the recommended improvements, respondents reported they are most interested in but have not yet moved forward with were building shell measures such as insulation and efficient windows and efficient doors (Figure 4-33). Respondents explained that cost (68%), current equipment still being operational (16%), not knowing what to do (12%), and a lack of time (12%) were the biggest barriers to making improvements.

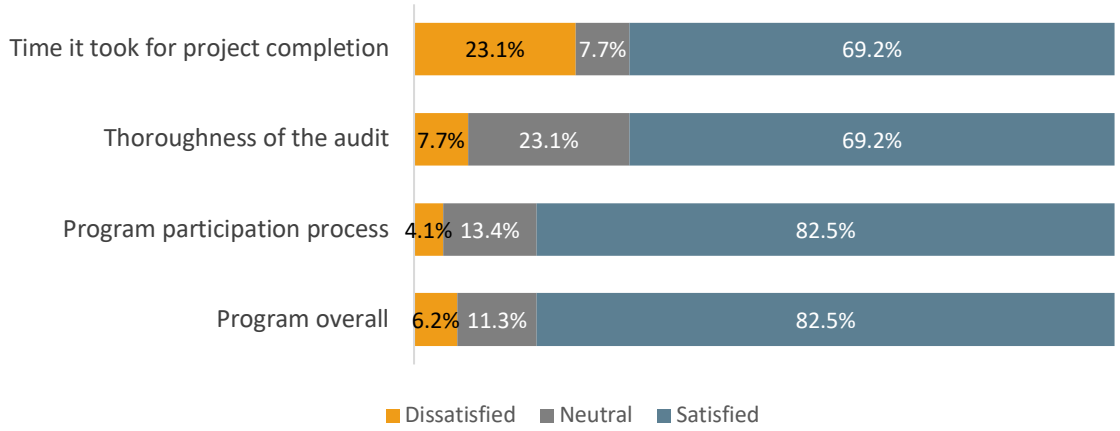
Figure 4-33: Most Interested Improvements Left Undone (n=97)



4.4.3.3 Program Satisfaction

A majority of the surveyed HEA participants reported they were satisfied with the participation process and overall experience with HEA (Figure 4-34). Among respondents who expressed dissatisfaction, the time it took to complete the project was the biggest complaint, followed by the thoroughness of the audit.

Figure 4-34: Program Satisfaction (n=97)



Respondents suggested a variety of recommendations for program improvement (Table 4-21).

Table 4-21: Recommendation for HEA Program Improvement

Recommendation
Provide a list of recommended contractors for recommended improvements. Several participants mentioned that offering vetted contractors that perform each of the recommended improvements would be even more actionable and would provide great value.
Reduce waiting times and improve scheduling. As expressed by the dissatisfied participants with the time it took for project completion, this is another area mentioned frequently. One participant said, “it took 7 months to get done after applying”.
Increase awareness and advertising of the program. These mentions are in response to their positive experience with HEA. Some participants wished that they had learned about HEA offering earlier.
Provide more information beyond just cost savings. Some participants thought that the improvement recommendations focused on cost benefits, but they wished they learned more about non-energy benefits by making recommended improvements including contribution to carbon footprints.

More than three quarters of respondents (77.3%) indicated they were ‘very’ or ‘extremely’ likely to recommend the HEA program to others (Figure 4-35). Additionally, more than two-thirds of the HEA participants (67.0%) said their participation in the HEA program increased their satisfaction with Avista as their service provider.

Figure 4-35: Likelihood to Recommend Avista Programs (n=97)

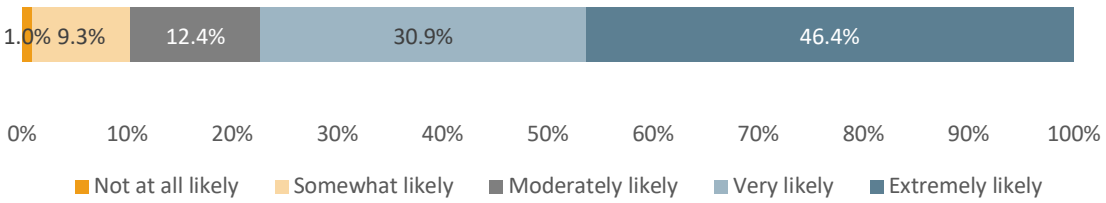
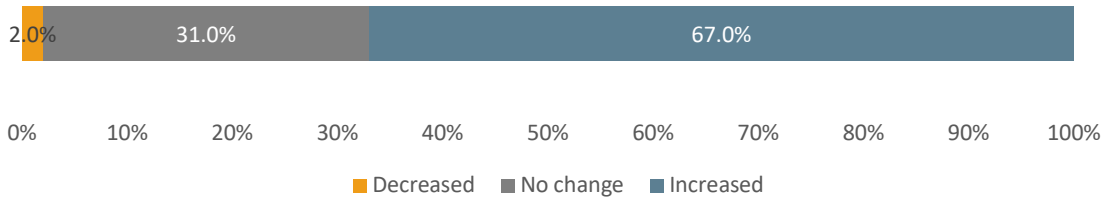


Figure 4-36: Change in Satisfaction with Avista (n=97)



4.4.3.4 Respondent Demographics and Home Characteristics

The Evaluators summarize the HEA program respondent demographics and home characteristics in this section of the report. Table 4-22 presents respondents' demographic and residence characteristics.

Table 4-22: Residence Characteristics and Respondent Demographics (n=varies)

Response	%
Homeownership Status (n=97)	
Own	97.9%
Rent	0.0%
Own and rent to someone else	1.0%
I don't know	0.0%
Prefer not to answer	1.0%
Housing Type (n=97)	
Single-family house detached	90.7%
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	2.1%
Mobile or manufactured home	4.1%
Apartment with 2 to 4 units	0.0%
Apartment with 5+ units	1.0%
Other, please specify	2.1%
I don't know	0.0%
Central A/C Status (n=97)	
Yes	77.3%
Home Fuel Type (n=97)	
Electricity	19.6%
Natural Gas	73.2%
Propane	2.1%
Other, please specify	4.1%
I don't heat my home	0.0%
I don't know	1.0%
Prefer not to answer	0.0%
Total	19.6%
Water Heater Fuel Type (n=97)	
Natural Gas	40.7%
Electricity	53.7%
Propane	0.0%
Other, please specify	0.9%

Response	%
None	0.0%
I don't know	4.6%
Prefer not to answer	0.0%
Home Size (sq ft) (n=86)	
Less than 1,000ft^2	3.5%
1,000-1,999ft^2	44.2%
2,000-2,999ft^2	30.2%
3,000-3,999ft^2	16.3%
4,000ft^2 or more	5.8%
Housing Age (n=96)	
Before 1950	29.2%
1950 to 1959	10.4%
1960 to 1969	3.1%
1970 to 1979	18.8%
1980 to 1989	8.3%
1990 to 1999	15.6%
2000 to 2009	9.4%
2010 to 2019	3.1%
2020 to Present	1.0%
I don't know	1.0%
Number of people in Home (n=96)	
1 person	22.9%
2 people	41.7%
3 people	12.5%
4 people	9.4%
5 people	7.3%
6 people	1.0%
7 people	2.1%
8 or more people	0.0%
Prefer not to answer	3.1%
Age (years) (n=97)	
18 to 24	1.0%
25 to 34	12.4%
35 to 44	16.5%
45 to 54	8.2%
55 to 64	15.5%
65 to 75	34.0%
75 or older	8.2%
Prefer not to answer	4.1%
Anyone in home 65 years or older (n=97)	
Yes	53.6%
Annual Household Income (n=97)	
Less than $10,000	0.0%
$10,000 to $19,999	2.1%
$20,000 to $29,999	3.1%
$30,000 to $39,999	5.2%
$40,000 to $49,999	10.3%

Response	%
$50,000 to $74,999	17.5%
$75,000 to $99,999	11.3%
$100,000 to $149,999	15.5%
$150,000 to $199,999	7.2%
$200,000 or more	3.1%
Prefer not to answer	24.7%
Education (n=97)	
Did not graduate high school	0.0%
High school graduate	7.2%
Associates degree, vocation/ technical school, or some college	16.5%
Four-year college degree	28.9%
Graduate or professional degree	41.2%
Prefer not to answer	6.2%

4.4.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.4.4.1 Conclusions

The following conclusions represent key findings from the Home Energy Audit program survey:

1. **Program Engagement –** Despite a program pause during 2020-2021 due to the COVID-19 pandemic, the program has experienced significant attention and customer interest. Between 2022 and 2023, home audits nearly quadrupled, increasing from 121 in PY2022 to 463 in PY2023. This increase in program popularity has resulted in a lengthy waitlist with customers having to wait 5-6 months to receive an audit.
2. **Program Impact –** Survey respondents suggested that as result of the program, they are more interested in energy saving behaviors and in making energy efficient equipment improvements. Some respondents noted that they engaged in other Avista energy efficiency programs following their home energy audit, indicating that the HEA program is fueling interest in other offerings.
3. **Program Experience** – In general, survey respondents were satisfied with the HEA program. The area with the most dissatisfaction was the amount of time to receive the audit.

4.4.4.2 Recommendations

Based on of the above conclusions, the Evaluators suggest the following recommendations for the Home Energy Audit program moving forward.

1. **Address the backlog issue** – Program staff should continue to prioritize resolving the pending application backlog to reduce wait times and improve customer satisfaction. Recommendations include hiring additional auditors or streamlining the auditing process to lessen burdens on participating customers.
2. **Provide a list of recommended contractors** – Consider providing a list of vetted contractors to customers to help them make the recommended improvements more actionable for homeowners interested in completing the recommended energy efficiency upgrades.

3. **Other programs follow-on activities** – Increase coordination with other the Avista energy efficiency programs to increase the rates of actions taken on the recommended improvements. Specifically, program staff should share participant information with other programs' staff and suggest they follow up directly to assist with the auditor recommendations specific to the audited household.
4. **Track the HEA referral process**– Although it is still too early to analyze the effect of the HEA program in terms of subsequent participation in other Avista programs, as more than half of the survey respondents noted they are still planning to implement the audit recommendations, Avista should develop a system to easily track HEA program participants' participation in other programs.

4.5 On Bill Repayment Program

The On-Bill Repayment (OBR) Program offers homeowners and small business customers in Washington access to financing options for qualified energy-efficiency upgrades; this program is not currently available in Idaho. Beginning in October 2021, Avista started offering OBR through a third-party lending partner, the Puget Sound Cooperative Credit Union (PSCCU). OBR offers zero-down and low-rate loans for energy-efficient projects that can be more easily tracked and paid back through their monthly utility bill. OBR is not intended for customers who qualify for Avista's Low-Income Weatherization program and who can therefore be served directly through the partnering community action agencies.

Table 4-23 summarizes OBR program activities in 2022 and 2023.

Table 4-23: Summary of OBR Projects

Measure Type	2022 (n=75)	2023 (n=108)
HVAC	56	60
Insulation	9	23
Windows & doors	12	19
Water heater	2	0
Appliance	1	0

4.5.1 Data Collection Activities

The process evaluation of the On Bill Repayment Program included the following data collection activities:

- *Staff Interviews*. The Evaluators conducted in-depth interviews with program staff in August 2022 and 2023.
- *Customer Surveys*. The Evaluators surveyed customers who participated in the program during 2022-2023. Surveys covered a range of topics, including program awareness, participation, and satisfaction.

4.5.2 Staff Interview

In this section, the Evaluators summarize the findings from the OBR program staff in-depth interviews.

4.5.2.1 Program Design

The main goal of the On Bill Repayment (OBR) program is to provide additional support and encouragement for customers to choose energy-efficient options by participating in Avista's portfolio of residential energy efficiency and renewable-energy programs. OBR is not designed to generate its own

savings, but savings are claimed by native programs. The program was constructed in response to a Washington Utilities and Transportation Commission order.

Customers qualify for OBR financing for a wide range of energy-saving measures such as HVAC, windows and doors, insulation, lighting, appliances; loans last up to 180 months and can be as high as $30,000 for residential customers and $75,000 for small business customers. Program staff underscored an ongoing concern regarding federal interest rate; they explained high interest rates have made it difficult for the program to buy down interest rates, and thus the APR has increased precipitously since program inception, topping out at 5% at the time of the interview in August 2023 and 7.5% in March 2024.

4.5.2.2 Program Administration and Staffing

Avista contracts with a third-party lending partner, Puget Sound Cooperative Credit Union (PSCCU), for loan management. This partnership is supported by the Clean Energy Fund grant from the Washington State Department of Commerce and is part of a broader effort to maintain low interest rates for participants. Program staff reported high satisfaction with this partnership.

4.5.2.3 Marketing and Outreach

At the onset of the program in October 2021, Avista advertised OBR opportunity through bill inserts and newsletters. Avista also promoted the program through its trade ally network via sweepstake incentives for successful loan applications. Program staff reported that these campaigns proved successful, and OBR is gaining traction.

4.5.2.4 Implementation and Delivery

Program staff indicated that the OBR process has been straightforward, citing a lack of implementation challenges so far. Interested customers apply for loans via a PSCCU online form. PSCCU then reviews and approves the application and distributes the loan balance to the contractor upon project completion. The OBR loan payment then appears on the customer bills within 30-60 days.

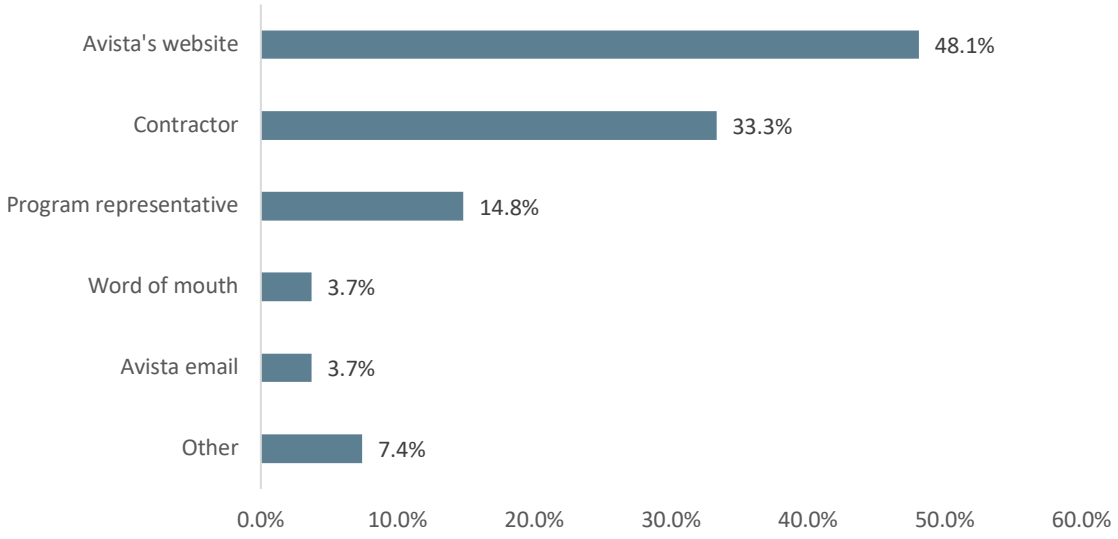
4.5.3 Program Participant Survey Results

Evaluators contacted all available OBR participants and received responses from 27 unique customers who participated in Avista's OBR program in 2022-2023. Participants were invited to complete a survey via email; contacts received one initial invitation and up to two reminder emails.

4.5.3.1 Awareness

Most surveyed OBR participants (48%) reported that they first learned about OBR opportunity from sources of Avista – including its website, emails from Avista, or Avista program staff. A third of the participants (33%) said they heard about it from their contractors.

Figure 4-37: Information Source about OBR (n=27)

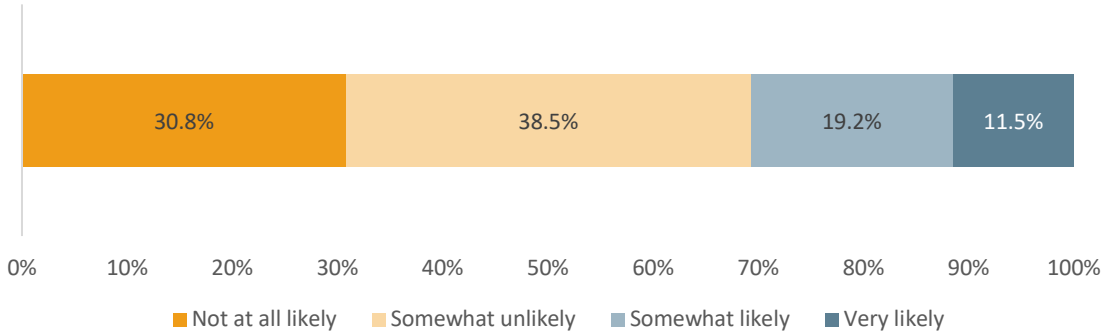


Across survey respondents who did not participate in the On Bill Repayment program (n=1,410), the vast majority did not know anything about the program (81.8%, n=1,154)

4.5.3.2 Efficacy of OBR

More than two-thirds of the respondents (69.4%) reported it was unlikely ('not at all' – 'somewhat') that they would have moved forward with the purchase or installation of the energy saving equipment without the OBR assistance (Figure 4-38). Moreover, 85% of the participants said that due to OBR, they purchased or installed the equipment sooner than they would have if OBR was not offered. All of these respondents estimated they would have delayed the purchase or installation by at least one year.

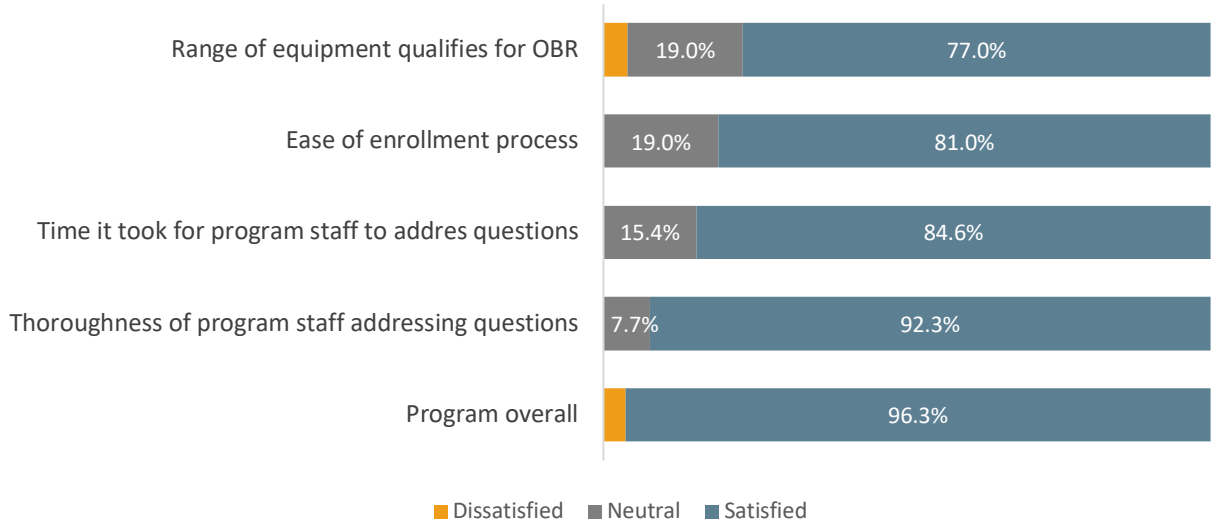
Figure 4-38: Likelihood of Installing or Purchasing without OBR (n=27)



4.5.3.3 Program Satisfaction

The vast majority of respondents (96.3%) expressed satisfaction with the OBR program overall (Figure 4-39). A notable portion of the participants felt neutral about the range of equipment that qualified for OBR (19.0%) and the ease of enrollment process (19.0%).

Figure 4-39: Program Satisfaction (n=27)



Respondents suggested a variety of recommendations for program improvement (Table 4-24).

Table 4-24: Recommendation for HEA Program Improvement

Recommendation
Some respondents who had issues with enrollment or qualification wished that the program could have helped homes with delivered fuel heating or low credit scores.
Respondents mentioned that their contractors did not understand the OBR financing they had arranged and encountered issues with payments.
One respondent wished that Avista's website for online billing could be improved by separating repayment portion from the total billed so that they can more easily understand actual energy cost.

Almost three quarters of the surveyed OBR participants reported that were 'very' or 'extremely' likely to recommend the OBR program to others (Figure 4-40). Additionally, three-quarters of the respondents noted that their participation in the OBR program increased their satisfaction with Avista (Figure 4-41).

Figure 4-40: Likelihood to Recommend Avista Program (n=27)

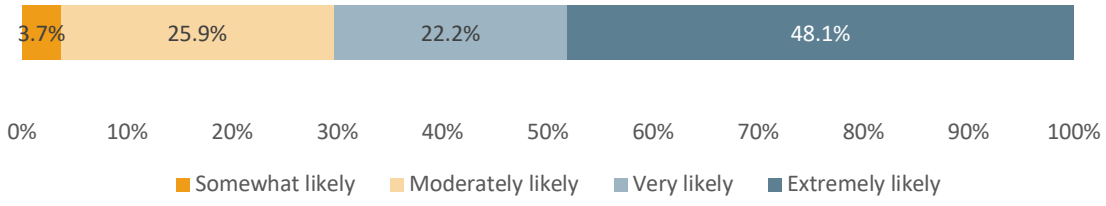
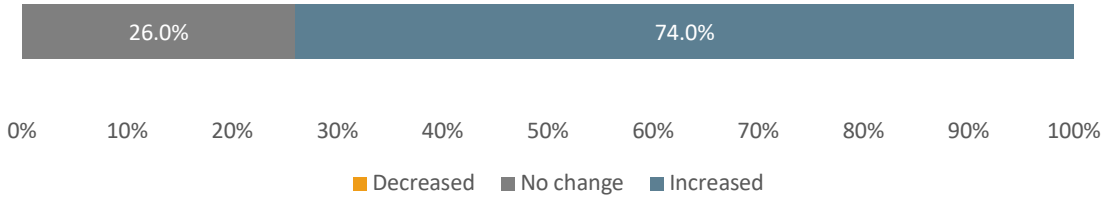


Figure 4-41: Change in Satisfaction with Avista (n=27)



4.5.3.4 Respondent Demographics and Home Characteristics

Table 4-25 presents respondents' demographic and residence characteristics.

Table 4-25: Residence Characteristics and Respondent Demographics (n=varies)

Response	Percent
Homeownership Status (n=27)	
Own	96.3%
Rent	0.0%
Own and rent to someone else	3.7%
I don't know	0.0%
Prefer not to answer	0.0%
Housing Type (n=27)	
Single-family house detached	92.6%
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	3.7%
Mobile or manufactured home	3.7%
Apartment with 2 to 4 units	0.0%
Apartment with 5+ units	0.0%
Other, please specify	0.0%
I don't know	0.0%
Central A/C Status (n=27)	
Yes	70.4%
Home Fuel Type (n=27)	
Electricity	25.9%
Natural Gas	63.0%
Propane	0.0%
Other, please specify	11.1%
I don't heat my home	0.0%
I don't know	0.0%
Prefer not to answer	0.0%
Total	25.9%
Water Heater Fuel Type (n=27)	
Natural Gas	48.1%
Electricity	48.1%
Propane	0.0%
Other, please specify	3.7%
None	0.0%
I don't know	0.0%
Prefer not to answer	0.0%

Response	Percent
Home Size (sq ft) (n=25)	
Less than 1,000ft^2	0%
1,000-1,999ft^2	48.0%
2,000-2,999ft^2	28.0%
3,000-3,999ft^2	20.0%
4,000ft^2 or more	4.0%
Housing Age (n=27)	
Before 1950	29.6%
1950 to 1959	29.6%
1960 to 1969	3.7%
1970 to 1979	7.4%
1980 to 1989	3.7%
1990 to 1999	11.1%
2000 to 2009	11.1%
2010 to 2019	0.0%
2020 to Present	0.0%
I don't know	0.0%
Number of people in Home (n=27)	
1 person	7.4%
2 people	44.4%
3 people	25.9%
4 people	14.8%
5 people	0.0%
6 people	3.7%
7 people	0.0%
8 or more people	0.0%
Prefer not to answer	3.7%
Age (years) (n=27)	
18 to 24	0.0%
25 to 34	11.1%
35 to 44	11.1%
45 to 54	25.9%
55 to 64	29.6%
65 to 75	18.5%
75 or older	3.7%
Prefer not to answer	0.0%
Anyone in home 65 years or older (n=27)	
Yes	22.2%
Annual Household Income (n=27)	
Less than $10,000	0.0%
$10,000 to $19,999	0.0%
$20,000 to $29,999	3.7%
$30,000 to $39,999	7.4%
$40,000 to $49,999	3.7%
$50,000 to $74,999	14.8%
$75,000 to $99,999	14.8%
$100,000 to $149,999	33.3%
$150,000 to $199,999	3.7%
$200,000 or more	3.7%

Response	Percent
Prefer not to answer	14.8%
Education (n=27)	
Did not graduate high school	0.0%
High school graduate	0.0%
Associates degree, vocation/ technical school, or some college	40.7%
Four-year college degree	33.3%
Graduate or professional degree	22.2%
Prefer not to answer	3.7%

4.5.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.5.4.1 Conclusions

The following conclusions represent key findings from the On Bill Repayment program survey:

1. **Marketing** – The OBR program has gained traction through effective marketing campaigns targeted at customers and trade allies.
2. **Increases Energy Efficient Equipment Purchases** – Most OBR survey respondents (69%) reported that they were unlikely to have purchased the energy efficient equipment without the OBR program assistance, and 85% of respondents indicated that the financing helped them make these improvements sooner.
3. **Program Satisfaction** – Survey respondents were generally satisfied with the OBR program and likely to recommend it to others.

4.5.4.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for On Bill Repayment program moving forward.

1. **Education and training of contractors** – Provide more education and training to contractors about the OBR financing process to minimize payment confusion and improve the customer experience.
2. **Online billing information** – Enhance Avista's online billing website to clearly separate the OBR repayment portion from the total billed amount, allowing customers to better understand their actual energy costs as well as remaining financed amounts.
3. **Increased promotion** – Continue to promote the OBR program through various channels, such as bill inserts, newsletters, and trade ally networks, to maintain and increase customer awareness and participation.

4.6 Always On Home Energy Report Pilot Program

The Always On Home Energy Report Pilot (Always On Pilot) seeks to provide customers with more precise information about the types of equipment in their home that are using the most energy and provides suggestions on how to reduce that energy load.

4.6.1 Data Collection Activities

The process evaluation of the Always On Pilot Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed two staff at Avista involved in the administration of the Always On Pilot. These interviews were to collect information from program staff about program design, administration, marketing, and stakeholders.
- *Program Participant Surveys.* The Evaluators conducted surveys with a series of program participants. These surveys covered a range of topics, including program awareness, participation, and satisfaction.

4.6.2 Staff Interview

The Evaluators summarize the findings from the staff in-depth interviews in this section.

4.6.2.1 Program Design

The Always On pilot program launched in July 2022 and encourages residential households to reduce energy usage contributing to the "always-on" load. This "always-on" load, or "idle" load is the portion of daily household energy usage consumed from household devices that have been turned off or are in standby mode, but still drawing power. Desktop and laptop computers, cable modems, video game consoles, and microwaves are some examples of equipment contributing to always-on load. This portion of household load can amount to 20 to 30 percent of a customer's bill. This portion of household energy usage can easily be reduced with low- or no-cost behavioral changes, such as turning off computers when not in use.

The Residential Always-On Load Behavioral Pilot Program makes use of territory-wide AMI deployment by integrating AMI data with machine learning algorithms to identify the always-on load in each household. Avista has identified the top third of residential customers with always-on load and has created three potential groups: two treatment arms and one control group. For the first treatment group, Avista uses this AMI and algorithm information to send communications to customers including personalized information regarding always-on usage, associated costs, tips to reduce the load, and anticipated cost savings each month. For the second treatment group, Avista also delivered an incentive for reducing their always-on load compared to their baseline; however, starting in PY2023, this incentive was removed from the program design. This variation in treatment within similar groups of households will allow cost effectiveness for each treatment type as well as incremental energy savings.

This pilot program was implemented in the second quarter of 2022 and targeted the top third (nearly 25,000 customers) of residential always-on loads.

4.6.2.2 Program Administration

The pilot enrolled 50,000 treatment participants and 25,000 control participants. Treatment participants were split into two groups: group one received monthly emails with energy saving tips and group two received the same monthly emails along with a participation incentive. Staff explained that this pilot represented the first internally implemented behavioral program and cited multiple implementation challenges related to data tracking and data quality.

Despite these challenges as well as low saving results in 2022, the pilot continued in 2023, but with a simplified design. Instead of two treatment groups and one control group, the 2023 version of the pilot

had one treatment and one control group; all treatment participants in 2023 received the same messaging and incentives were removed.

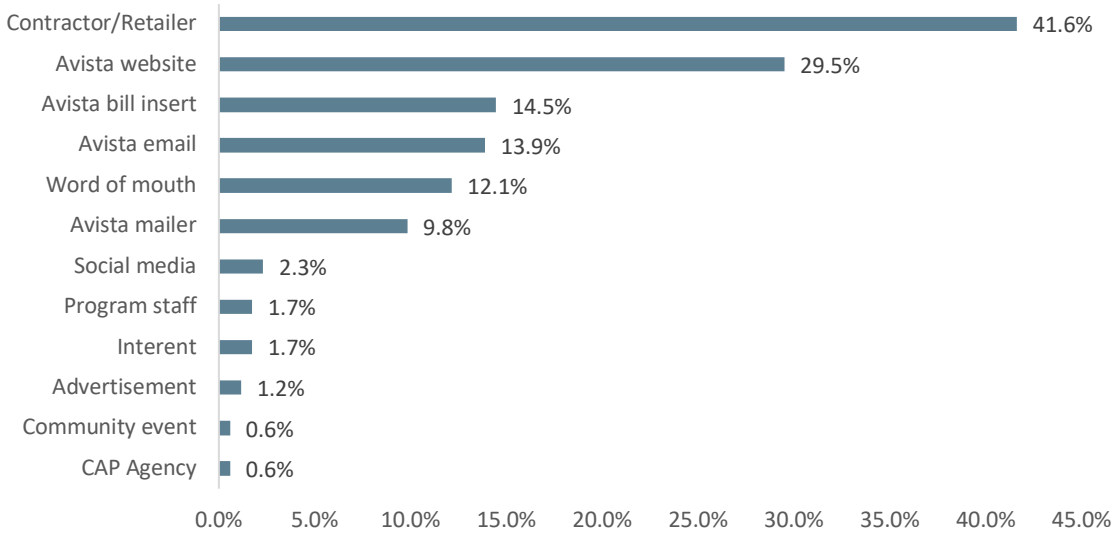
4.6.3 Program Participant Survey Results

The Evaluators conducted a survey of Always On Home Energy Report Pilot program participants to gather feedback about customers' engagement with and experience of the program. Participants were contacted via email up to three times and asked to complete a survey. In total, 173 participants who participated in the Always On Home Energy Report Pilot program in 2022 or 2023 responded to survey efforts.

4.6.3.1 Program Awareness

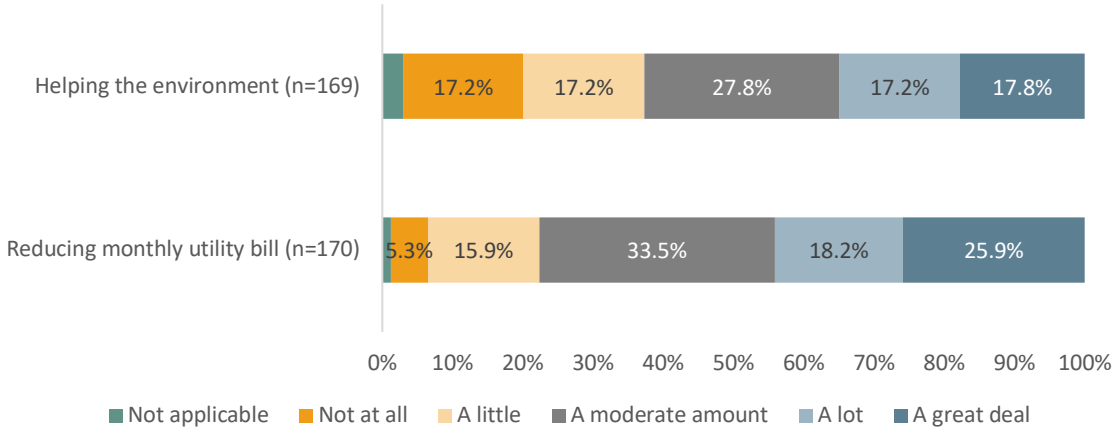
Respondents learned about Avista's energy efficiency offerings through a variety of avenues, most commonly a contractor or retailer (41.6%, n=72) (Figure 4-42).

Figure 4-42: Program Awareness (n=173)



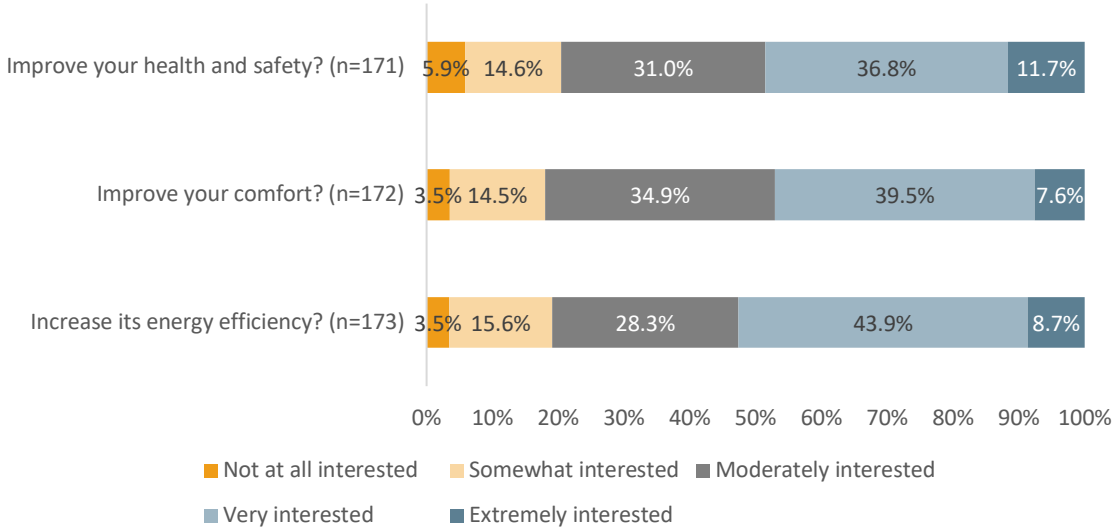
More than one-third of respondents were motivated to participate in the program to reduce their monthly utility bills (44.1%, n=75) and help the environment (34.9%, n=59) (Figure 4-43).

Figure 4-43: Factors Influencing Participation (n=varies)



About half of respondents were very or extremely interested in additional home improvements that would improve their health and safety (48.5%, n=83), improve their comfort (47.1%, n=81), and increase their home's energy efficiency (52.6%, n=91) (Figure 4-44).

Figure 4-44: Interest in home improvements that would… (n=varies)



4.6.3.2 Program Participation

More than half of respondents remembered receiving an email alert from the Always On Pilot (61.3%, n=106). The majority of these respondents noted that when they receive the email they skim through the content (71.7%, n=76); just under one-fifth of respondents read the whole email (18.9%, n=20) (Figure 4-45). Among the 100 respondents who read at least part of the email alert, more than one-third reacted by unplugging their appliances when they are not in use (37.0%, n=37) and 16.0% (n=16) visited Avista's website to learn more about "always on" load (Table 4-26). Among the 16 respondents who visited Avista's website, all but two respondents found the tips in the website to be at least somewhat helpful (n=14).

Figure 4-45: Response to Email Alert (n=106)

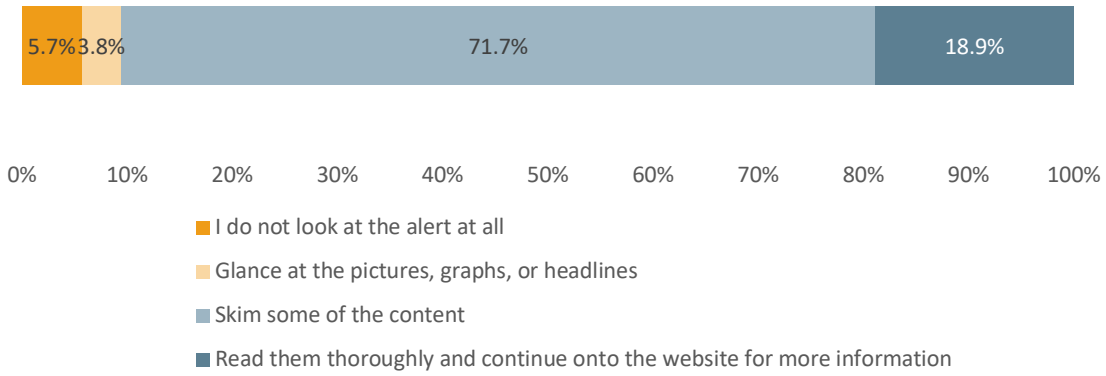


Table 4-26: Post Email Behaviors (n=100)

Behaviors	%	n
Started unplugging appliances when they are not in use	37.0%	37
Save one or more emails for reference	22.0%	22
Discuss one or more emails with others	19.0%	19
Visited Avista website to learn about "always on" load	16.0%	16
Installed advanced power strips	9.0%	9
None of the above	28.0%	28

Respondents indicated that they are interested in learning about other energy usage and reduction tips for a variety of equipment types including water heating, space heating, and space cooling (Table 4-27). Just over two-thirds of respondents would like to receive the same number of updates through the Always On Pilot (68.2%, n=118); 18.5% (n=32) requested more updates and 13.3% (n=23) requested fewer updates.

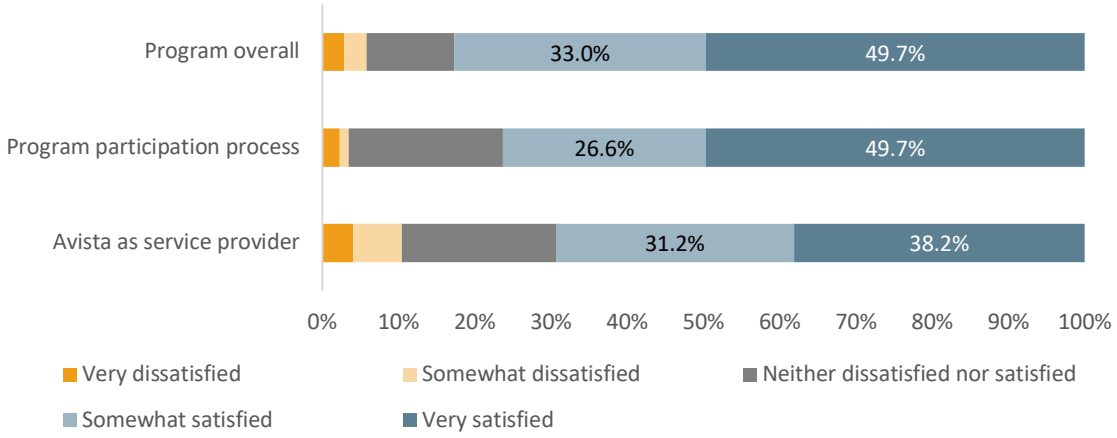
Table 4-27: Interested in learning about energy usage of specific equipment (n=173)

Equipment	%	n
Water Heating	39.3%	68
Space Heating	28.3%	49
Space Cooling	26.6%	46
Lighting	22.0%	38
Laundry	20.2%	35
Cooking	14.5%	25

4.6.3.3 Program Satisfaction

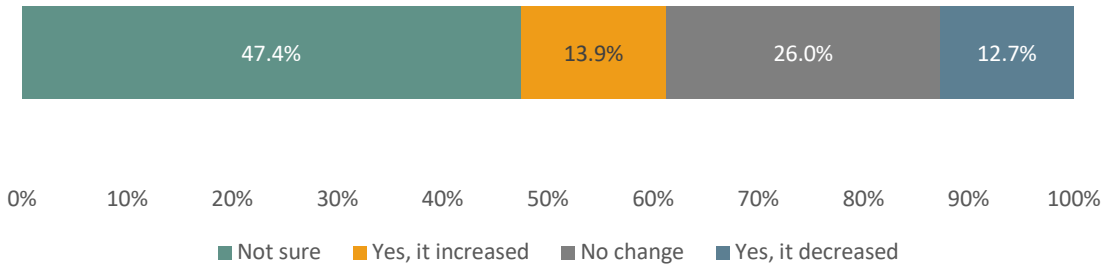
Most respondents were satisfied with the program and Avista as their service provider (Figure 4-46). The majority of respondents considered Avista at least moderately reliable source of information about energy efficient products (82.1%, n=142).

Figure 4-46: Program Satisfaction (n=173)



Perceived changes in respondents' utility bill amounts varied (Figure 4-47), with 12.7% (n=22) of respondents noting their bill decreased, 26.0% (n=45) indicating their bill stayed the same, and 13.9% (n=24) of respondents explaining that their bill had increased.

Figure 4-47: Changes in Utility Bill (n=173)



Respondents provided recommendations for portfolio-wide improvements, including providing financial incentives for more products and providing larger financial incentives (Figure 4-48)

Figure 4-48: Recommendations (n=173)

Recommendations	%	n
Provide financial incentives for additional products	54.9%	95
Provide larger financial incentives	53.2%	92
Share more personalized information about your energy use	31.8%	55
More contractor information	1.7%	3
Reduce utility rates	0.6%	1
Not sure	16.8%	29

4.6.3.4 Demographics

Table 4-8 describes the demographics of survey respondents.

Table 4-28: Demographics (n=173, unless otherwise indicated)

Answer	%	Count
Homeownership		
Own	96.0%	166
Rent	1.7%	3
Own and rent to someone else	1.7%	3
I don't know	0.0%	0
Prefer not to answer	0.6%	1
Building Age (n=169)		
Before 1950	18.9%	32
1950 to 1959	13.6%	23
1960 to 1969	7.1%	12
1970 to 1979	12.4%	21
1980 to 1989	9.5%	16
1990 to 1999	14.2%	24
2000 to 2009	17.2%	29
2010 to 2019	4.7%	8
2020 to Present	0.0%	0
I don't know	1.8%	3
Prefer not to answer	0.6%	1
Heating Fuel Type		
Electricity	24.9%	43
Natural Gas	74.0%	128
Wood	1.2%	2
Oil	0.6%	1
Pellet	0.6%	1
Air Conditioning		
Yes	78.0%	135
No	20.2%	35
I don't know	1.7%	3
Water Heater Fuel Type		
Natural Gas	60.1%	104
Electricity	38.7%	67
Propane	1.2%	2
Not sure	1.7%	3
Home Type		
Single-family house detached	93.6%	162
Duplex, condominium, townhouse	1.2%	2
Mobile or manufactured home	3.5%	6
Apartment with 2 to 4 units	0.6%	1
Apartment with 5+ units	0.6%	1
Not sure	0.6%	1
Household Size (n=172)		
1 person	9.9%	17
2 people	50.0%	86
3 people	16.3%	28
4 people	13.4%	23
5 people	7.6%	13
6 people	2.3%	4
7 people	0.6%	1

8 or more people	0.0%	0
Prefer not to answer	0.0%	0
Age		
18 to 24	0.0%	0
25 to 34	3.5%	6
35 to 44	17.9%	31
45 to 54	17.9%	31
55 to 64	22.0%	38
65 to 75	23.1%	40
75 or older	12.1%	21
Prefer not to answer	3.5%	6
Household member is 65+ years old		
Yes	42.8%	74
Household income		
Less than $10,000	0.6%	1
$10,000 to $19,999	1.2%	2
$20,000 to $29,999	2.9%	5
$30,000 to $39,999	1.7%	3
$40,000 to $49,999	5.8%	10
$50,000 to $74,999	15.6%	27
$75,000 to $99,999	10.4%	18
$100,000 to $149,999	16.8%	29
$150,000 to $199,999	9.3%	16
$200,000 or more	6.9%	12
Prefer not to answer	28.9%	50
Education		
Did not graduate high school	0.6%	1
High school graduate	11.0%	19
Associates degree, vocation/ technical school, or some college	32.4%	56
Four-year college degree	27.8%	48
Graduate or professional degree	23.7%	41
Prefer not to answer	4.6%	8

4.6.4 Conclusions and Recommendations

Based on data collected via interviews and surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

4.6.4.1 Conclusions

The following conclusions represent key findings from the Always On Pilot survey:

1. **Program motivation –**About half of respondents were very or extremely interested in additional home improvements that would improve their health and safety, improve their comfort, and increase their home's overall energy efficiency.
2. **Program participation –** More than half of respondents remembered receiving an email alert from the Always On Program (61.3%, n=106). The majority of these respondents noted that when they receive the email they at least skim through the content (90.6%, n=96). Most respondents are satisfied with the number of updates provided through the program (68.2%, n=118).

3. **Website engagement –** Among the 100 respondents who read at least part of the email alert, more 16.0% (n=16) visited Avista's website to learn more about "always on" load. Of these, all but two found the tips Avista provides on the website to be at least somewhat helpful (n=14).
4. **Desired information –** Respondents indicated that they are interested in learning about other energy usage and reduction tips for a variety of equipment types including water heating, space heating, and space cooling.
5. **Change in bill –** Perceived changes in respondents' utility bill amounts varied. About one-quarter explained their bill remained the same (26.0%, n=45) while 12.7% (n=22) noted their bill decreased and 13.9% (n=24) indicated their bill increased; 47.4% (n=82) could not speak to changes in their bill.

4.6.4.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for the Always On Pilot program moving forward.

1. **Expand content provided in alerts –** Consider including other energy saving tips and recommendations in the email alerts and website, aside from information regarding always on load. Topic areas of interest include information regarding energy efficient equipment as well as other behavior changes customers can make to reduce their energy usage.

4.7 Residential Programs Non-Participants

The Evaluators delivered surveys to a sample of residential non-participants in order to assess barriers to entry, current satisfaction with Avista as a utility provider, and additional insights.

4.7.1 Data Collection Activities

The Evaluators conducted a survey of customers who did not participate in Avista's residential incentive programs to gather feedback on customer knowledge of Avista's offerings, as well as their energy saving behaviors.

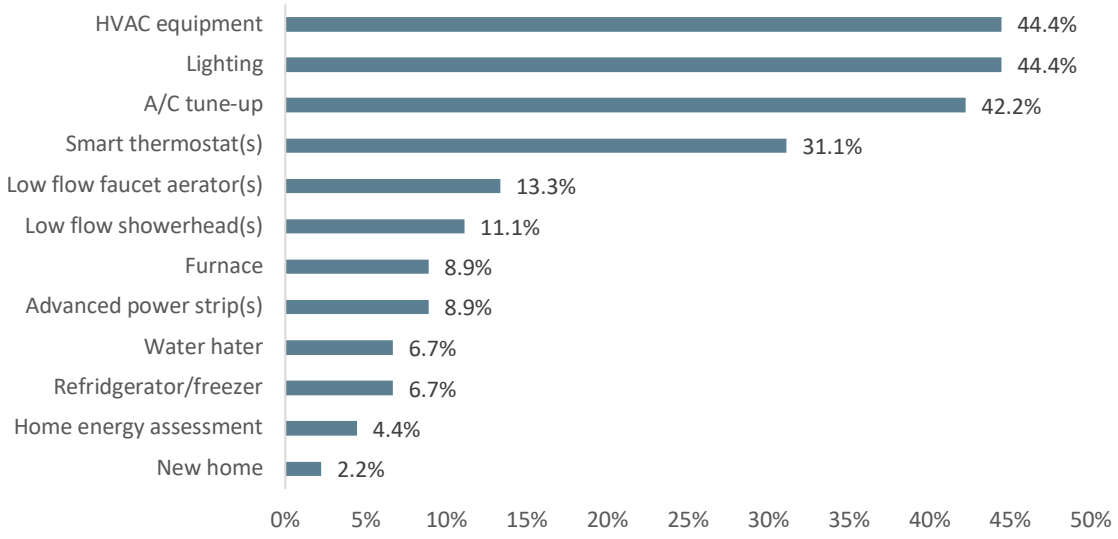
4.7.2 Non-Participant Survey Results

Tracking data included 1,278 customers with an email address. Customers were contacted via email up to three times and invited to complete the survey. One hundred and forty participants responded to the survey.

4.7.2.1 Program Awareness and Engagement

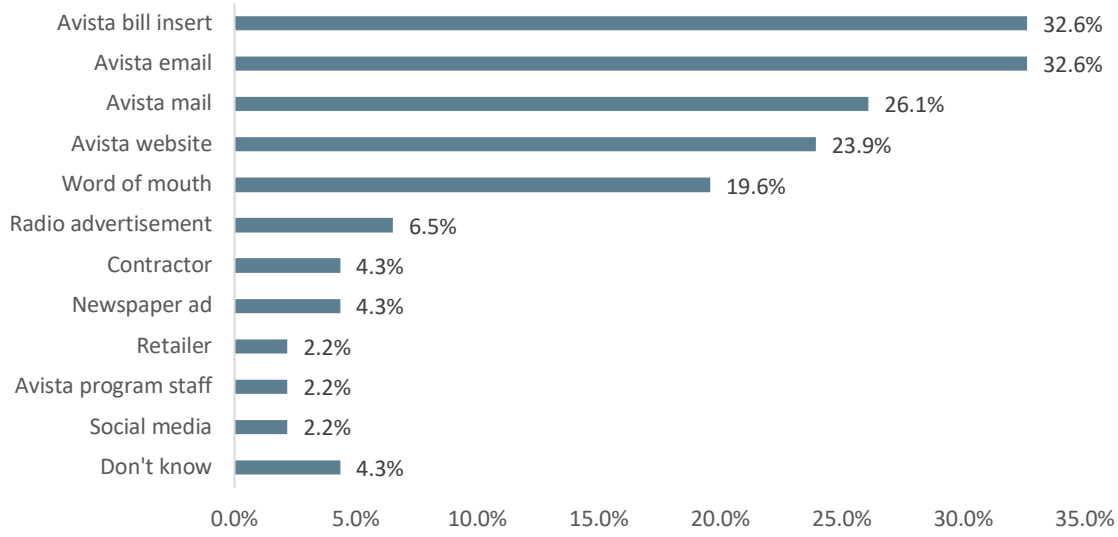
About half of the 140 respondents had not received a home energy assessment, equipment tune up, or replaced equipment in the past three years (48.6%, n=68); 19.3% were not sure if they had received any of those services. Across the 45 respondents (32.1%) who had had an assessment, tune up, or purchased new equipment, HVAC equipment (44.4%, n=20), lighting equipment (44.4%, n=20), and A/C tune ups (42.2%, n=19) were the most popular purchases and services (Figure 4-49).

Figure 4-49: Purchased Equipment (n=145)



More than two-thirds of respondents had never heard of Avista's residential energy efficiency programs (67.1%, m=94). Among those respondents who were aware of Avista programs (32.9%, n=46), messages on utilities bill (32.6%, n=15) or Avista emails (32.6%, n=15) were the most common program awareness sources (Figure 4-50).

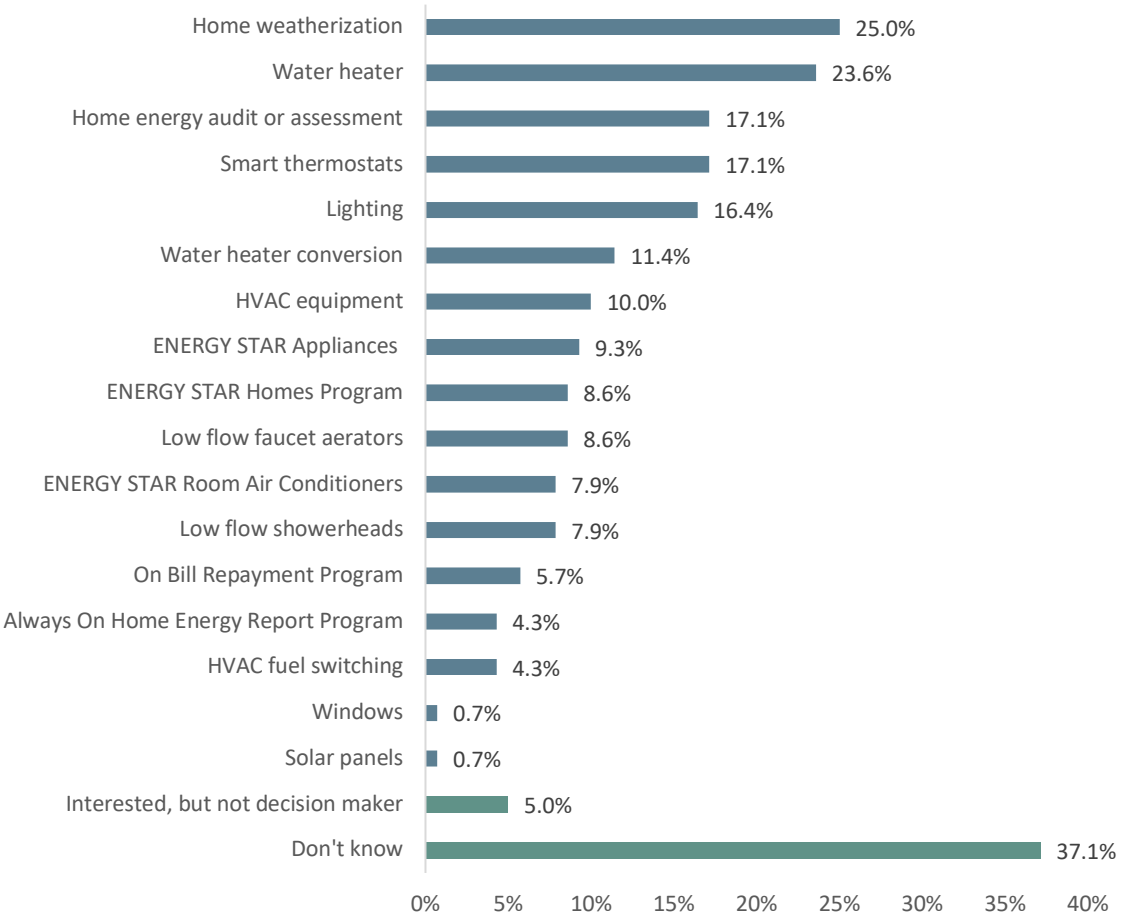
Figure 4-50: Program Awareness (n=46)



Among the 46 respondents who were aware of Avista's programs, about two-thirds were aware of the incentives to replace inefficient equipment (63.0%, n=29); fewer respondents were aware of heating and cooling specific programs (45.7%, n=21), home energy audits (32.6%, n=15), and new construction incentives (23.9%, n=11).

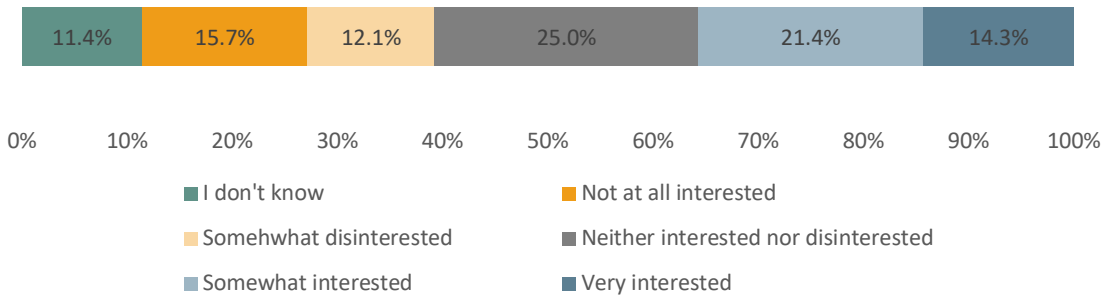
Respondents were most interested in learning more about the weatherization program (25.0%, n=35) and water heater incentives (23.6%, n=33).

Figure 4-51: Interest in Avista Programs (n=140)



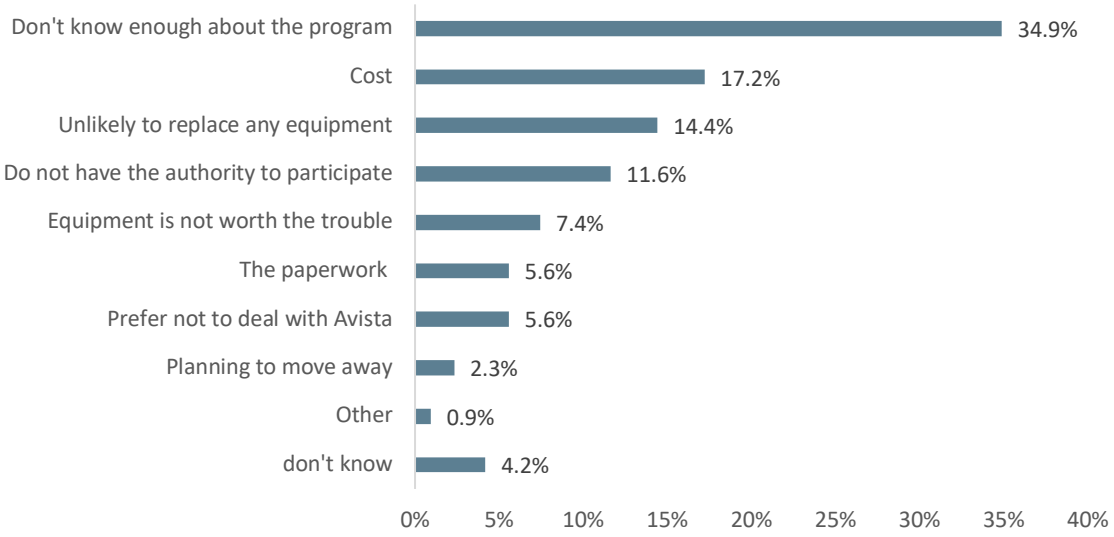
More than one-third of respondents were somewhat are very interested in participating in Avista programs (35.7%, n=50) (Figure 4-52).

Figure 4-52: Interest in participating in Avista programs (n=140)



Respondents cited a lack of information about the programs and cost as the most common reasons for not participating in Avista's energy efficient offerings (Figure 4-53). Most respondents (67.9%, n=102) had some authority to make improvements to their building.

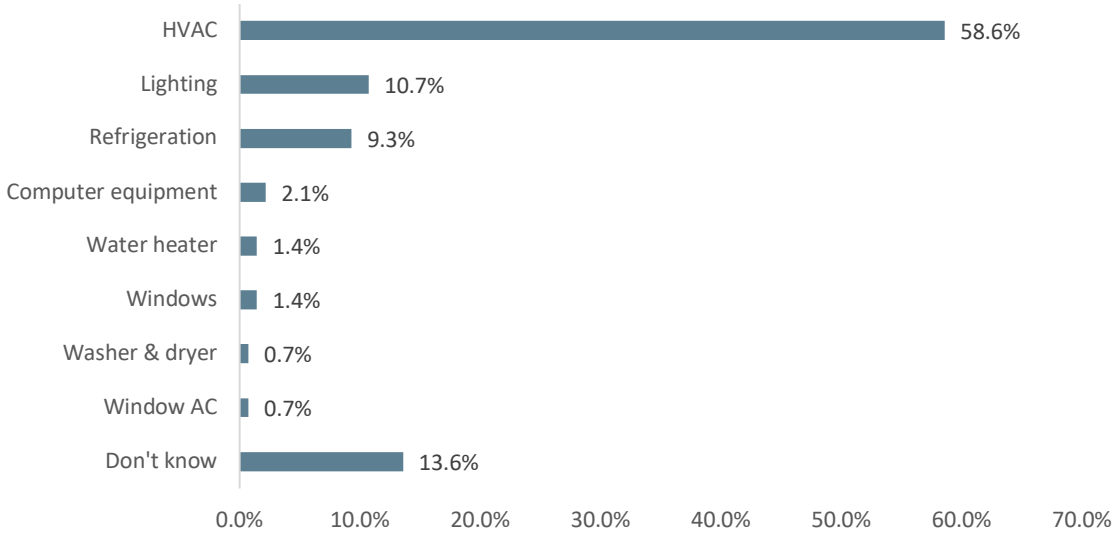
Figure 4-53: Factors preventing participation (n=140)



4.7.2.2 Home Equipment

Two thirds of respondents indicated that their HVAC equipment were their homes' biggest energy consumers (65.9%, n=81) (Figure 4-54).

Figure 4-54: Perceived energy consumption by product type (n=140)



Seventy-one percent of respondents had air conditioning (n=100) and more than half of these respondents had central A/C (60.0%, n=60); half of the A/C systems were less than 10 years old (51.8%, n=71). More than half of respondents had gas furnaces (57.1%, n=80); heating systems ranged in age, with a little less than half being less than ten years old (46.9%, n=60). Half of respondents had their HVAC system serviced in the last three years (50.0%, n=70).

More than half of respondents used programmable thermostats (39.3%, n=55) or smart thermostats (19.3%, n=27). More than half of respondents use LED bulbs in their homes (53.6%, n=75).

4.7.2.3 Demographics

Table 4-29 demonstrates respondents' demographic characteristics.

Table 4-29: Demographics (n=140, unless otherwise indicated)

Answer	%	Count
Home ownership status		
Own	63.6%	89
Rent	32.9%	46
Own and rent to someone else	1.4%	2
Prefer not to answer	0.7%	1
Don't know	1.4%	2
Building age (n=91)		
1980 to 1989	5.5%	5
1960 to 1969	6.6%	6
2000 to 2009	6.6%	6
1950 to 1959	8.8%	8
1970 to 1979	9.9%	9
2020 to Present	9.9%	9
Before 1950	15.4%	14
1990 to 1999	15.4%	14
2010 to 2019	19.8%	18
Don't know	2.2%	2
Heating Type		
Natural Gas	56.4%	79
Electricity	35.0%	49
Pellet/wood stove	3.6%	5
Propane	1.4%	2
Both Gas & Electric	1.4%	2
Oil	0.7%	1
Don't know	1.4%	2
Building type		
Single-family house detached	65.0%	91
Apartment with 5+ units	12.1%	17
Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.)	9.3%	13
Mobile or manufactured home	6.4%	9
Apartment with 2 to 4 units	5.0%	7
Prefer not to answer	0.7%	1
Don't know	1.4%	2
Household Size		
1 person	23.6%	33
2 people	33.6%	47
3 people	10.7%	15

4 people	14.3%	20
5 people	5.7%	8
6 people	3.6%	5
7 people	1.4%	2
8 or more people	2.1%	3
Prefer not to answer	5.0%	7
Age		
18 to 24	3.6%	5
25 to 34	15.7%	22
35 to 44	20.7%	29
45 to 54	22.1%	31
55 to 64	15.7%	22
65 to 75	12.1%	17
75 or older	6.4%	9
Prefer not to answer	3.6%	5

4.7.3 Conclusions and Recommendations

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improving the Residential programs moving forward.

4.7.3.1 Conclusions

The following conclusions represent key findings from the residential non-participant survey:

1. **Program Awareness –** Most of the non-participant respondents were not aware of Avista's energy efficiency rebates and program (67.1%, n=94). Among those respondents who were aware of Avista programs (32.9%, n=46), messages on utilities bill and utility emails were the most common sources of program awareness. Additionally, respondents who were aware of Avista's programs were most familiar with the appliance rebates program and less similar with home energy audit offering and new construction rebates.
2. **Energy efficiency familiarity –** Just under one-third of non-participant respondents had received a home energy assessment, purchased new equipment, or had an equipment tune up in the past three years (32.1%, n=45).
3. **Interest in Avista programming** -- More than one-third of respondents were somewhat or very interested in participating in Avista programs. Respondents were most interested in learning more about the weatherization program (25.0%, n=35) and water heater incentives (23.6%, n=33).

4.7.3.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for residential programming moving forward.

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment, nor offered home energy audits. Staff should consider increasing marketing efforts to better promote the programs and reach a

larger audience. Increased focus should be placed on the weatherization and appliance, furnace, HVAC, and water heating rebate offerings as respondents expressed the most interest in those offerings.

2. **Expand energy efficient tips circulation –** Consider expanding the pool of people who receive tips on how to save energy through various behavioral changes, or expand on behavioral additional energy conservation habits on Avista website. Introducing customers to the concept of energy efficiency may increase future buy-in for equipment purchases and tune ups.

5 Non-Residential Programs Process Evaluation Results

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

5.1 Commercial Prescriptive Rebate Programs

Avista offers a variety of rebates for commercial customers interested in upgrading equipment. Commercial equipment rebates range from lighting measures to HVAC equipment, insulation, food service equipment, and more specialized equipment like grocery store appliances and variable frequency drivers. The following summary includes information pertaining to commercial lighting, appliances, small business direct install, and site-specific programs. Midstream program details are outlined in the next section (Section 1).

5.1.1 Data Collection Activities

The process evaluation of the Commercial prescriptive rebate programs included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed four staff at Avista involved in the administration of the Commercial prescriptive rebate programs. These interviews collected information from program staff about program design, administration, marketing, and stakeholders.
- *Program Participant Surveys.* The Evaluators conducted surveys with a series of program participants. These surveys covered a range of topics, including program awareness, participation, and satisfaction.
- *Trade Ally Interviews.* The Evaluators surveyed trade allies who participated in the Commercial prescriptive rebate programs.

5.1.2 Staff Interview

The Evaluators interviewed four Avista program staff involved in the commercial prescriptive rebate programs. The following summary includes information pertaining to commercial lighting, appliances, small business direct install, and site specific. Midstream program details are outlined in Section 5.1.6.

5.1.2.1 Prescriptive Lighting and Small Business Direct Install

Non-residential lighting measures display the largest energy savings in the commercial portfolio. Lighting measures are available to customers via prescriptive, site-specific, and small business direct install pathways. The prescriptive pathway follows a generalized incentive structure and process, site specific

projects are tailored to individual buildings and customer needs, and small business projects are geared towards small business owners. The lighting pathway covers a variety of lighting measures including lamps and lighting controls. Staff noted that prescriptive lighting measures are more popular in Idaho than Washington.

In response to low participation rates among small businesses, Avista has increased promotional efforts for the Small Business Direct Install (SBDI) program. The SBDI program is implemented by a third-party implementer who contacts approximately 23 local contractors to go into small business and install a variety of direct install measures. Measures are offered to business owners for free and focus primarily on lighting-related equipment. Although the SBDI program has moved some customers away from the prescriptive lighting program, staff noted that it helps fill a programmatic gap and attract previously underserved business owners.

Both the prescriptive lighting and SBDI programs utilize the same trade ally network while the Site-Specific program typically connects with in-house contractors who work directly for the businesses participating in the pathway. Although program marketing is mostly driven by trade allies, Avista account managers also promote the programs to their contacts and Avista advertises the programs via social media.

5.1.2.2 Site-Specific Program

The Site-Specific Program provides calculated incentives to support the installation of qualifying energy efficiency equipment at commercial/industrial sites. These projects typically have a higher degree of complexity than the traditional prescriptive offerings and rely on custom calculations of savings and incentive levels. Examples of these projects include process improvements, upgrades to specialized equipment used in manufacturing, lighting installations that rely on specialized controls, and other measures designed around the customer's specific needs.

Avista's Site-Specific Program is a major component in its non-residential electric offerings. The program approach strives for a flexible response to energy efficiency projects that have demonstrable kWh savings within program criteria. The majority of site-specific kWh savings are composed of custom lighting projects and custom HVAC, envelope, and industrial process load projects that do not fit the prescriptive path. The Site-Specific Program is available to all commercial/industrial retail electric customers, and typically brings in the largest portion of savings to the overall energy efficiency portfolio.

5.1.2.3 Commercial Appliances

In addition to lighting measures, Avista offers rebates for a variety of other measures like variable frequency drivers, HVAC equipment, food service, grocer equipment, and insulation. Between 2022 and 2023 HVAC equipment and food service measures moved to a midstream program, which is further outlined in Section 5.1.6. Most appliance rebate applications are submitted online via iEnergy. Most program outreach is done by trade allies and Avista account managers; Avista staff also market the program online.

Beginning in 2022, compressed air measures moved to a pay-for-performance model, which rebated customers based on energy saved, rather than a flat rate for the equipment purchase. Additionally, staff added a new commercial thermostat measure and clothes washer measure in Washington only (these measures are not offered in Idaho due to cost effectiveness results).

5.1.3 Prescriptive Lighting, Appliances, and Small Business Direct Install Participant Survey Results

The Evaluators conducted a survey to assess Avista's non-residential rebate program. Survey questions focused on participants' awareness of, participation in, and satisfaction with Avista's non-residential prescriptive lighting, appliance rebate, and small business direct install offerings. Participants were contacted via email up to three times and asked to complete a survey. In total, 266 participants who received measures through the non-residential rebate program in 2022 or 2023 responded to survey efforts.

5.1.3.1 Program Awareness

Almost half of the 266 respondents learned about the program via contractors, equipment vendors or energy consultants (48.9%, n=130) (Figure 5-1). Half of the respondents were aware of the program for at least two years (49.6%, n=132). A little more than one-third of respondents were aware that additional rebates exist for non-residential customers (36.5%, n=97). Among these respondents, about half of the respondents were aware of gas-HVAC system rebates and prescriptive lighting related rebates (
Figure 5-2).

Figure 5-1: Program Awareness (n=266)

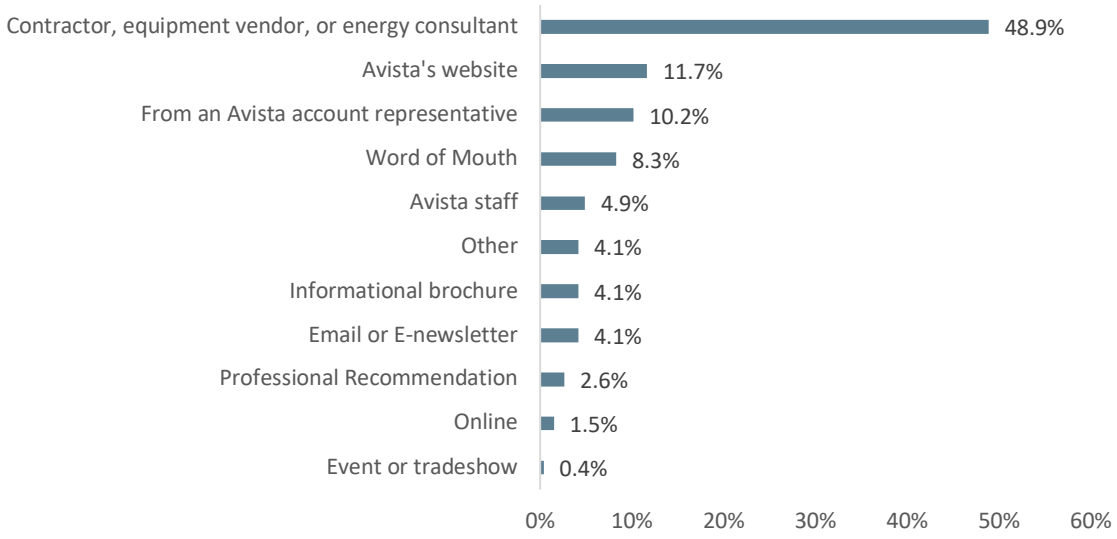
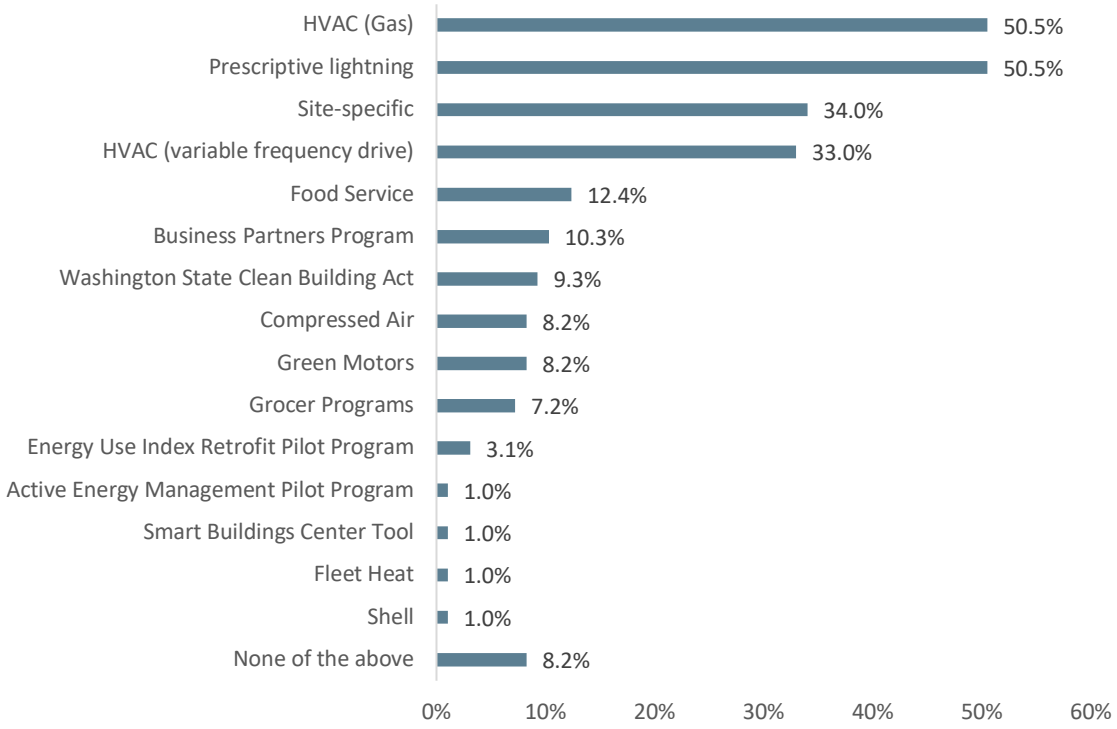
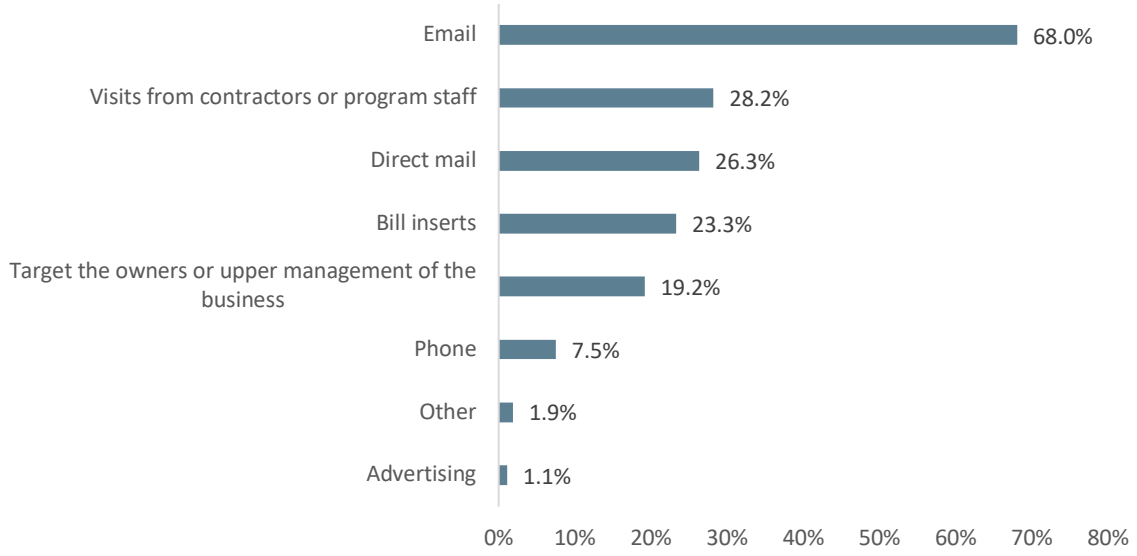


Figure 5-2: Rebate Awareness, by type (n=97)



More than two-thirds of respondents indicated that email was the most effective way to promote rebates to non-residential customers (68.0%, n=180) (Figure 5-3).

Figure 5-3: Contacting firms (n=266)



5.1.3.2 Energy Efficient Equipment Purchasing Behaviors

When replacing equipment, firms tended to focus on reducing costs (75.6%, n=201) and improving performance (65.8%, n=175) (Figure 5-4). The majority of respondents explained that their firms choose to purchase energy efficient equipment instead of standard equipment to save money on utility bills (89.5%, n=238) (Figure 5-5).

Figure 5-4: Motivators for Upgrading Equipment (n=266)

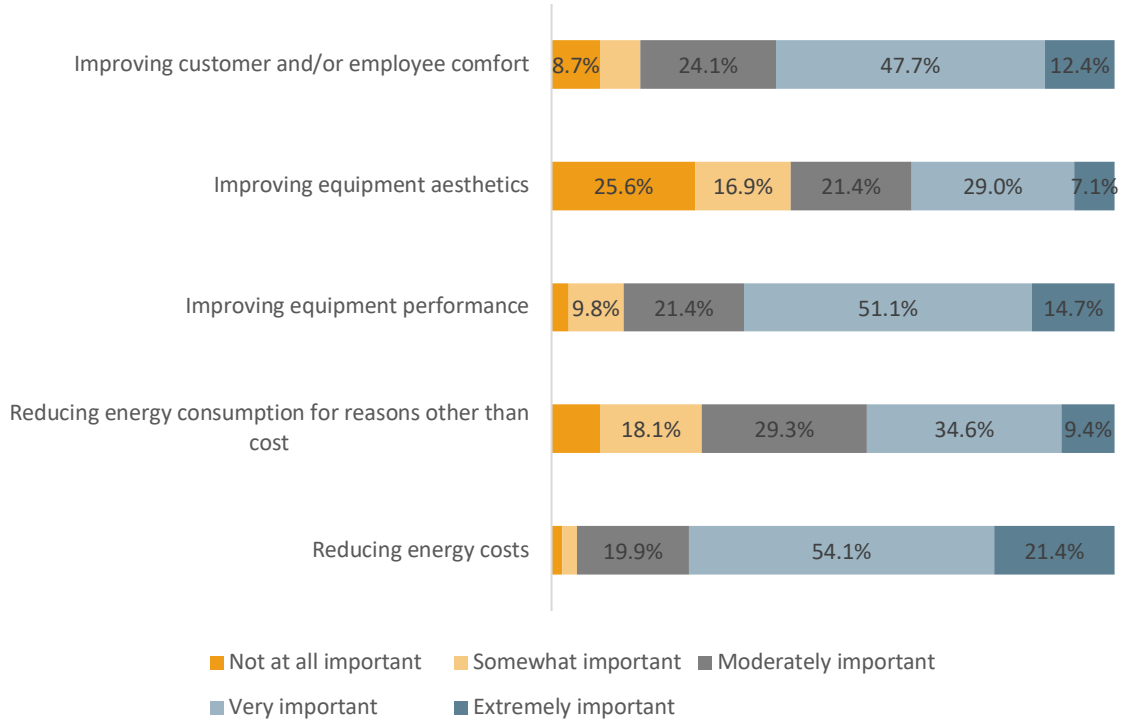
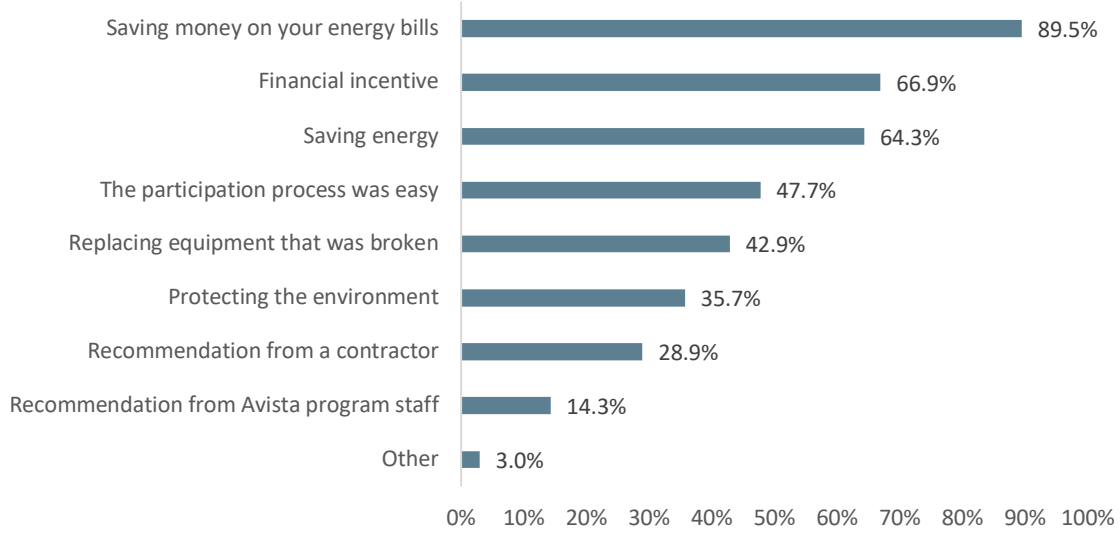


Figure 5-5: Reasoning to purchase energy efficient equipment over standard equipment (n=266)



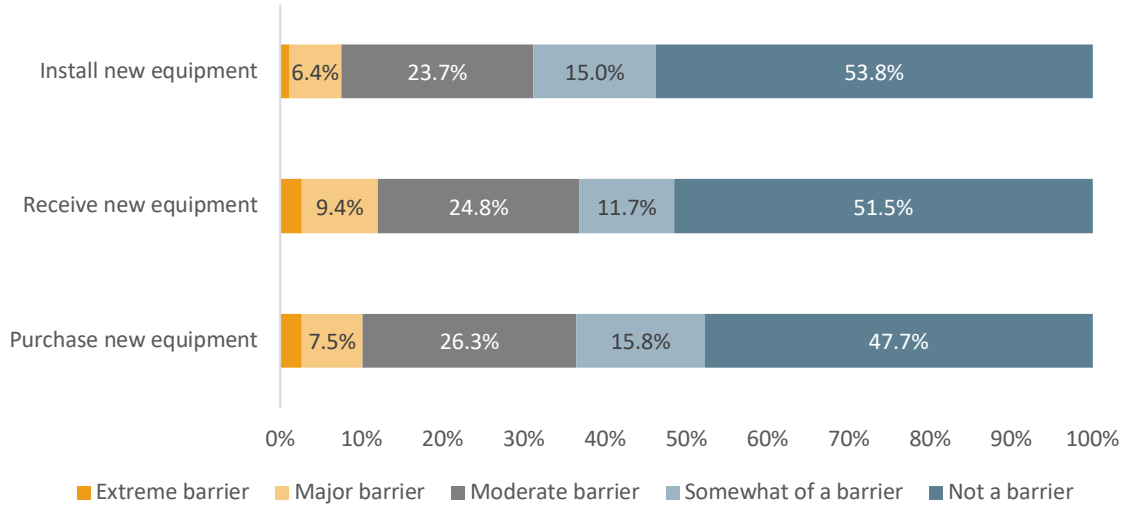
The majority of respondents indicated they faced challenges when trying to install energy efficient equipment (89.5%, n=238). The most common challenges included high initial costs and lack of rebate awareness (Table 5-1).

Table 5-1: Barriers to Purchasing Energy Efficient Equipment (n=238)

Equipment	%	n
High initial cost	56.3%	134
Lack of rebate awareness	46.6%	111
Understanding areas for improvement	31.5%	75
Funding competition	23.9%	57
Long payback period or return on investment	23.5%	56
Do not own the building(s)	20.2%	48
Lack of staff	19.3%	46
Lack of corporate support	2.1%	5
Difficulty finding a contractor	1.7%	4
I don't know	2.9%	7

About half of respondents explained that supply chain issues had not caused major barriers when purchasing, receiving, or installing new energy efficient equipment (Figure 5-6)

Figure 5-6: Supply chain barriers (n=266)



5.1.3.3 Program Participation

Respondents received rebates for a variety of measures, most notably lighting (Table 5-2). Aside from a small proportion of lighting rebate recipients (n=11), all respondents indicated the equipment they received rebates for was still installed and operational. Most lighting (92.7%, n=190) and food service (83.3%, n=5) rebate recipients replaced existing equipment.

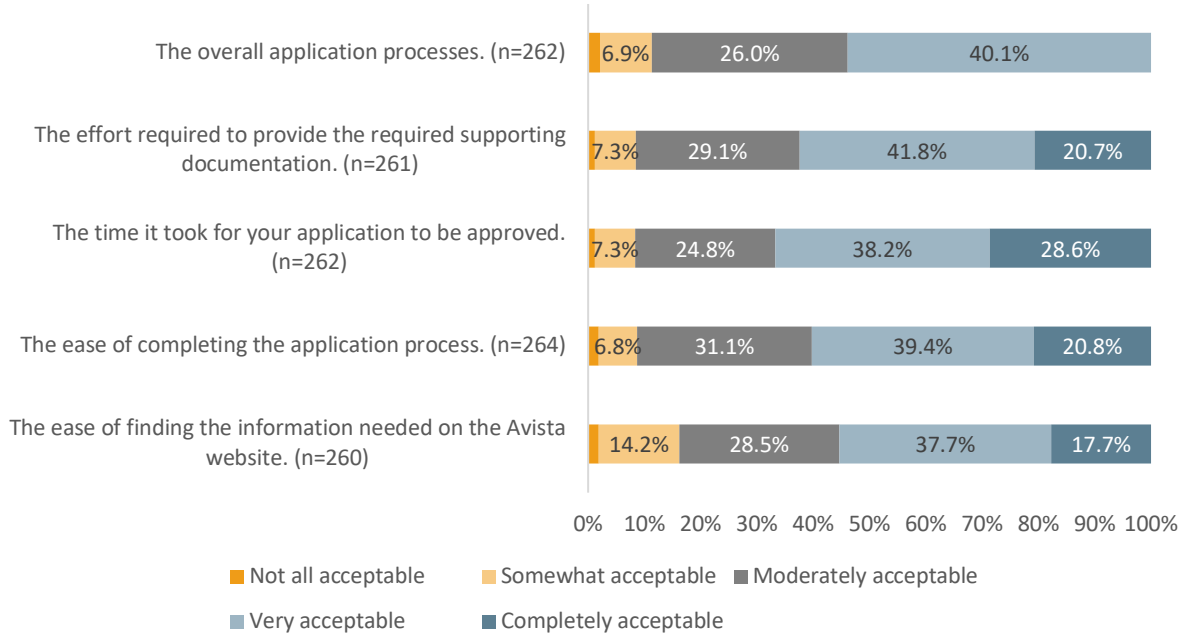
*Table 5-2: Status of Rebated Equipment (n varies)**

Rebated Equipment	Installed		Uninstalled	Don't know
	All	Some		
Lighting (n=205)	194	10	0	1
Furnace (n=16)	16	0	0	0
Insulation (n=12)	12	0	0	0
Food service equipment (n=6)	6	0	0	0
Variable Frequency Drive (n=2)	2	0	0	0
*Does not include 29 small business direct install recipients				

Before participating in the commercial rebate program, more than half of respondents had previously installed energy efficient products (54.9%, n=146). Less than one-quarter of respondents had concerns about the program before deciding to participate (21.4%, n=57). Among those respondents who expressed concerns, financial considerations (n=19) and skepticism about the program's legitimacy (n=17) were the most common hesitations.

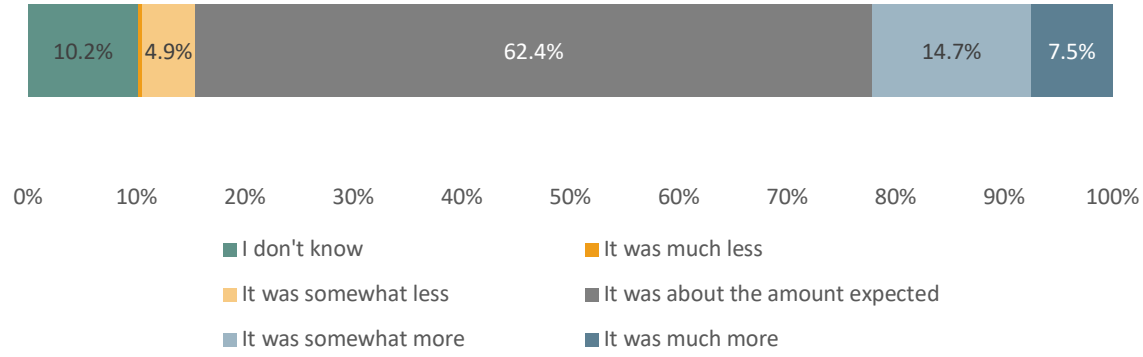
Most respondents found the application clear and easy to complete (78.9%, n=210). In general, applications were completed by the contractor or equipment vendor (53.8%, n=143) or the respondent themselves (35.0%, n=93). More than half of respondents found all aspects of the application process to be acceptable (Figure 5-7). The most problematic aspect of the application process was the ease with which applicants were able to find the information they needed on the Avista website, with 16.2% indicating this process was less than moderately acceptable (n=42).

Figure 5-7: Acceptability of Application Process (n=varies)



More than half of respondents confirmed that the rebate amount was what they expected (62.4%, n=166) and 22.2% (n=59) indicated it was more than they expected (Figure 5-8). Most respondents received their rebate about a month after project completion and (61.7%, n=164) and more than two-thirds of respondents were satisfied with the time it took them to receive the rebate (69.6%, n=185).

Figure 5-8: Rebate Amount (n=266)

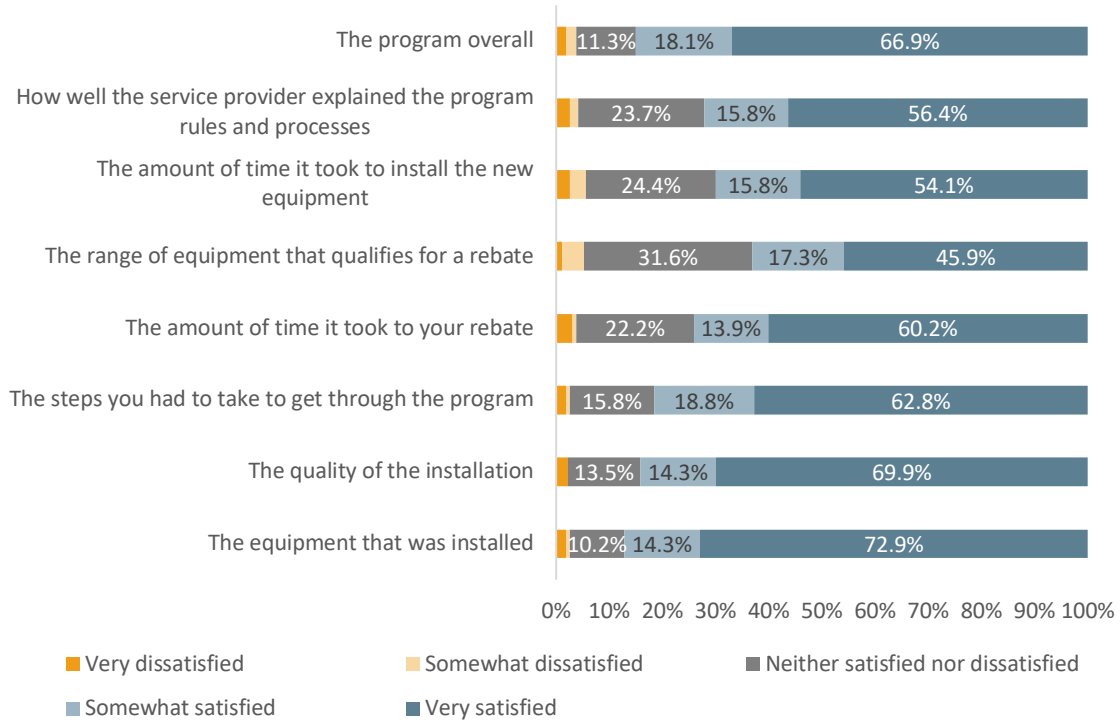


More than one-quarter of respondents confirmed that Avista program staff inspected their project after completion (27.3%, n=73).

5.1.3.4 Satisfaction

Respondents tended to be satisfied with all aspects of the program; the areas with the most dissatisfaction included the range of equipment that qualifies for rebates (5.3%, n=10) and the time it took to install equipment (5.6%, n=14) (Figure 5-9).

Figure 5-9: Program Satisfaction (n=266)



The majority of respondent were satisfied with Avista as their service provider (85.0%, n=226) (Figure 5-10) and participating in the program increased more than half of respondents' satisfaction with Avista (67.3%, n=179) (
Figure 5-11). The majority of respondents indicated they were likely to recommend the program to others (84.2%, n=143).

Figure 5-10: Satisfaction with Avista (n=266)

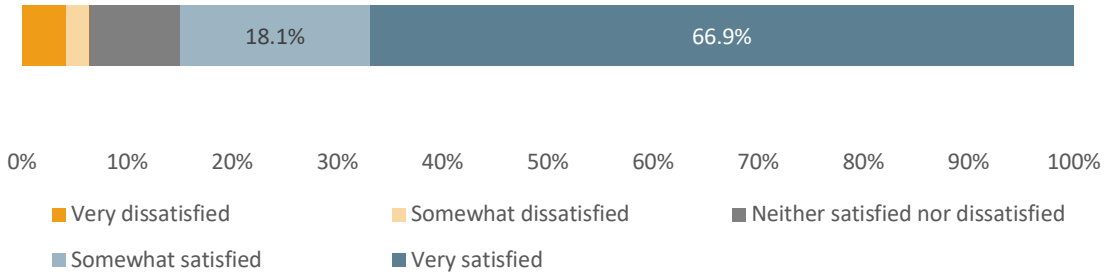
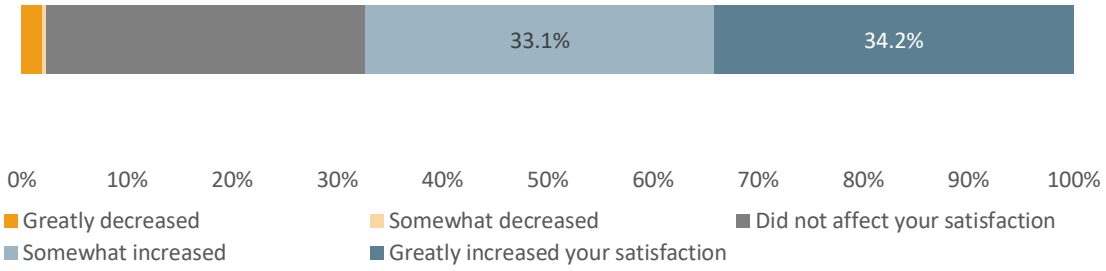


Figure 5-11: Change in satisfaction after program participation (n=266)



5.1.3.5 Firmographics

Table 5-3 describes the firmographic composition of respondents' businesses and Table 5-4 describes firms' policies regarding energy efficiency and energy savings.

Table 5-3: Firmographics (n=266)

Answer	%	Count
Facility Type		
Your company's only location	54.5%	145
One of several locations owned by your company	28.2%	75
Headquarters with other locations	10.2%	27
I don't know	7.1%	19
Facility ownership		
Own and occupy	62.0%	165
We own and rent to someone else	10.2%	27
Rent	20.7%	55
I don't know	3.4%	9

Prefer not to answer	3.8%	10
Respondent role		
Proprietor/Owner	33.1%	92
Board member	15.4%	11
Facilities Manager	12.8%	34
Manager	12.4%	33
President/ CEO	12.0%	32
Other financial/administrative position	5.6%	27
Other facilities management/maintenance position	5.3%	14
Energy Manager	1.9%	10
Chief Financial Officer	1.5%	7

Table 5-4: Company energy efficiency related policies (n=266)

Does company have…	Yes	No	I don't know
…defined roles for monitoring and/ or managing energy usage?	54.1%	41.0%	4.9%
…defined energy savings goals?	56.0%	36.1%	7.9%
…specific policy requiring that energy efficiency be considered when purchasing equipment?	66.9%	24.4%	8.7%
…carbon reduction goals?	73.3%	15.8%	10.9%

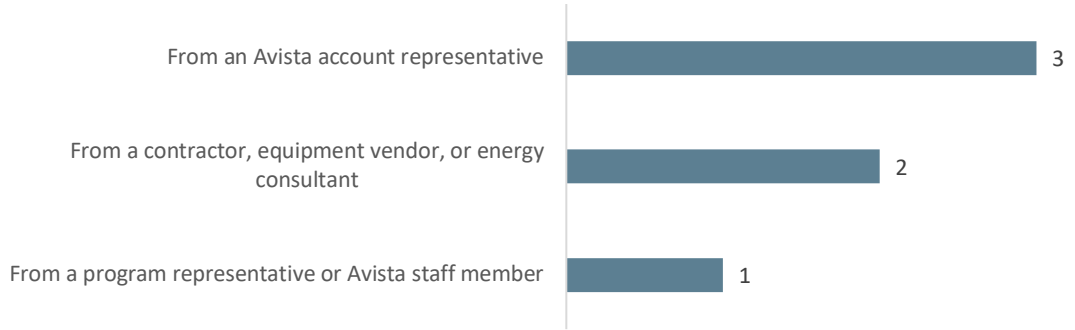
5.1.4 Site-Specific Participant Survey Results

Evaluators conducted a survey to assess Avista's non-residential site-specific program. Survey questions focused on participants' awareness of, participation in, and satisfaction with Avista's non-residential site-specific program. Participants were contacted via email three times and asked to complete a survey. In total, six participants who received measures through the site-specific program in 2022 or 2023 responded to survey efforts.

5.1.4.1 Program Awareness

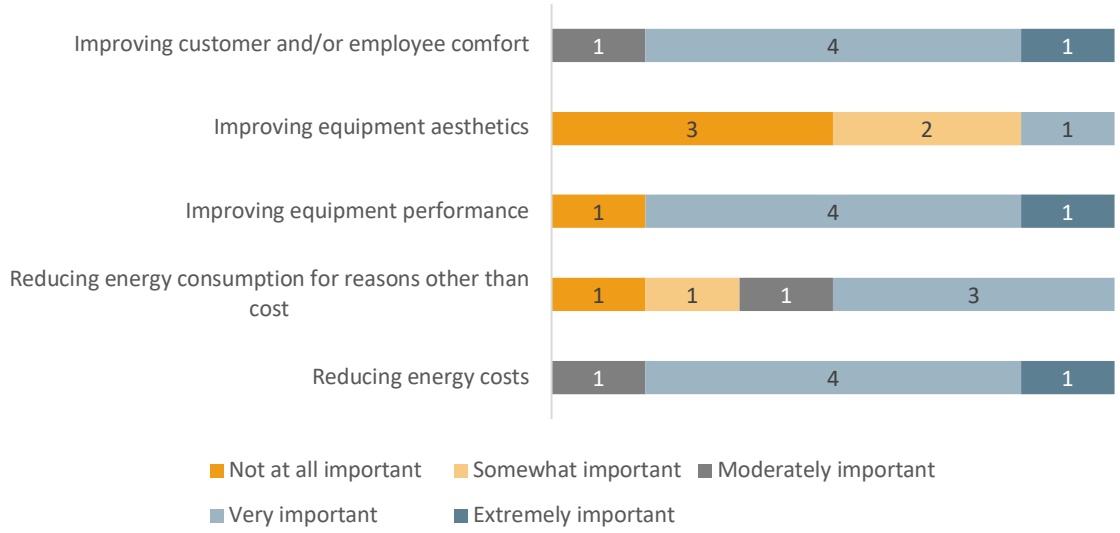
Respondents learned about the program through Avista account representatives, contractors, vendors, or energy consultants, and/or Avista staff (Figure 5-12). Five respondents had been aware of Avista's energy efficient offerings for at least two years; in addition to the site-specific program, respondents were aware of prescriptive lighting program (n=2), the compressed air offering (n=2), and the variable frequency drive offering (n=1).

Figure 5-12: Program Awareness (n=6)



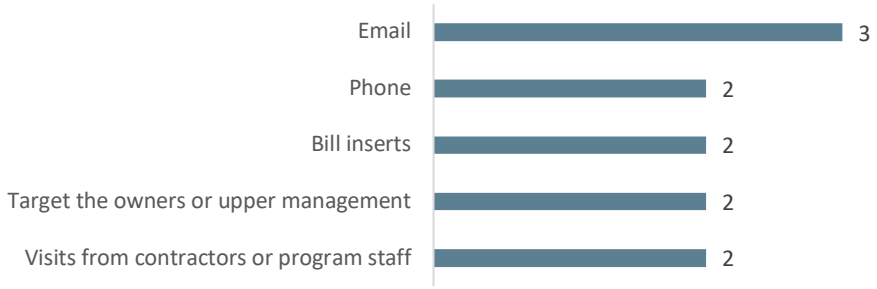
When replacing equipment, respondents noted that reducing their company's energy costs (n=5) and improving customer and employee comfort (n=5) were important motivating factors (Figure 5-13).

Figure 5-13: Motivation to Participate (n=6)



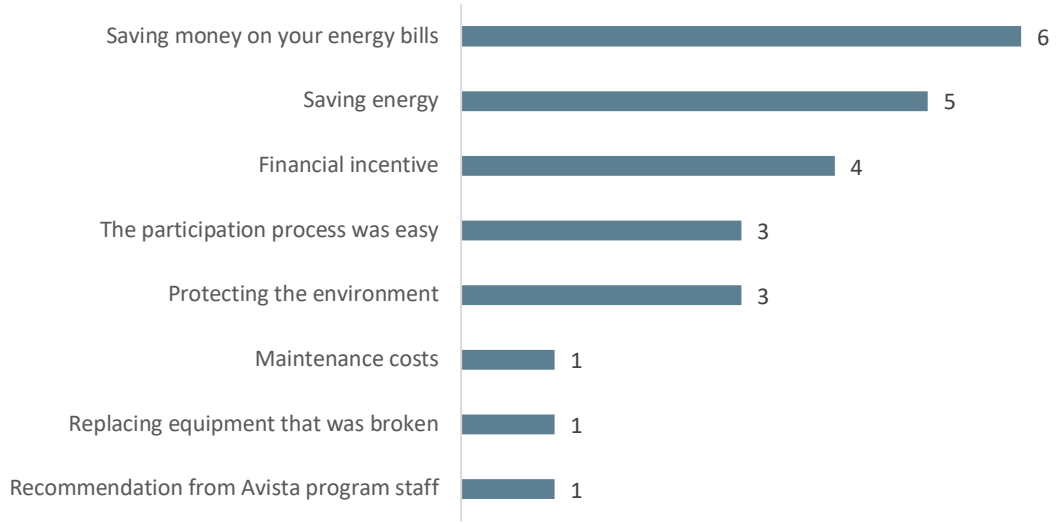
Half of the respondents noted that they prefer utilities connect with them via email regarding new rebates and energy saving opportunities (Figure 5-14).

Figure 5-14: Communication channels (n=6)



Saving money on energy bills and saving energy more generally were respondents' top two motivating factors for installing energy efficient equipment at their facilities (Figure 5-15).

Figure 5-15: Motivations to Participate (n=6)



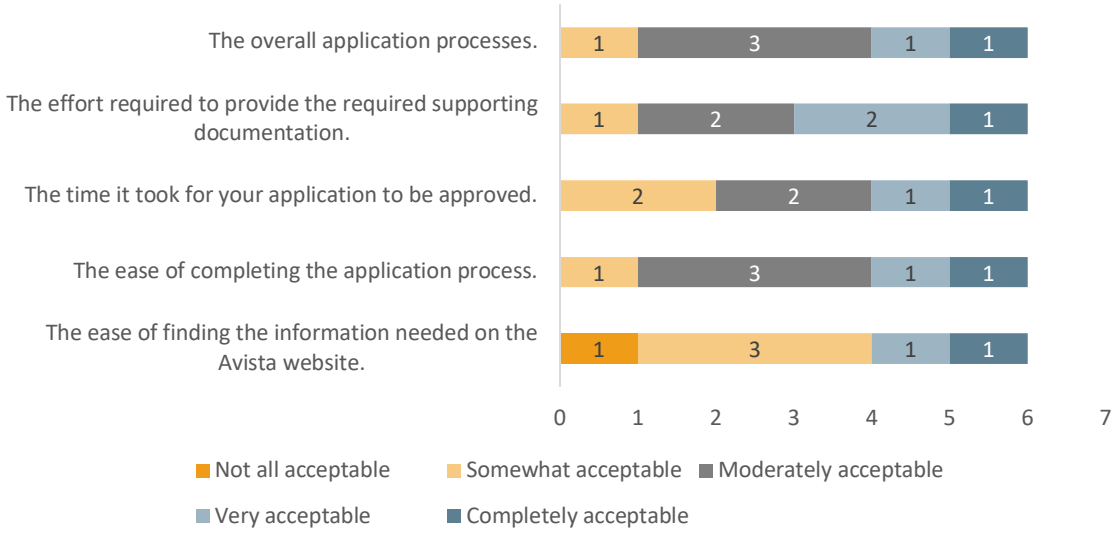
5.1.4.2 Program Participation

Half of the respondents indicated that participation in the site-specific program marked the first time they purchased energy efficient equipment for their facility (n=3). Respondents noted that prior to participation, equipment cost was a concern, but that the rebates helped fill the gap (n=2).

Five of the respondents confirmed an Avista representative came to inspect the project upon completion. These respondents indicated the inspector was very courteous, professional, efficient, and knowledgeable regarding the program (n=5).

Experiences with the program application process was mixed (Figure 5-16). Respondents noted that the information provided on Avista's website was insufficient, application processing times were long, and the process was not always easy. Half of the respondents sought assistance when completing the application to overcome some of these burdens (n=3).

Figure 5-16: Satisfaction with Application Process (n=6)

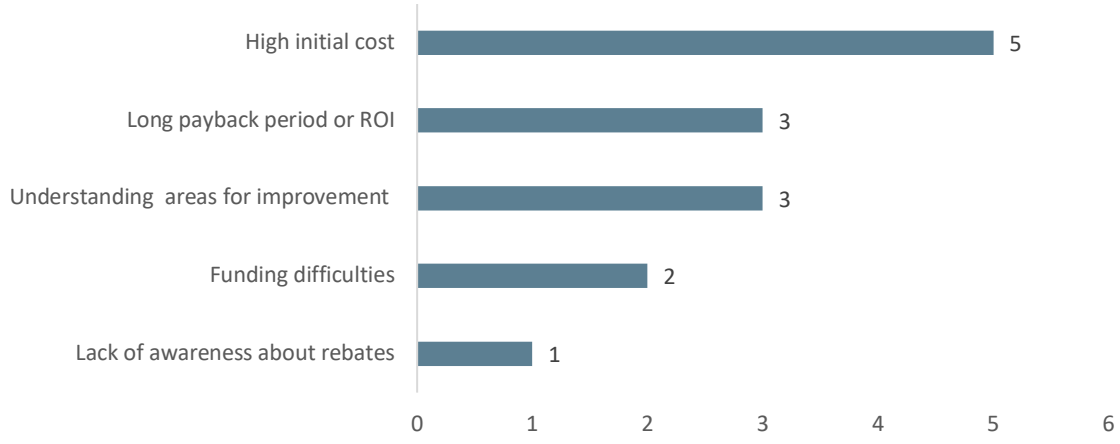


Once applications were processed, program participation experience improved. Five of the respondents confirmed that the rebate amount was what they expected (n=5), and one respondent noted it was larger than they expected (n=1). For most of the respondents the rebate arrived two to four weeks after project completion; the two respondents who waited more than six weeks for their rebate expressed dissatisfaction with the delay.

Respondents cited a variety of program participation barriers including the high initial costs (n=5) and long payback periods (n=3) associated with energy efficient equipment, as well as a general difficulty understanding equipment was most in need of an upgrade (n=3) (Figure 5-17). Three respondents noted that supply chain issues created issues when purchasing new equipment for the planned facility upgrades.

All but one respondent communicated with Avista staff during the program. Half of the respondents noted that staff answered questions in a thorough and timely fashion (n=3).

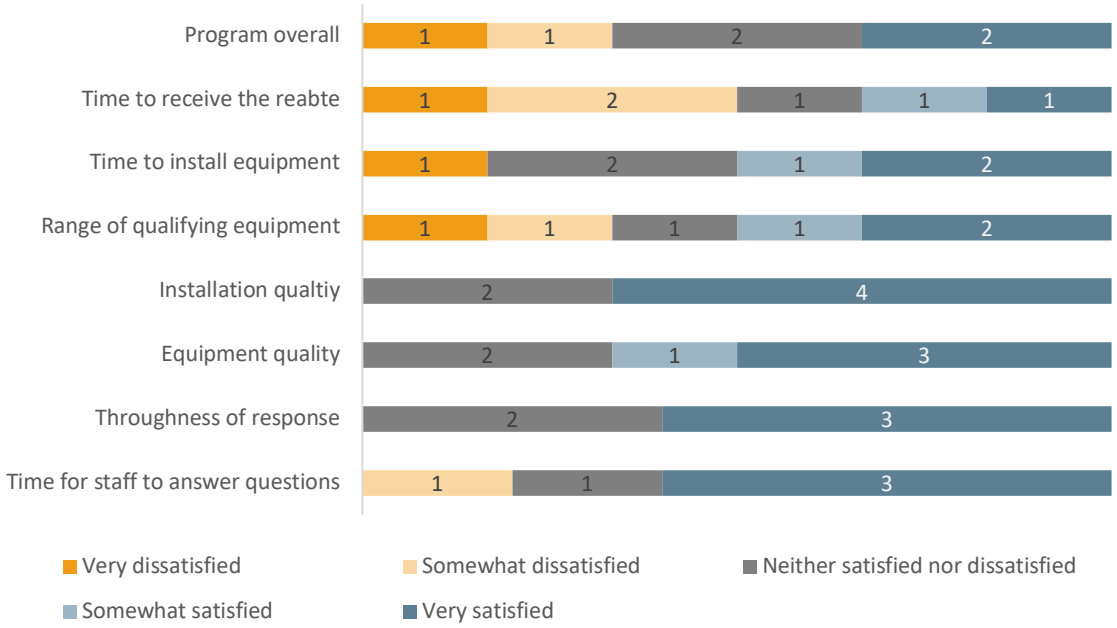
Figure 5-17: Participation Challenges (n=6)



5.1.4.3 Satisfaction

Program satisfaction varied across the six respondents. Respondents expressed higher satisfaction with the quality of the installation (n=4) and equipment quality (n=4), and lower satisfaction with the time it took to receive the rebate (n=3), followed by the range of qualifying equipment (n=2) and program overall (n=2).

Figure 5-18: Program Satisfaction (n=6)



All respondents were either very (n=5) or soemwhat (n=1) satisfied with Avista as thier service provider (n=5). Four of the respondents explained that participation in the site specific program increased their satisfaction with Avista and five respondents indicated they were likely to recommedn the program to others.

5.1.4.4 Firmographics

Table 5-5 describes the firmographic composition of respondents' businesses and Table describes firms' policies regarding energy efficiency and energy savings.

Table 5-5: Firmographics (n=6)

Answer	%	Count
Facility type		
Your company's only location	50.0%	3
One of several locations owned by your company	33.3%	2
The headquarter location of a company with several locations	16.7%	1
Facility ownership		
We own and occupy the facility	83.3%	5
We own the facility and rent it to someone else	16.7%	1
Respondent role		
Facilities Manager	16.7%	1
Other facilities management/ maintenance position	16.7%	1
Chief Financial Officer	16.7%	1

Engineer	16.7%	1
President/ CEO	16.7%	1
Manager	16.7%	1

Table 5-6: Company energy efficiency related policies (n=6)

Does company have…	Yes	No	I don't know
…defined roles for monitoring and/ or managing energy usage?	6	0	0
…defined energy savings goals?	3	3	0
…specific policy requiring that energy efficiency be considered when purchasing equipment?	6	0	0
…carbon reduction goals?	0	3	3

5.1.5 Trade Ally Interview Results

The Evaluators conducted phone interviews with 22 participating non-residential trade allies in 2022 and 2023. A total of 232 contacts were identified and each trade ally was contacted at least three times via email.

5.1.5.1 Background and Program Tenure

Responding trade allies represented a variety of business types (Table 5-7).

Table 5-7: Respondents' Business Types (n=22) (multiple selections allowed)

Business Type	n
Contractors/installers	13
Designers/engineers	2
Distributor	6
Energy service company	1
Manufacturer/Wholesaler	1
Power company	1

Most respondents specialize in lighting equipment (n=18); other specialties included building shell or weatherization services (n=2), food service equipment (n=2), horticulture equipment (n=1), and HVAC equipment (n=1). Thirteen of the responding trade allies serve customers in both Washington and Idaho, while the remaining eight work exclusively in Washington. More than half of the respondents have been involved with the program for several years (n=16); three respondents indicated 2023 was their first year in the program.

5.1.5.2 Engaging Customers

Respondents' target customers varied; five respondents serve residential and commercial customers, 17 respondents serve commercial customers only, and one respondent focuses on horticulture customers. Some respondents rely on word-of-mouth to generate project leads (n=7); other customer engagement strategies include sales team outreach, cold calls, and company marketing materials.

Half of respondents did not know about Avista's program specific marketing materials (n=12), but agreed that it would be beneficial to have. One respondent who was aware of the materials indicated they are confusing (n=1).

> *"if they could lay out the rebate in a way that makes sense to everybody you know, not everybody's the best communicators or salespeople, I think I'm a terrible salesperson, so if they had someone in marketing that made us a nice brochure of it, probably would help." –Trade Ally*

Respondents cited a variety of barriers preventing customers from engaging in the program (Table 5-8).

Table 5-8: Barriers to Participation

Barrier	n
Upfront costs	8
Time to participate	5
Skepticism towards program	2
Available equipment	2
Reluctance towards new technology	1
Application process	1
Rebate requirements	1
Disinterest	1
Lack of autonomy on building design	1

5.1.5.3 Application Process and Program Incentives

Six of the responding trade allies completed the rebate application on behalf of their customers; other respondents noted that customers (n=2) or distributors (n=1) completed the application. Among the six respondents who complete the application for customers, five identified challenges with the process (Table 5-9). Trade allies who were interviewed in 2022 did not comment on the application process.

Table 5-9: Application Challenges

Challenge	n
Confusion over which program to apply	1
Lack of descriptions for eligible light fixtures	1
Process for site-specific projects	1
Address validation tool not always working equipment	1
Midstream program	1

There was no consensus regarding current incentive levels. Eight respondents indicated that the current incentives are comprehensive and generous, while 12 respondents identified incentive level concerns. Eleven respondents also proposed additional measures be added to the program (Table 5-10).

Table 5-10: Incentive Suggestions (n=11)

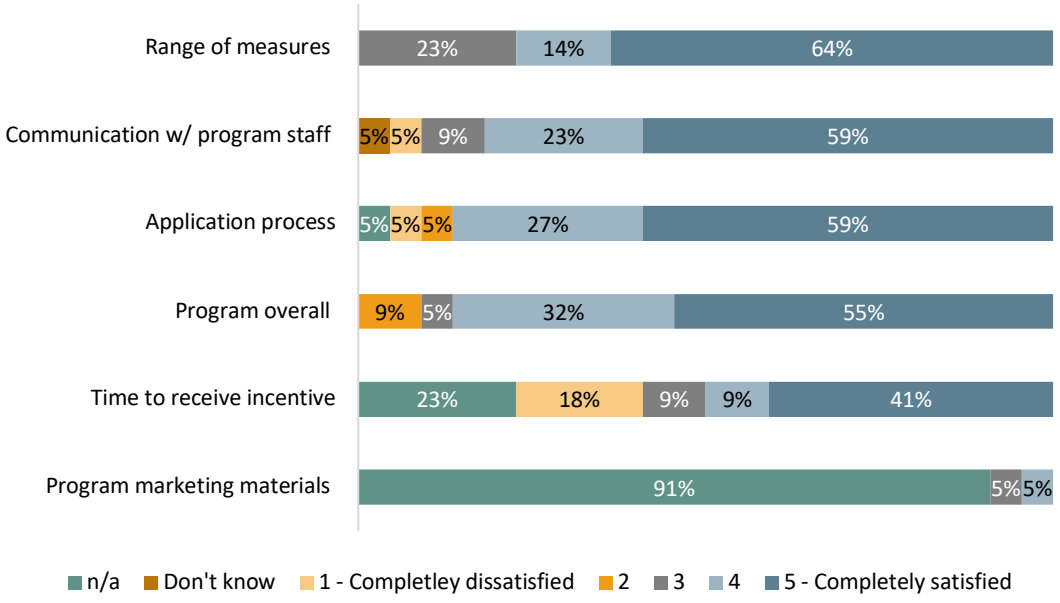
Measures	n
Incentives too low to encourage adoption	4
LED flat panel light fixtures	1
Greenhouse equipment	1
Windows	1
Sports field lighting	1
High output bulbs	1
Sign work	1
Increase lighting incentives in general	1

Increase all incentives	1
Proposed additions	7
Bathroom fan timer switches	1
Dehumidifiers	1
Duct wrap	1
Expanded heat pump options	1
Retrofits for incandescent to LED bulbs	1
Tankless water heaters	1
1500 watt lighting	1
Expanded options for sports lighting	1
Fryers	1
New griddle technology	1
Higher wattage bulbs	1

5.1.5.4 Program Satisfaction and Recommendations

In general, responding trade allies were satisfied with the program. Respondents were most satisfied with the range of measures eligible for a rebate, and least satisfied with the application process (Figure 5-19). Some respondents praised the program's simplicity (n=3), program incentives (n=3), program staff (n=2) comprehensiveness (n=1), and promotion of efficient equipment (n=1).

Figure 5-19: Program Satisfaction



Respondents reported the most challenges with the site-specific pathway (n=4). These respondents highlighted challenges with this pathway, citing confusion over the general process (n=1) and frustration with the length of the M&V review period (n=1). One respondent elaborated on a site-specific project that took over a year to receive a rebate, comparing this wait time to that of other neighboring utilities.

Additional challenges include the new application process regarding midstream distributors introduced in 2023 (n=1), lack of clarity on eligible equipment (n=1), confusion on who receives the rebate (n=1),

confusion on the customer portal (n=1), discrepancies in required information for applications (n=1), getting customer account number or meter numbers for the application (n=1).

Responding trade allies provided recommendations for program improvement. These recommendations ranged from increasing the availability of marketing materials to modifying the application process (Table 5-11).

Table 5-11: Recommendations for Improvement (n=12)

Recommendations	n
Provide Avista branded marketing materials	3
Streamline standard projects via instant rebate options	2
Create a formal trade ally network	1
Add trade ally bonuses	1
Discontinue Midstream program	1
Improve M&V period for site-specific jobs	1
Improve clarity of application process	1
Loosen qualifications for attic insulation	1
Add option for customers to go in and fill out application in-person	1

5.1.6 Conclusions and Recommendations

Based on data collected via participant surveys and trade ally interviews, the Evaluators provide the following conclusions and recommendations for improvement for the commercial rebate program moving forward.

5.1.6.1 Conclusions

The following conclusions represent key findings from the commercial prescriptive rebate program across the prescriptive lighting, appliances, small business direct install, and site-specific pathways:

1. **Program Awareness –** Across the various pathways, survey respondents most commonly learned about the rebate offerings from contractors, equipment vendors, and/or energy consultants. Survey respondents indicated email is the most effective way to communicate with them about rebate opportunities.
2. **Marketing Materials –** Half of the interviewed trade allies did not know about Avista's program-specific marketing materials (n=12), but agreed these resources would be useful to have.
3. **Barriers to Engagement –** The upfront cost of energy efficient equipment was the largest barrier to program engagement. Survey and interview respondents explained that firms are motivated to buy energy efficient equipment for the cost savings potential, but often lack the upfront capital to do so.
4. **Prior Energy Efficient Equipment Experience –** About half of the survey respondents across the various pathways noted that they had previously installed energy efficient equipment in their facilities.
5. **Program Experience –** Survey and interview respondents tended to be satisfied with all aspects of the program. Areas of dissatisfaction for both survey respondents and interviewed trade allies included difficulty finding necessary information on Avista's website and the range of eligible equipment.

6. **Site Specific Program Experience –** Interviewed trade allies reported the most challenges with the site-specific pathway offered through the program. These respondents cited confusion over the general process and frustration with the length of time required by the M&V review period.

5.1.6.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for non-residential commercial rebate programming moving forward.

1. **Program marketing –** Continue to deploy customer-focused promotional and marketing campaigns through email communication, as customers identified this as the most favorable method of communication. Consider a wide distribution of Avista-branded marketing materials to trade allies so that the trade allies can better promote and explain the program to their customers.
2. **Eligible Equipment –** Consider expanding equipment eligible for rebates based on trade ally recommendations. Trade ally respondents had more difficulties with the site-specific program than the midstream, prescriptive lighting, appliance rebate, and direct install programs. Integrating more measures into these midstream and downstream rebate pathways may alleviate pressure put on the site-specific pathway.

5.2 MIDSTREAM PROGRAM

Avista designed the Midstream Program to shift the onus of applying for rebates from end-use customers to distributors. Not only does this reduce customers'/contractors' administrative burden (i.e., no need to submit paperwork tracking energy efficient installations), but it is also anticipated to increase high-efficiency equipment options at competitive prices. Midstream rebates provide an immediate discount on eligible products, which appear as a line item on customer invoices. Starting on July 1, 2023, the Midstream Program replaced Avista's residential and commercial downstream space-heating and water-heating programs as well as the commercial food service equipment rebate program.

Through the Midstream Program, Avista seeks to achieve three overall objectives:

- Provide greater long-term, cost-effective savings for residential and commercial customers alike
- Reduce Avista's administrative burden in processing space-heating, water-heating, and commercial kitchen equipment applications
- Accelerate the market transformation of energy-efficient equipment

The Midstream Program provides bought-down equipment to both Residential and Commercial entities. This chapter discusses and presents results only for the non-residential measures.

5.2.1 Data Collection Activities

The process evaluation of the Commercial Midstream Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed one staff at Avista involved in the administration of the Commercial Rebates Program. This interview collected information from program staff about program design, administration, marketing, and stakeholders.

- *Trade Ally Interviews.* The Evaluators surveyed trade allies who participated in the Commercial Midstream program.

5.2.2 Staff Interviews

The Evaluators summarize the findings from the Midstream Program staff in-depth interviews in this section.

5.2.2.1 Program Design

Beginning in 2023, Avista transitioned to a midstream program for a subset of commercial measures. Avista's motivation for the switch to midstream was to achieve high saving goals and minimize customer confusion regarding these equipment types. Staff explained that the midstream model reduces the paperwork burden for customers and allows for more market transformation by focusing efforts on equipment distributors rather than end users. Measures rebated through the commercial midstream program included HVAC and water heating measures, as well as food service measures.

5.2.2.2 Program Administration

Distributors have flexibility in regard to how they utilize the HVAC and water heating incentives provided to them, as incentives can be used for equipment marketing, discounts, and education. Although many distributors pass the rebate onto the customer, they are not required to do so. Food service measure incentives must be passed through to the customer.

In general, despite a slow start to the program, staff have appreciated the midstream model, explaining that it is more efficient and allows for faster rebate processing. At the time of the 2023 interview, staff noted they had engaged eight distributors across both states, with plans to bring on three more. Staff explained that the biggest pain point of the program is explaining to staff and customers why the incentive is no longer being offered directly to the customers.

5.2.3 Midstream Trade Ally Interview Results

The Evaluators conducted phone interviews with five participating midstream distributors. Eight distributors participated in Avista's midstream program in 2023. All eight distributors were invited to participate in an interview; distributors were contacted up to three times via phone and email. Avista's midstream program encompasses both residential and commercial measures; these interviews represent responses from distributors across both sectors. More information regarding the results of these interviews can be found in the residential chapter in Section 4.1.6: Midstream Trade Ally Interview Results.

5.2.4 Conclusions and Recommendations

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

5.2.4.1 Conclusions

The following conclusions represent key findings from the midstream program data collection activities.

1. **Program process** – Midstream distributors highlighted some issues with the website and general application flow of the program, but noted that the program is new.

5.2.4.2 Recommendations

Based off of the above conclusions, the Evaluators suggest the following recommendations for residential programming moving forward.

1. **Increase training opportunities –** Midstream distributors and various trade allies expressed some confusion over the transition to a midstream pathway for certain measures. Consider offering these stakeholder additional training opportunities to explain the transition and the new program processes and requirements.

5.3 Active Energy Management Program

The Active Energy Management (AEM) pilot program provides commercial customers with information on how to improve their energy usage.

5.3.1 Data Collection Activities

The process evaluation of the Active Energy Management Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed one staff member at Avista involved in the administration of AEM pilot. This interview collected information from program staff about program design, administration, marketing, and stakeholders.

5.3.2 Staff Interviews

Starting as a pilot program, the Active Energy Management (AEM) pilot program provides commercial customers with information on how to improve their energy usage. Data collection procedures and information dissemination procedures were based off of data collected from two Avista owned "smart" buildings located in Spokane, WA. The Evaluators interviewed program staff involved with the AEM pilot to learn more about the program design and administration.

5.3.2.1 Program Design

The AEM pilot is a strategic energy management (SEM) program focused on non-capital-based energy efficiency measures. This pilot marks Avista's first foray into an SEM program. Staff recruited customers to participate in the pilot throughout 2021 and experienced some challenges due to the COVID-19 pandemic and staff turnover. The pilot seeks to provide customers with whole building solutions to energy usage, blending technology, engineer expertise, and strategic energy management best practices.

Staff originally hoped to target high energy using customers, but ultimately relied on existing relationships to recruit companies to participate. The pilot is offered in Washington and Idaho and customers represent a variety of business types.

Program participants benefit from receiving real time data on energy usage and identifying equipment in need of improvement. To date, participants have discovered maintenance issues with some of their equipment and made behavioral changes that have resulted in reductions in their utility bills.

5.3.2.2 Program Administration

The AEM pilot is administered by Edo, a third-party implementer. Edo technicians install a box at the participants' building automation server that connects to Avista's larger network so that they can track

specific energy usage data. Edo then uses this data to determine which equipment is and is not working optimally. Edo representatives meet with participants once a month to discuss progress and provide suggestions for improvement. Based on energy usage patterns, Edo representatives may also recommend equipment updates and refer customers to the commercial rebate offerings.

5.3.2.3 Marketing and Outreach

Staff noted the recruitment for the program was slow and eventually relied heavily on existing relationships. Program staff originally underestimated the extent of engineering knowledge the customer contacts needed to have to fully understand, appreciate, and implement program recommendations.

5.3.3 Conclusions and Recommendations

There are no process evaluation related conclusions nor recommendations for the Active Energy Management program.

5.4 Clean Buildings Program

The Clean Buildings Accelerator program provides building owners assistance with meeting Clean Building requirements and support with energy saving efforts. The Evaluators interviewed the program manager of the program at Avista to learn more about the program design and implementation strategy.

5.4.1 Data Collection Activities

The process evaluation of the Clean Buildings Program included the following data collection activities:

- *Avista Program Staff Interviews.* The Evaluators interviewed one staff member at Avista involved in the administration of the Clean Buildings Program. This interview collected information from program staff about program design, administration, marketing, and stakeholders.

5.4.2 Staff Interviews

The Evaluators summarize the findings from the Clean Buildings Program staff in-depth interviews in this section.

5.4.2.1 Program Design

The Clean Building Accelerator (CBA) program consists of an initial orientation session, monthly 2-2.5-hour workshops for four months, a virtual energy scan, monthly 30-min coaching calls, an ENERGY STAR portfolio manager training, and three 2-hour workshops for recent graduates to discuss results and best practices. The program targets commercial building owners in Washington impacted by the HB1257 Clean Building Law and provides them assistance with meeting the law's requirements.

5.4.2.2 Program Administration

The CBA program is implemented by a third-party implementer, Stillwater Energy. Stillwater is responsible for the overall administration and day-to-day communication of the program. Participants receive the various coaching services for free and benefit from specific suggestions tailored to meet their buildings' needs and capabilities.

As of the 2023 interview, one cohort had completed its entire progression through the program, one cohort was midway through the program, and one cohort (cohort number three) was preparing to begin. Each cohort has about six to seven customers. In addition to preparing customers to become compliant with the Clean Building law, program implementers refer customers to Avista's commercial rebate programs if customers need new appliances and/or lighting measures.

5.4.2.3 Marketing and Outreach

Staff market the program through the Avista website and commercial account managers. When recruiting participants, staff prioritize duel-fuel buildings. Staff noted that program recruitment proved challenging, and they have to reduce cohort size goals.

5.4.3 Conclusions and Recommendations

There are no process evaluation related conclusions nor recommendations for the Clean Buildings program.

5.5 NON-RESIDENTIAL NON-PARTICIPANTS

5.5.1 Data Collection Activities

The Evaluators surveyed non-residential customers who did not participate in Avista's energy efficiency programs to gather feedback on customer knowledge of Avista Programs and their company's energy efficient behaviors.

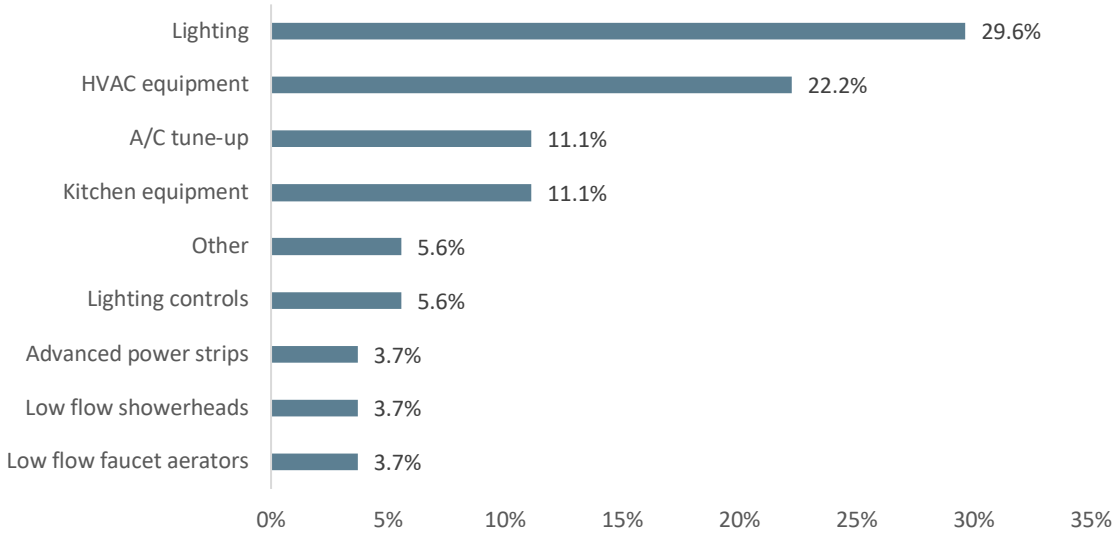
5.5.2 Non-Participant Survey Results

Tracking data included 1,278 customers with an email address. Customers were contacted via email up to three times and invited to complete the survey. One hundred and forty participants responded to the survey.

5.5.2.1 Respondent Behavior

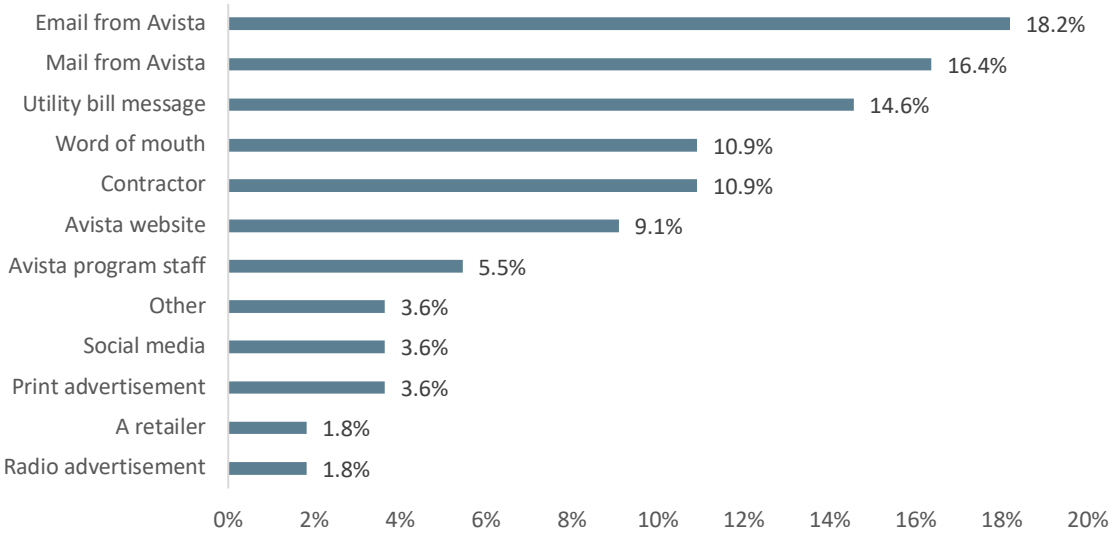
Most of the respondents had the authority to make improvements to their building(s) (62.5%, n=35). Almost half of respondents did not replace or upgrade electrical appliances in the last three years (48.2%, n=27). Among the 24 respondents who did replace and/or upgrade equipment in the last three years, lighting (29.6%, n=16) and HVAC equipment (22.2%, n=12) were the most common (Figure 5-20). None of these respondents were aware of Avista's incentives programs.

Figure 5-20: Upgraded equipment (n=24)



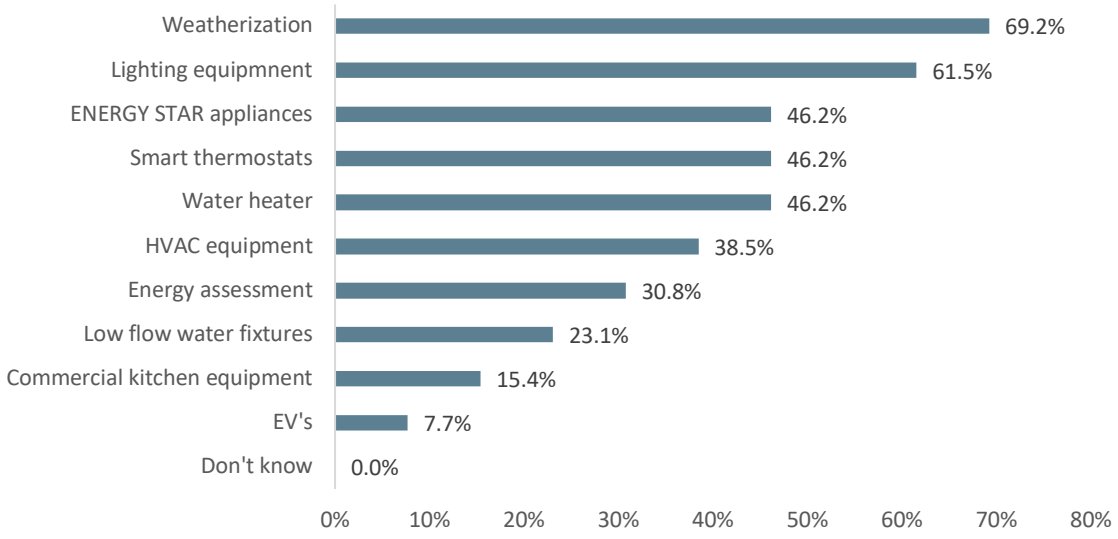
More than a quarter of respondents explained that they did not take advantage of Avista's incentives because they did not have information about the offerings (26.7%, n=24). About half of all respondents (53.6%, n=30) were aware of Avista's non-residential focused incentive programs. These respondents predominantly learned about programs directly from Avista through emails (18.2%, n=10), mail (16.4%, n=9), and messages on bills (14.6%, n=8) (Figure *5-21*).

Figure 5-21: Program Awareness (n=30)



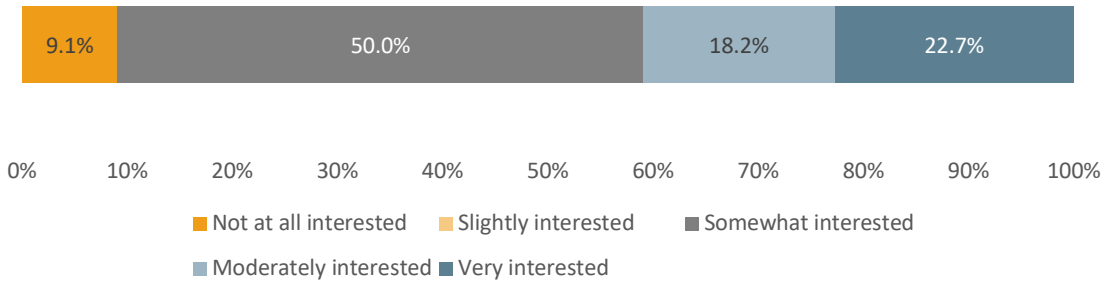
Respondents were most aware of lighting incentives (31.5%, n=17), equipment replacement incentives (27.8%, n=15), and HVAC incentives (25.9%, n=14). Almost a quarter of respondents were interested in energy-efficient upgrades (23.2%, n=13); of these respondents, most were interested in weatherization (69.2%, n=9) and lighting equipment (61.%%, n=8) (Figure *5-22*).

Figure 5-22: Interest by Category (n=13)



All but two respondents (9.1%) indicated they were at least somewhat interested in Avista's incentive programs (9.1%, n=2) (Figure *5-23*).

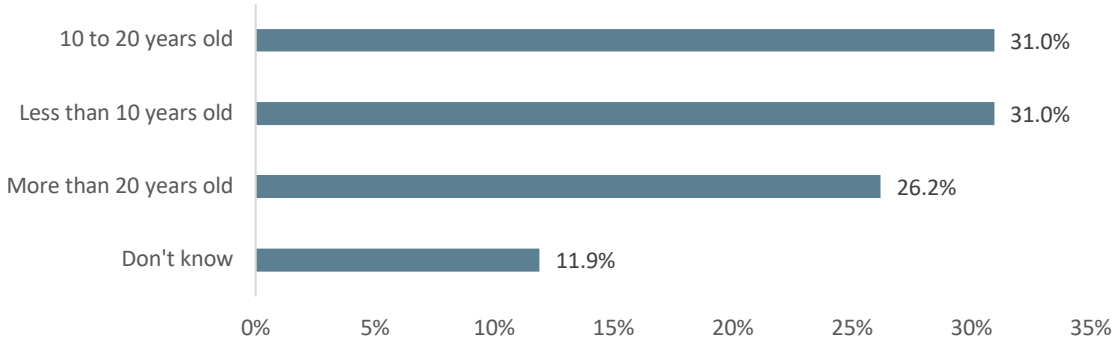
Figure 5-23: Participation interest (n=22)



5.5.2.2 Equipment Status

More than half of the respondents indicated that their HVAC equipment was the largest energy consumer at their facility (57.1%, n=32). Almost three-quarters of respondents had air-conditioning at their facilities (71.4%, n=40). Most of the air-conditioned facilities relied on central A/C (63.6%, n=28) and a third of these systems were less than 10 years old (36.0%, n=18). More than half of the respondents noted that their facilities had a gas furnace (55.0%, n=33), and a tenth used electrical resistance heating (11.7%, n=7). The age of the heating systems varied greatly (Figure 5-24) and half of these systems had been serviced in the last year (50.0%, n=28).

Figure 5-24: Heating equipment age (n=42)



Half of the respondents used programmable thermostats (51.0%, n=29) for temperature control, while a quarter used manual thermostats (25.0%, n=14). Half of the respondents indicated they had LED lights at their facilities (51.8%, n=29) and

Almost all respondents receive electricity from Avista (92.8%, n=52) two-thirds receive natural gas (66.0%, n=37).

5.5.2.3 Firmographics

Table 5-12 includes firmographic characteristics of survey respondents.

Table 5-12: Demographics (n=56, unless otherwise indicated)

Answer	%	Count
Ownership status		
Own and occupy	66.1%	37
Rent	21.4%	12
Own and rent to someone else	12.5%	7
Facility description		
Your company's only location	63.2%	12
One of several locations owned by your company	26.3%	5
I don't know	10.5%	2
Utility bill		
We are billed directly by Avista	100.0%	56
Not billed directly by Avista	0.0%	0
Building type		
Retail	12.5%	7
Religious worship	12.5%	7
Industrial/manufacturing	10.7%	6
Small office	10.7%	6
Health clinic	8.9%	5
Lodging	7.1%	4
Large office	5.4%	3
Government building	3.6%	2
Restaurant (sit down)	3.6%	2

Assembly hall/gathering space	3.6%	2
Agricultural	1.8%	1
Warehouse or distribution center	1.8%	1
Vacant lot	1.8%	1
Other	8.9%	5
I don't know	5.4%	3
Prefer not to answer	1.8%	1

5.5.3 Conclusions and Recommendations

Based on data collected via non-participant surveys, the Evaluators provide the following conclusions and recommendations for improvement moving forward.

5.5.3.1 Conclusions

The following conclusions represent key findings from the residential non-participant survey:

1. **Program Awareness –** About half of all respondents (53.6%, n=30) were aware of Avista's non-residential focused incentive programs, however a quarter of respondents explained that they did not take advantage of Avista's incentives because they did not have enough information about the offerings (26.7%, n=24).
2. **Energy efficiency familiarity –** Almost half of respondents did not replace or upgrade electrical appliances in the last three years (48.2%, n=27). Among the 24 respondents who did replace and/or upgrade equipment in the last three years, lighting (29.6%, n=16) and HVAC equipment (22.2%, n=12) were the most common.
3. **Interest in Avista programming** -- All but two respondents indicated they were at least somewhat interested in Avista's incentive programs.

5.5.3.2 Recommendations

Based on the above conclusions, the Evaluators suggest the following recommendations for non-residential programs moving forward.

1. **Increase program marketing –** Many of the non-participant respondents did not know Avista offered rebates and incentives for energy efficient equipment nor did they feel they had enough information about the offerings to make informed decisions for improving the energy efficiency of their facility. Staff should consider increasing marketing efforts to better promote the programs and reach a larger audience for non-residential program participation.

6 APPENDIX

In this appendix, the Evaluators provide the survey and interview guide instruments deployed during this process evaluation.

6.1 SURVEYS

6.1.1 Residential Participant Survey

Avista-Residential Participant Survey (STANDARD)

Start of Block: Screener

Q194 Welcome! Thank you for taking this survey to tell us about your experience with Avista's residential energy efficiency programs! Your feedback is very important to us and will help us improve programs for customers like you. This survey should take about 15 minutes. Your responses are confidential and will be used for research purposes only. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy.

Upon completion of the survey we will collect your email address to send a $20 electronic gift card as a token of our thanks.

Q1 To start off this survey, we will ask you about your participation in the program.

Program records indicate that you received a rebate through Avista's Residential Energy Efficiency Program at **${e://Field/ADDRESS}** in 2022 or 2023. Is that correct?

- O Yes (1)
- O I participated BUT my address is incorrect *(Please provide correct address.)* (2) _____
- O No, I did not participate (3)

Skip To: End of Block If To start off this survey, we will ask you about your participation in the program. Program record... = No, I did not participate

End of Block: Screener

Start of Block: Program Participation

Display This Question:

If HVAC_TYPE1 Is Not Empty

Or HVAC_TYPE2 Is Not Empty

Or DRYER > 0

Or WASHER > 0

Or RFC > 0

Or FREEZER > 0

Or WH_TYPE1 Is Not Empty

Or WH_TYPE2 Is Not Empty

Or TSTAT > 0

Or HP > 0

Or ES_DOORS > 0

Q2 Please confirm the measures that you installed.
(If you are unsure if the measure was installed, please select the "No" option.)

Display This Choice:

If HVAC_TYPE1 Is Not Empty

Display This Choice:

If HVAC_TYPE2 Is Not Empty

Display This Choice:

If DRYER > 0

Display This Choice:

If WASHER > 0

Display This Choice:

If RFC > 0

Display This Choice:

If FREEZER > 0

Display This Choice:

If WH_TYPE1 Is Not Empty

Display This Choice:

If WH_TYPE2 Is Not Empty

Display This Choice:

If TSTAT > 0

Display This Choice:

If HP > 0

Display This Choice:

If ES_DOORS > 0

	Yes (1)	No (2)
Display This Choice: If HVAC_TYPE1 Is Not Empty ${e://Field/HVAC_TYPE1} (1)	O	O
Display This Choice: If HVAC_TYPE2 Is Not Empty ${e://Field/HVAC_TYPE2} (2)	O	O
Display This Choice: If DRYER > 0 Clothes Dryer (3)	O	O
Display This Choice: If WASHER > 0 Clothes Washer (4)	O	O
Display This Choice: If RFC > 0 Refrigerator-Freezer Combo (5)	O	O
Display This Choice: If FREEZER > 0 Stand-Alone Freezer (6)	O	O
Display This Choice: If WH_TYPE1 Is Not Empty ${e://Field/WH_TYPE1} (7)	O	O
Display This Choice: If WH_TYPE2 Is Not Empty ${e://Field/WH_TYPE2} (8)	O	O
Display This Choice: If TSTAT > 0 Smart Thermostat (9)	O	O

Display This Choice: *If HP > 0* Heat Pump (10)	O	O
Display This Choice: *If ES_DOORS > 0* Energy Star doors (11)	O	O

Display This Question:

If AI > 0

Or CI > 0

Or ATI > 0

Or WI > 0

Or FI > 0

Or WS > 0

Or WR > 0

Or ABI > 0

Q3 According to program records you also received the following improvements. Can you confirm that this is correct?

Display This Choice:

If AI > 0

Display This Choice:

If CI > 0

Display This Choice:

If ATI > 0

Display This Choice:

If WI > 0

Display This Choice:

If FI > 0

Display This Choice:

If WS > 0

Display This Choice:

If WR > 0

Display This Choice:

If ABI = 1

	Yes (1)	No (2)
Display This Choice: If AI > 0 Air Infiltration (1)	O	O
Display This Choice: If CI > 0 Ceiling Insulation (2)	O	O
Display This Choice: If ATI > 0 Attic Insulation (3)	O	O
Display This Choice: If WI > 0 Wall Insulation (4)	O	O
Display This Choice: If FI > 0 Floor Insulation (5)	O	O
Display This Choice: If WS > 0 Weather Stripping (6)	O	O
Display This Choice: If WR > 0 Window Replacement (7)	O	O
Display This Choice: If ABI = 1 Aerobarrier Insulation (8)	O	O

Display This Question:

If According to program records you also received the following improvements. Can you confirm that t... [Yes] (Count) > 0

Carry Forward Selected Choices from "According to program records you also received the following improvements. Can you confirm that this is correct?"

Q4 Did you plan to install the following measures before you learned about the assistance offered through Avista's Residential Energy Efficiency Program?

Display This Choice:

If AI > 0

Display This Choice:

If CI > 0

Display This Choice:

If ATI > 0

Display This Choice:

If WI > 0

Display This Choice:

If FI > 0

Display This Choice:

If WS > 0

Display This Choice:

If WR > 0

Display This Choice:

If ABI = 1

	Yes (1)	No (2)	I don't know (98)
Display This Choice: If AI > 0 Air Infiltration (x1)	O	O	O
Display This Choice: If CI > 0 Ceiling Insulation (x2)	O	O	O
Display This Choice: If ATI > 0 Attic Insulation (x3)	O	O	O
Display This Choice: If WI > 0 Wall Insulation (x4)	O	O	O
Display This Choice: If FI > 0 Floor Insulation (x5)	O	O	O
Display This Choice: If WS > 0 Weather Stripping (x6)	O	O	O
Display This Choice: If WR > 0 Window Replacement (x7)	O	O	O
Display This Choice: If ABI = 1 Aerobarrier Insulation (x8)	O	O	O

End of Block: Program Participation

Start of Block: Program Awareness

Q5 In this section we will ask you questions about your awareness of the program.

How did you learn about **Avista's Residential Energy Efficiency Program**?
(Please select all that apply.)

- ☐ Mailed information from Avista (1)
- ☐ Email from Avista (2)
- ☐ Newspaper or magazine article or advertisement (3)
- ☐ Contractor (4)
- ☐ Community Action Program (CAP Agency) (5)
- ☐ Tribal Housing Authority (6)
- ☐ Food Bank (7)
- ☐ Energy fair or other community events (8)
- ☐ Word of mouth from a personal contact *(e.g., family member, friend, neighbor, colleague, etc.)* (9)
- ☐ Radio advertisement (10)
- ☐ Utility bill message (11)
- ☐ Utility website (12)
- ☐ Another website (13)
- ☐ Social media*(i.e., Facebook, Instagram, Twitter, Tik Tok, etc.)* (14)

- ☐ Avista program staff (15)
- ☐ Information at a retailer (16)
- ☐ Other, please specify (96) _____

Q6 How much did each of the following contribute to your decision to purchase/install the energy efficient equipment you received the program?

	Not at all (1)	A little (2)	A moderate amount (3)	A lot (4)	A great deal (5)	Not applicable (97)
Reducing your monthly utility bill (1)	O	O	O	O	O	O
Helping the environment (2)	O	O	O	O	O	O
Other benefits, please specify (3)	O	O	O	O	O	O

Q7 When thinking about purchasing/installing the energy efficient equipment you received through the program, what sources of information were important in your decision making?
(Please select all that apply.)

- ☐ Contractor recommendation (1)
- ☐ Utility recommendation or information (2)
- ☐ Recommendation from a personal contact *(e.g., family member, friend, neighbor, colleague, etc.)* (3)
- ☐ Other, please specify (4) _____
- ☒ None of the above (5)
- ☒ I don't know (6)

Display This Question:
If OBR = 1
Or HEA = 1

Q8 How important was the Avista rebate in your decision to purchase/install the energy efficient equipment you received through the program?

- O Not at all important (1)
- O Somewhat important (2)
- O Moderately important (3)
- O Very important (4)
- O Extremely important (5)

Display This Question:

If HEA = 0

Q9 What is your level of awareness about Avista's home audit/assessment program, an in-home energy evaluation that identify recommendations to improve the home's overall energy efficiency, comfort, and health??

- O I have never heard of it before now (1)
- O I have heard of it but don't know anything about it (2)
- O I know a little about it (3)
- O I know a lot about it (4)

Display This Question:

If OBR = 0

X→

Q118 What is your level of awareness about Avista's Energy Efficiency Financing program that allows you to access zero down, low-interest energy efficiency project financing by repaying loan amount added on your Avista's monthly bill?

- O I have never heard of it before now (1)
- O I have heard of it but don't know anything about it (2)
- O I know a little about it (3)
- O I know a lot about it (4)

End of Block: Program Awareness

Start of Block: Home Energy Audit (HEA) Pilot

Q119 Were you planning on having a home energy audit BEFORE you learned about the program?

- O Yes (1)
- O No (2)
- O Don't know (98)

Page Break

Q120 What were the most important reasons why you decided to get a Home Energy Audit?

- ☐ To learn more about how I use energy in my home (1)
- ☐ To learn how I can reduce my energy costs (2)
- ☐ To get free light bulbs/LEDs installed (3)
- ☐ To get free water-saving equipment installed (4)
- ☐ To improve home comfort (5)
- ☐ To improve the air quality in my home (or other health reason) (6)
- ☐ To learn how I can increase the value of my home (7)
- ☐ To help the environment (8)
- ☐ To learn how to become as energy efficient as my friends/neighbors (9)
- ☐ Contractor recommended it (10)
- ☐ I had one on a previous home (11)
- ☐ Other (please specify) (96)

_____

- ☐ ⊗ Don't know (98)

Page Break

Q121 How helpful did you find the recommendations and other information you received as a result of the Home Energy Audit?

- O Not at all helpful (1)
- O Slightly helpful (2)
- O Somewhat helpful (3)
- O Moderately helpful (4)
- O Extremely helpful (5)

Page Break

Display This Question:

If How helpful did you find the recommendations and other information you received as a result of th... = Not at all helpful

Q122 Why was that audit not helpful to you?

_____

Page Break

Q123 Since the home energy audit, would you say you have made all of the recommended energy efficiency improvements, made some of them, or not made any?

- O Made all (1)
- O Made some but not all (2)
- O Have not made any (3)
- O Don't know (98)

Page Break

Display This Question:

If Since the home energy audit, would you say you have made all of the recommended energy efficiency... = Made some but not all

Or Since the home energy audit, would you say you have made all of the recommended energy efficiency... = Have not made any

Q124 What are the main reasons you have not made those recommended improvements? Select all that apply.

- ☐ Cost (1)
- ☐ Do not have time (2)
- ☐ Waiting for current equipment to fail (3)
- ☐ Need help/Don't know how (4)
- ☐ Do not feel they need to be done (5)
- ☐ Recommended improvements will not save energy (6)
- ☐ Do not own the property (7)
- ☐ Need more information (8)
- ☐ Still planning to make improvements in the future (9)
- ☐ Other (please specify) (96) _____
- ☐ ⊗ Don't know (98)

Page Break

Q150 Are you interested in making additional energy efficiency improvements?

- O Yes (1)
- O No (2)
- O I don't know (98)

Page Break

Display This Question:

If Are you interested in making additional energy efficiency improvements? = Yes

Q151 What additional improvements are you most interested in? Select all that apply

- ☐ Lighting (1)
- ☐ Space heating equipment (2)
- ☐ A/C tune-up (3)
- ☐ Smart thermostats (4)
- ☐ Low-flow faucet aerators (5)
- ☐ Low-flow showerheads (6)
- ☐ Water heating equipment (7)
- ☐ Advanced power strips (8)
- ☐ Efficient refrigerator (9)
- ☐ Efficient induction stove (10)
- ☐ Wall insulation, floor insulation, attic insulation (11)
- ☐ Efficient windows/doors (12)
- ☐ Energy efficient washer/dryer (13)
- ☐ Other – please specify (96)

_____

Page Break

Display This Question:

If LED_QTY > 0

Q1 Program records indicate the auditor installed ${e://Field/LED_QTY} LED light bulbs. Is that correct?

- O Yes (1)
- O No (2)
- O Don't Know (98)

Display This Question:

If Program records indicate the auditor installed ${e://Field/LED_QTY} LED light bulbs. Is that corr... = No

Q2 How many LED light bulbs did you receive?

_____

Display This Question:

If Program records indicate the auditor installed ${e://Field/LED_QTY} LED light bulbs. Is that corr... = Yes

Or Or How many LED light bulbs did you receive? Text Response Is Greater Than 0

Q3 Are all the LED light bulbs you received currently in use and working properly?

- O Yes (1)
- O No (2)
- O Don’t know (98)

Display This Question:

If Are all the LED light bulbs you received currently in use and working properly? = No

And Program records indicate the auditor installed ${e://Field/LED_QTY} LED light bulbs. Is that corr... = Yes

Q4 How many of the LED light bulbs are currently installed?

_____

Display This Question:

If If How many LED light bulbs did you receive? Text Response Is Greater Than 0

And Are all the LED light bulbs you received currently in use and working properly? = No

Q5 How many of those ${Q2/ChoiceTextEntryValue} LED light bulbs are currently installed?

_____

Display This Question:

If Are all the LED light bulbs you received currently in use and working properly? = No

Q6 Why aren't all the LED light bulbs still in use?

- ☐ Burnt out (1)
- ☐ Too bright (2)
- ☐ Not bright enough (3)
- ☐ Other (Please specify) (96) _____
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If SHOWER_QTY > 0

Q11 Program records indicate you received ${e://Field/SHOWER_QTY} showerhead(s). Is that correct?

- O Yes (1)
- O No (2)
- O Don't know (98)

Display This Question:

If Program records indicate you received ${e://Field/SHOWER_QTY} showerhead(s). Is that correct? = No

Q12 How many low flow showerhead(s) did you receive?

_____

Display This Question:

If Program records indicate you received ${e://Field/SHOWER_QTY} showerhead(s). Is that correct? = Yes

Q13 How many of the ${e://Field/SHOWER_QTY} low flow showerhead(s) are currently installed?

_____

Display This Question:

If If How many low flow showerhead(s) did you receive? Text Response Is Greater Than 0

Q14 How many of the ${Q12/ChoiceTextEntryValue} low flow showerhead(s) are currently installed?

_____

Display This Question:

If If How many of the ${e://Field/SHOWER_QTY} low flow showerhead(s) are currently installed? Text Response Is Not Equal to ${e://Field/SHOWERHEAD_QTY}

Or If

If How many of the ${q://QID1214783894/ChoiceTextEntryValue} low flow showerhead(s) are currently in... Text Response Is Not Equal to ${q://QID1214783894/ChoiceTextEntryValue}

And And How many of the ${q://QID1214783894/ChoiceTextEntryValue} low flow showerhead(s) are currently in... Text Response Is Not Empty

Q191 Why aren't all showerhead(s) still installed? Select all that apply

- ☐ Not enough water pressure (1)
- ☐ Was not working properly (4)
- ☐ Liked my old aerator(s) better (5)
- ☐ Other – please explain (6) _____

Page Break

Display This Question:

If AERATOR_QTY > 0

Q15 Records indicate you received ${e://Field/AERATOR_QTY} faucet aerators(s). Is that correct?

- O Yes (1)
- O No (2)
- O Don't know (98)

Display This Question:

If Records indicate you received ${e://Field/AERATOR_QTY} faucet aerators(s). Is that correct? = No

Q16 How many faucet aerator(s) did you receive through the program?

_____

Display This Question:

If Records indicate you received ${e://Field/AERATOR_QTY} faucet aerators(s). Is that correct? = Yes

Q17 How many of the ${e://Field/AERATOR_QTY} faucet aerator(s) are currently installed?

_____

Display This Question:

If If How many faucet aerator(s) did you receive through the program? Text Response Is Greater Than 0

Q18 How many of the ${Q16/ChoiceTextEntryValue} faucet aerator(s) are currently installed?

_____

Display This Question:

If If How many of the ${e://Field/AERATOR_QTY} faucet aerator(s) are currently installed? Text Response Is Not Equal to ${e://Field/AERATOR_QTY}

Or If

If How many of the ${q://QID1214783898/ChoiceTextEntryValue} faucet aerator(s) are currently installed? Text Response Is Not Equal to ${q://QID1214783898/ChoiceTextEntryValue}

And And How many of the ${q://QID1214783898/ChoiceTextEntryValue} faucet aerator(s) are currently installed? Text Response Is Not Empty

Q189 Why aren't the aerator(s) still installed? Select all that apply

- ☐ Not enough water pressure (1)
- ☐ Was not working properly (4)
- ☐ Liked my old aerator(s) better (5)
- ☐ Other – please explain (6) _____

Page Break

Q128 Have you participated in in any other residential programs through Avista since your home energy assessment?

- ☒ I have not participated in other residential programs through Avista (1)
- ☐ Water Heater program (2)
- ☐ HVAC program (3)
- ☐ Shell program (4)
- ☐ Fuel Efficiency Progtam (5)
- ☐ ENERGY STAR Homes Program (6)
- ☐ Income Qualified Program (7)
- ☐ Small Home & Multifamily Weatherization Program (8)
- ☐ Appliance Program (9)
- ☐ Multifamily Direct Install Program (10)
- ☐ Always on Home Energy Report Program (11)
- ☐ On Bill Repayment Program (12)
- ☐ Other (please specify) (96)

_____

Page Break

Display This Question:

If Have you participated in in any other residential programs through Avista since your home energy... != I have not participated in other residential programs through Avista

Q129 How influential were the recommendations you received from the Home Energy Audit for you to decide to participate in that program?

- O Not at all influential (1)
- O Slightly influential (2)
- O Somewhat influential (3)
- O Very influential (4)
- O Extremely influential (5)
- O Not sure (98)

Page Break

Q130 Do you have any suggestions about how Avista can improve the Home Energy Audit?

_____

_____

_____

_____

_____

End of Block: Home Energy Audit (HEA) Pilot

Start of Block: On-Bill Repayment (OBR) Pilot

Q132 Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repayment Program. Is this correct?

O Yes (1)

O No (2)

O I don't know (3)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q131 How did you first learn about the On Bill Repayment Program? Select all that apply

- ☐ Contractor (1)
- ☐ Program representative (4)
- ☐ Avista's website (5)
- ☐ Customer engagement portal (6)
- ☐ Word-of-mouth (7)
- ☐ Bill inserts or utility mailer (8)
- ☐ Email from Avista (9)
- ☐ Social media (10)
- ☐ Internet ad (11)
- ☐ Radio or TV ad (12)
- ☐ Print advertisement (13)
- ☐ Retailer (14)
- ☐ Other – please specify (15) _____
- ☐ ⊗ I don't know (16)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q133 Using a scale of 1 through 5, where 1 means "very difficult" and 5 means "very easy", how would you rate the process of enrolling in the On Bill Repayment program?

- O 1 – Very difficult (1)
- O 2 (2)
- O 3 (3)
- O 4 (4)
- O 5 – Very easy (5)
- O I don't know (6)

Page Break

Display This Question:

If Using a scale of 1 through 5, where 1 means "very difficult" and 5 means "very easy", how would y... = 1 – Very difficult

Or Using a scale of 1 through 5, where 1 means "very difficult" and 5 means "very easy", how would y... = 2

Q134 Why was the enrollment process difficult?

_____

_____

_____

_____

_____

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q135 Using a scale of 1 through 5, where 1 means "Not at all satisfied" and 5 means "Very satisfied", how satisfied were you with the range of equipment that qualifies for financing?

- O 1 - Not at all satisfied (1)
- O 2 (2)
- O 3 (3)
- O 4 (4)
- O 5 - Very satisfied (5)
- O I don't know (98)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q136 If the program financing was not available, how likely would you have been to purchase and install ${e://Field/OBR_MEASURE}?

- O Not at all likely (1)
- O Somewhat unlikely (2)
- O Somewhat likely (3)
- O Very likely (4)
- O I don't know (5)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q137 With the availability of the financing options, did you purchase and install ${e://Field/OBR_MEASURE} sooner than you would have if the program was not available?

- O Yes (1)
- O No (2)
- O I don't know (3)

Page Break

Display This Question:

If With the availability of the financing options, did you purchase and install ... = Yes

Q138 When would you have otherwise purchased and install ${e://Field/OBR_MEASURE}?

- O Within 6 months (1)
- O 7 months to 1 year (2)
- O More than 1 year up to 2 years (3)
- O More than 2 years up to 3 years (4)
- O More than 3 years up to 5 years (5)
- O More than 5 years (6)
- O I don't know (7)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q140 Have you participated in in any other residential programs through Avista since your enrollment in the On Bill Repayment program?

O Yes (please specify which program): (1) _____

O No (2)

Page Break

Display This Question:

If Have you participated in in any other residential programs through Avista since your enrollment i... = Yes

(please specify which program):

Q139 How influential was the On Bill Repayment program in your decision to participate in that other program or programs?

- O Not at all influential (1)
- O Slightly influential (2)
- O Somewhat influential (3)
- O Very influential (4)
- O Extremely influential (5)
- O Not sure (6)

Page Break

Display This Question:

If Program records indicate your home at ${e://Field/ADDRESS} is enrolled in Avista's On Bill Repaym... = Yes

Q141 Do you have any suggestions about how Avista can improve the On Bill Repayment program?

_____

_____

_____

_____

_____

End of Block: On-Bill Repayment (OBR) Pilot

Start of Block: Always On Home Energy Report

Q142 In the past six months, do you remember receiving an email alert from Avista about your always on energy use? "Always on" energy use refers to the energy used by appliances while they are plugged in, but turned off.

O Yes (1)

O No (2)

O I don't know/I am not sure (98)

Display This Question:

If In the past six months, do you remember receiving an email alert from Avista about your always on... = Yes

Q143 In general, what do you do when you receive an always on email alert?

- O Read them thoroughly and continue onto the website for more information (1)
- O Skim some of the content (2)
- O Glance at the pictures, graphs, or headlines (3)
- O I do not look at the alert at all (4)

Display This Question:

If In general, what do you do when you receive an always on email alert? = Read them thoroughly and continue onto the website for more information

Or In general, what do you do when you receive an always on email alert? = Skim some of the content

Or In general, what do you do when you receive an always on email alert? = Glance at the pictures, graphs, or headlines

Q144 After reviewing your always on alert, which of the following do you do? Select all that apply.

- ☐ Discuss one or more emails with others (1)
- ☐ Save one or more emails for reference (2)
- ☐ Started unplugging appliances when they are not in use (3)
- ☐ Installed advanced power strips (4)
- ☐ Visited Avista's website to learn more about your always on load" (5)
- ☐ Other (please specify) (6) _____
- ☐ ⊗ None of the above (7)

Display This Question:

If After reviewing your always on alert, which of the following do you do? Select all that apply. = Visited Avista's website to learn more about your always on load"

Q145 How helpful were the tips and information on Avista's website to help you identify and evaluate your always on load?

- O Not at all helpful (1)
- O Slightly helpful (2)
- O Somewhat helpful (3)
- O Moderately helpful (4)
- O Very helpful (9)

Q146 What other types of electric consumption would you be interested in learning more about and reducing? Please select all that apply.

- ☐ Water Heating (1)
- ☐ Space Heating (2)
- ☐ Space Cooling (3)
- ☐ Lighting (4)
- ☐ Laundry (5)
- ☐ Cooking (6)
- ☐ ⊗ None of the above (7)

Page Break

Q147 Would you prefer to receive

- O More frequent updates about specific energy use in your home (1)
- O Less frequent updates about specific energy use in your home (4)
- O About the same number of updates about specific energy use in your home (5)

Page Break

Q148 How would you suggest Avista improve efforts to help you save energy?

- ☐ Share more personalized information about your energy use (1)
- ☐ Provide larger financial incentives (2)
- ☐ Provide financial incentives for additional products (3)
- ☐ Other (please specify) (4) _____
- ☒ I don't know (5)

Q149 Since enrolling in the On Bill Repayment program have you noticed any changes in your utility bill from Avista?

- ○ Yes, it decreased (1)
- ○ Yes, it increased (2)
- ○ No change (3)
- ○ I don't know (4)

End of Block: Always On Home Energy Report

Start of Block: HVAC

Q10 In this section we will ask you about the **HVAC equipment** you installed.

Why did you select the model/type for your HVAC replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available/only choice (5)
- ☐ The contractor/retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

JS ✱

Q11 How old was your previous HVAC system at the time you installed the **${e://Field/HVAC_TYPE1}**?
(Your best estimate is fine.)

_____

Q12 What type of fuel did your old HVAC system use before installing the **${e://Field/HVAC_TYPE1}**?

- O Natural Gas (1)
- O Electricity (2)
- O Wood (3)
- O Oil (4)
- O Other, please specify (5) _____
- O I don't know (98)

Q13 Did the old, replaced HVAC system still work at the time you replaced it?

- O Yes (1)
- O No (2)
- O I don't know (98)

Q14 What type of fuel does your new **${e://Field/HVAC_TYPE1}** use?

- O Natural Gas (1)
- O Electricity (2)
- O Wood (3)
- O Oil (4)
- O Other, please specify (5) _____
- O I don't know (98)

Q15 Is the new **${e://Field/HVAC_TYPE1}** that you received a rebate for currently installed and working?

- O Yes (1)
- O No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- O No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- O No, it is not installed AND not working *(Please explain)* (4) _____
- O I don't know (98)

End of Block: HVAC

Start of Block: 2nd HVAC

Q16 In this section we will ask you about the **second HVAC equipment** you installed, which according to program records is a ${e://Field/HVAC_TYPE2}.

Why did you select the model/type for your HVAC replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available/only choice (5)
- ☐ The contractor/retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

Q17 How old was your previous HVAC system at the time you installed the **${e://Field/HVAC_TYPE2}**?
(Your best estimate is fine.)

_____

Q18 What type of fuel did your old HVAC system use before installing the **${e://Field/ HVAC_TYPE2}**?

- O Natural Gas (1)
- O Electricity (2)
- O Wood (3)
- O Oil (4)
- O Other, please specify (5) _____
- O I don't know (98)

Q19 Did the old, replaced HVAC equipment still work at the time you replaced it?

- O Yes (1)
- O No (2)
- O I don't know (98)

Q20 What type of fuel does your new **${e://Field/HVAC_TYPE2}** use?

- O Natural Gas (1)
- O Electricity (2)
- O Wood (3)
- O Oil (4)
- O Other, please specify (5) _____
- O I don't know (98)

Q21 Is the new **${e://Field/HVAC_TYPE2}** that you received a rebate for currently installed and working?

- O Yes (1)
- O No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- O No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- O No, it is not installed AND not working *(Please explain)* (4) _____
- O I don't know (98)

End of Block: 2nd HVAC

Start of Block: Clothes Dryer

Q22 In this section we will ask you about the **clothes dryer** you installed.

What type of clothes dryer did you have before installing your new ENERGY STAR-rated clothes dryer?

- O Standard efficiency clothes dryer (1)
- O ENERGY STAR rated clothes dryer (2)
- O A different clothes dryer (3)
- O I did not have a clothes dryer (4)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = Standard efficiency clothes dryer

Or In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = ENERGY STAR rated clothes dryer

Or In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = A different clothes dryer

Q23 Did the old, replaced clothes dryer still work at the time you replaced it?

- O Yes (1)
- O No (2)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = Standard efficiency clothes dryer

Or In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = ENERGY STAR rated clothes dryer

Or In this section we will ask you about the clothes dryer you installed. What type of clothes dryer... = A different clothes dryer

JS *

Q24 How old was your old, replaced clothes dryer at the time you installed the ENERGY STAR-rated clothes dryer?
(Your best estimate is fine.)

_____

X→

Q25 Is the new ENERGY STAR-rated clothes dryer that you received a rebate for currently installed and working?

O Yes (1)

O No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____

O No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____

O No, it is not installed AND not working *(Please explain)* (4) _____

O I don't know (5)

End of Block: Clothes Dryer

Start of Block: Clothes Washer

X→

Q26 In this section we will ask you about the **clothes washer** you installed.

What type of clothes washer did you have before installing your new ENERGY STAR-rated clothes washer?

- O Standard efficiency clothes washer (1)
- O ENERGY STAR rated clothes washer (2)
- O A different clothes washer (3)
- O I did not have a clothes washer (4)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the clothes washer you installed. What type of clothes wash... = Standard efficiency clothes washer

Or In this section we will ask you about the clothes washer you installed. What type of clothes wash... = ENERGY STAR rated clothes washer

Or In this section we will ask you about the clothes washer you installed. What type of clothes wash... = A different clothes washer

Q27 Did the old, replaced clothes washer still work at the time you replaced it?

- O Yes (1)
- O No (2)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the clothes washer you installed. What type of clothes wash... = Standard efficiency clothes washer

Or In this section we will ask you about the clothes washer you installed. What type of clothes wash... = ENERGY STAR rated clothes washer

Or In this section we will ask you about the clothes washer you installed. What type of clothes wash... = A different clothes washer

JS *

Q28 How old was your old, replaced clothes washer at the time you installed the ENERGY STAR-rated clothes washer?
(Your best estimate is fine.)

_____

X→

Q29 Is the new ENERGY STAR-rated clothes washer that you received a rebate for currently installed and working?

O Yes (1)

O No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____

O No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____

O No, it is not installed AND not working *(Please explain)* (4) _____

O I don't know (98)

End of Block: Clothes Washer

Start of Block: Refrigerator-Freezer combo

X→

Q30 In this section we will ask you about the **refrigerator-freezer** you installed.

What was the purpose of the new ENERGY STAR-rated refrigerator-freezer that you purchased?

- O A replacement for existing equipment in your home (1)
- O A new purchase, because you did not have a refrigerator and/or freezer in your home (2)
- O A purchase of an additional refrigerator-freezer for your home (3)

Display This Question:

If In this section we will ask you about the refrigerator-freezer you installed. What was the purpos... = A replacement for existing equipment in your home

Q31 What type of refrigerator-freezer did your new ENERGY STAR rated refrigerator-freezer replace?

- O Standard efficiency refrigerator-freezer (1)
- O ENERGY STAR rated refrigerator-freezer (2)
- O A stand-alone refrigerator only (3)
- O A stand-alone freezer only (4)
- O A different type of refrigerator-freezer (5)

Display This Question:

If In this section we will ask you about the refrigerator-freezer you installed. What was the purpos... = A replacement for existing equipment in your home

X→

Q32 Did the old, replaced refrigerator-freezer still work at the time you replaced it?

- O Yes (1)
- O No (2)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the refrigerator-freezer you installed. What was the purpos... = A replacement for existing equipment in your home

JS *

Q33 How old was your old, replaced refrigerator-freezer at the time you installed the ENERGY STAR-rated refrigerator-freezer?
(Your best estimate is fine.)

_____

X→

Q34 Is the new ENERGY STAR-rated refrigerator-freezer that you received a rebate for currently installed and working?

O Yes (1)

O Yes (2)

O No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (3) _____

O No, it is not installed BUT it is working *(Please explain why it is not installed)* (4) _____

O No, it is not installed AND not working *(Please explain)* (5) _____

O I don't know (98)

End of Block: Refrigerator-Freezer combo

Start of Block: Stand-alone Freezer

X→

Q35 In this section we will ask you about the **stand-alone freezer** you installed.

What type of stand-alone freezer did you have before installing your new ENERGY STAR-rated stand-alone freezer?

O Standard efficiency freezer (1)

O ENERGY STAR freezer (2)

O A different type of freezer (3)

O I did not have a stand-alone freezer (4)

O I don't know (98)

Display This Question:

If In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = Standard efficiency freezer

Or In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = ENERGY STAR freezer

Or In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = A different type of freezer

Q36 Did the old, replaced stand-alone freezer still work at the time you replaced it?

- O Yes (1)
- O No (2)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = Standard efficiency freezer

Or In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = ENERGY STAR freezer

Or In this section we will ask you about the stand-alone freezer you installed. What type of stand-a... = A different type of freezer

Q37 How old was your old, replaced stand-alone freezer at the time you installed the ENERGY STAR-rated stand-alone freezer?
(Your best estimate is fine.)

_____

Q38 Is the new ENERGY STAR-rated stand-alone freezer that you received a rebate for currently installed and working?

O Yes (1)

O No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____

O No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____

O No, it is not installed AND not working *(Please explain)* (4) _____

O I don't know (98)

End of Block: Stand-alone Freezer

Start of Block: Water Heater

Q39 In this section we will ask you about the **water heater** you installed.

Why did you select the model/type for your water heater replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available/only choice (5)
- ☐ The contractor/retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

JS *

Q40 How old was your old, replaced water heater at the time you installed the **${e://Field/WH_TYPE1}**?
(Your best estimate is fine, please provide a numeric value.)

_____

Q41 What type of fuel did your old water heater use before installing the **${e://Field/WH_TYPE1}**?

- O Natural Gas (1)
- O Electricity (2)
- O Wood (3)
- O Oil (4)
- O Other, please specify (5) _____
- O I don't know (98)

Q42 Did the old, replaced water heater still work at the time you replaced it?

- O Yes (1)
- O No (2)
- O I don't know (98)

Q43 What type of fuel does your new **${e://Field/WH_TYPE1}** use?

O Natural Gas (1)

O Electricity (2)

O Wood (3)

O Oil (4)

O Other, please specify (5) _____

O I don't know (98)

Q44 Is the new **${e://Field/WH_TYPE1}** that you received a rebate for currently installed and working?

O Yes (1)

O No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____

O No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____

O No, it is not installed AND not working *(Please explain)* (4) _____

O I don't know (98)

End of Block: Water Heater

Start of Block: 2nd WH

Q45 In this section we will ask you about the **second water heater** you installed, which according to program records is a ${e://Field/WH_TYPE2}.

Why did you select the model/type for your water heater replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available/only choice (5)
- ☐ The contractor/retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

JS *

Q46 How old was your old, replaced water heater at the time you installed the **${e://Field/WH_TYPE2}**?
(Your best estimate is fine.)

_____

Q47 What type of fuel did your old water heater use before installing the **${e://Field/WH_TYPE2}**?

- O Natural Gas (1)
- O Electricity (2)
- O Wood (3)
- O Oil (4)
- O Other, please specify (5) _____
- O I don't know (98)

Q48 Did the old, replaced water heater still work at the time you replaced it?

- O Yes (1)
- O No (2)
- O I don't know (98)

Q49 What type of fuel does your new **${e://Field/WH_TYPE2}** use?

- O Natural Gas (1)
- O Electricity (2)
- O Wood (3)
- O Oil (4)
- O Other, please specify (5) _____
- O I don't know (98)

Q50 Is the new **${e://Field/WH_TYPE2}** that you received a rebate for currently installed and working?

- O Yes (1)
- O No, it is installed BUT not working *(Please explain what is wrong to the best of your knowledge)* (2) _____
- O No, it is not installed BUT it is working *(Please explain why it is not installed)* (3) _____
- O No, it is not installed AND not working *(Please explain)* (4) _____
- O I don't know (98)

End of Block: 2nd WH

Start of Block: Smart Thermostat

Q51 In this section we will ask you about the smart thermostat you installed.

What type of thermostat did you have installed before installing a smart thermostat?

- O A programmable thermostat (not connected to Wi-Fi) that allows you to schedule the temperature settings for different times of day (1)
- O A standard thermostat that lets you set on/off temperatures (2)
- O A different Wi-Fi smart thermostat (3)
- O Did not previously have a thermostat (4)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A standard thermostat that lets you set on/off temperatures

Q52 You stated that the old thermostat was a standard thermostat that was not programmable. Did you manually change the temperature higher or lower when leaving the home or retiring for the night?

- O Yes (1)
- O No (2)
- O I don't know (98)

Q53 Who installed the smart thermostat that you received a rebate for?

- O Self- installed (1)
- O Contractor installed (2)
- O Other, please specify (3) _____

X→

Q54 Is the smart thermostat connected to the internet?

- O Yes (1)
- O No (2)
- O I don't know (98)

X→

Q55 What brand of smart thermostat do you have?

- O Nest (1)
- O Ecobee (2)
- O Honeywell (3)
- O Lennox iComfort (4)
- O Trane (5)
- O Emerson (6)
- O Bryant (7)
- O Carrier (8)
- O Other, please specify (9) _____
- O I don’t know (98)

Q56 Thinking about the smart thermostat that you received a rebate for, did you program a schedule to change the temperature setting at different times of day?

- O Yes (1)
- O No (2)
- O I don't know (98)

Q57 Do you let the smart thermostat manage the temperature of your home automatically?

- O Yes (1)
- O No (2)
- O I don't know (98)

Q58 Which of the following best describes how often you make **manual** adjustments to the thermostat settings?

- O Never (1)
- O Once to a few times a month (2)
- O Once to a few times a week (3)
- O Once a day or more (4)
- O I don’t know (98)

Q59 Do you have your thermostat set to run in 'away' or 'vacation mode' when you are not home?
Note your thermostat my refer to this feature by another name such as "home way assist," "smart away mode," or "smart away."

- O Yes (1)
- O No (2)
- O I am not aware of an "away mode" setting (3)
- O I don't know (98)

Display This Question:

If Do you have your thermostat set to run in 'away' or 'vacation mode' when you are not home?Note yo... = No

Q60 Why do you have “away mode” (or the similarly named featured on your smart thermostat) disabled?
(Please select all that apply.)

- ☐ I want my home to keep a comfortable temperature while I am gone (1)
- ☐ I am worried about privacy (2)
- ☐ I have pets that need to stay comfortable (3)
- ☐ I can’t figure out how to set it up (4)
- ☐ I have had problems with “away mode” (5)
- ☐ “Away mode” requires a smart phone connection and there are other people in my home who do not have phones connected to the thermostat (6)
- ☐ Someone is normally home (7)
- ☐ Other, please specify (8) _____

Display This Question:

If Do you have your thermostat set to run in ‘away’ or ‘vacation mode’ when you are not home?Note yo... = Yes

Q61 What temperature is your “away” setting for heating during the colder months?
(Please provide a numeric value.)

_____

Display This Question:

If Do you have your thermostat set to run in 'away' or 'vacation mode' when you are not home?Note yo... = Yes

Q62 What temperature is your "away" setting for cooling during the warmer months?
(Please provide a numeric value.)

_____

Display This Question:

If Do you have your thermostat set to run in 'away' or 'vacation mode' when you are not home?Note yo... = Yes

Q63 How is your thermostat set up to detect if you are home?

- O Thermostat occupancy sensor (1)
- O Phone location (2)
- O Both occupancy sensor and phone location (3)
- O I don't know (98)

Display This Question:

If TSTAT = 1

And HP = 1

And Who installed the smart thermostat that you received a rebate for? = Self- installed

Q64 Did you connect a C-wire to your thermostat when you installed it?

- O Yes (1)
- O Yes, but used an adapter kit (2)
- O No (3)
- O I don't know (98)

Q65 Which of the following does the smart thermostat control

- O Central Air Conditioning Only (1)
- O Heating System Only (2)
- O Both central air conditioning and heating (3)
- O I don't know (98)

Display This Question:

If Which of the following does the smart thermostat control = Heating System Only

Or Which of the following does the smart thermostat control = Both central air conditioning and heating

Q66 What type of heating system does your smart thermostat control in your home?

- O Central heat pump (1)
- O Electric baseboard (2)
- O Electric furnace (3)
- O Gas furnace (4)
- O Oil furnace (5)
- O Propane heater (6)
- O None/ It does not control heating (7)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A programmable thermostat (not connected to Wi-Fi) that allows you to schedule the temperature settings for different times of day

Or In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A standard thermostat that lets you set on/off temperatures

Or In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A different Wi-Fi smart thermostat

Q67 Did your old, replaced thermostat still work at the time you replaced it?

- O Yes (1)
- O No (2)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A programmable thermostat (not connected to Wi-Fi) that allows you to schedule the temperature settings for different times of day

Or In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A standard thermostat that lets you set on/off temperatures

Or In this section we will ask you about the smart thermostat you installed. What type of thermostat... = A different Wi-Fi smart thermostat

JS *

Q68 How old was your thermostat at the time you replaced it?
(Your best estimate is fine.)

_____

X→

Q69 Is the new smart thermostat that you received a rebate for currently installed and working?

O Yes (1)

O No (2)

O I don't know (98)

Display This Question:

If Is the new smart thermostat that you received a rebate for currently installed and working? = No

X→

Q70 Why did you remove or replace the smart thermostat?
(Please select all that apply.)

- ☐ It was no longer working properly (1)
- ☐ I purchased a different, new smart thermostat that I like better (2)
- ☐ I liked my old thermostat better, so I re-installed it (3)
- ☐ I performed some remodeling or maintenance that required the removal of the smart thermostat (4)
- ☐ Other, please specify (5) _____
- ☐ ⊗ I don't know (98)

End of Block: Smart Thermostat

Start of Block: Heat Pump

Q71 In this section we will ask you about the **heat pump** you installed.

Why did you select the model/ type for your central heat pump replacement?
(Please select all that apply.)

- ☐ It was a good price (1)
- ☐ There was a rebate for it (2)
- ☐ It costs less to operate it (3)
- ☐ It's good for the environment (4)
- ☐ It was all that was available / only choice (5)
- ☐ The contractor / retailer recommended it (6)
- ☐ It had features I wanted (7)
- ☐ It was the right size, color (8)
- ☐ Wanted that brand (9)
- ☐ It had an ENERGY STAR label (10)
- ☐ Other, please specify (11) _____

Q72 Is the central heat pump that you received a rebate for currently installed and working?

- O Yes (1)
- O No, please explain: (2) _____
- O I don't know (98)

X→

Q73 What type of equipment did you replace with the central heat pump you received a rebate for?

- O Cooling equipment only (1)
- O Heating equipment only (2)
- O Both cooling and heating equipment (3)
- O None - It was a new installation that did not replace any equipment. (4)
- O I I I don't know (98)

Display This Question:

If What type of equipment did you replace with the central heat pump you received a rebate for? = Heating equipment only

Or What type of equipment did you replace with the central heat pump you received a rebate for? = Both cooling and heating equipment

Q74 Did the central heat pump replacement that you received a rebate for replace an existing heating pump?

- O Yes (1)
- O No (2)
- O I don't know (3)

Display This Question:

If Did the central heat pump replacement that you received a rebate for replace an existing heating... = Yes

X→

Q75 What type of heating system did you have before you installed the central heat pump replacement?

- O Electric resistance heating (1)
- O Air source heat pump (2)
- O Other, please specify (3) _____
- O No heating equipment (4)
- O I don't know (98)

Display This Question:

If Did the central heat pump replacement that you received a rebate for replace an existing heating... = Yes

X→

Q76 Was your old, replaced heat pump functioning at the time of replacement?

- O Functioning (1)
- O Not functioning (2)
- O I don't know (98)

Display This Question:

If Was your old, replaced heat pump functioning at the time of replacement? = Functioning

Q77 If you had not replaced the central heat pump, how much longer do you think it would have operated?

- O Less than 2 years (1)
- O 2 to 4 years (2)
- O 5 to 10 years (3)
- O More than 10 years (4)
- O I don't know (98)

Q78 What is the approximate age of the central heat pump that was replaced?

_____

Q79 Around what year did you install the old central heat pump that you replaced?

- O Before 2006 (1)
- O Between 2006 and 2014 (2)
- O After 2014 (3)
- O I don't know (98)

End of Block: Heat Pump

Start of Block: Energy Star Doors

Q80 In this section we will ask you about the **ENERGY STAR doors** you installed.

Are the ENERGY STAR doors still installed?

- O Yes (1)
- O No, please explain: (2) _____

Q81 What type of door did your new ENERGY STAR door replace?

- O ENERGY STAR efficiency door (1)
- O Standard efficiency door (2)
- O I don’t know (98)

End of Block: Energy Star Doors

Start of Block: Contractor Satisfaction

Display This Question:

If CONTRACTOR = 1

Or Who installed the smart thermostat that you received a rebate for? = Contractor installed

Q82 Where did you find the contact information for the contractor that implemented the measure(s) you installed through the Residential Energy Efficiency Program?

- O **Avista** website (1)
- O A **Residential Energy Efficiency Program** representative referred you to the contractor (2)
- O The contractor was someone who you worked with before (3)
- O Through a personal contact *(e.g., family member, friend, colleague, neighbor, etc.)* (4)
- O Internet search (5)
- O Other, please specify (6) _____

Display This Question:

If CONTRACTOR = 1

Or Who installed the smart thermostat that you received a rebate for? = Contractor installed

X→

Q83 Did the contractor show you the discount you were receiving through **Residential Energy Efficiency Program** for implementing the measure(s) you installed?

- O Yes (1)
- O No (2)
- O I do not recall (98)

Display This Question:

If Who installed the smart thermostat that you received a rebate for? = Contractor installed

Or CONTRACTOR = 1

Q84 Please rate your agreement with the following statements regarding your experience with the contractor.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
The contractor was courteous and professional. (1)	O	O	O	O	O
The work was scheduled in a reasonable amount of time. (2)	O	O	O	O	O
The time it took to complete the work was reasonable. (3)	O	O	O	O	O

Display This Question:

If CONTRACTOR = 1

Or Who installed the smart thermostat that you received a rebate for? = Contractor installed

Q85 In addition to the work your contractor completed on the measure(s) installed through the program, did the contractor identify other energy saving opportunities in your house?

O Yes (1)

O No (2)

O I don't recall (98)

Display This Question:

If In addition to the work your contractor completed on the measure(s) installed through the program... = Yes

Q86 What types of energy saving opportunities did the contractor suggest?

_____

End of Block: Contractor Satisfaction

Start of Block: Satisfaction

Q87 In this section of the survey, we will ask you questions about your satisfaction with the service and offerings related to Avista's Residential Energy Efficiency Program.

Q88 How interested are you in making improvements in your home that would...

	Not at all interested (1)	Somewhat interested (2)	Moderately interested (3)	Very interested (4)	Extremely interested (5)
Increase its energy efficiency? (1)	O	O	O	O	O
Improve your comfort? (2)	O	O	O	O	O
Improve your health and safety? (3)	O	O	O	O	O
Other benefits, please specify: (4)	O	O	O	O	O

Q89 What is the likelihood you would **install** insulation yourself if you were able to receive a rebate?

- O Not at all likely (1)
- O Somewhat likely (2)
- O Moderately likely (3)
- O Very likely (4)
- O Extremely likely (5)

Q90 How reliable is Avista as a source for information about saving energy in your home?

- O Not at all reliable (1)
- O Somewhat reliable (2)
- O Moderately reliable (3)
- O Very reliable (4)
- O Extremely reliable (5)

Q195 Did you contact CAP agency staff with questions about your project?

- O Yes (1)
- O No (2)

Page Break

Q91 Did you contact Avista staff with questions about completing your project?

O Yes (1)

O No (2)

Page Break

Q92 Did an Avista representative ever visit your home to inspect any work associated with your project?

- O Yes (1)
- O No (2)
- O I don't know (98)

Page Break

Q93 Please rate your satisfaction with the following:

Display This Choice:

If Did you contact Avista staff with questions about completing your project? = Yes

Display This Choice:

If Did you contact Avista staff with questions about completing your project? = Yes

Display This Choice:

If OBR = 0

Or HEA = 0

Display This Choice:

If CONTRACTOR = 1

Or Who installed the smart thermostat that you received a rebate for? = Contractor installed

Display This Choice:

If Who installed the smart thermostat that you received a rebate for? = Contractor installed

Or CONTRACTOR = 1

Display This Choice:

If Did an Avista representative ever visit your home to inspect any work associated with your project? = Yes

Display This Choice:

If Did an Avista representative ever visit your home to inspect any work associated with your project? = Yes

Display This Choice:

If Did you contact CAP agency staff with questions about your project? = Yes

Display This Choice:

If Did you contact CAP agency staff with questions about your project? = Yes

Display This Choice:

If Did you contact CAP agency staff with questions about your project? = Yes

	Very dissatisfied (1)	Somewhat dissatisfied (2)	Neither dissatisfied nor satisfied (3)	Somewhat satisfied (4)	Very satisfied (5)
Display This Choice: *If Did you contact Avista staff with questions about completing your project? = Yes* How long it took program staff to address your questions or concerns (1)	O	O	O	O	O
Display This Choice: *If Did you contact Avista staff with questions about completing your project? = Yes* How thoroughly program staff addressed your questions or concerns (2)	O	O	O	O	O
The program participation process (3)	O	O	O	O	O
Display This Choice: *If OBR = 0* *Or HEA = 0* The rebate amount you received (16)	O	O	O	O	O

The rebate amount you received (5)	O	O	O	O	O
Display This Choice: *If CONTRACTOR = 1* *Or Who installed the smart thermostat that you received a rebate for? = Contractor installed*					
The contractor who you worked with (13)	O	O	O	O	O
Display This Choice: *If Who installed the smart thermostat that you received a rebate for? = Contractor installed* *Or CONTRACTOR = 1*					
The quality of the work provided by the contractor (6)	O	O	O	O	O

Display This Choice: *If Did an Avista representative ever visit your home to inspect any work associated with your project? = Yes* The process of scheduling the inspection (7)	O	O	O	O	O
Display This Choice: *If Did an Avista representative ever visit your home to inspect any work associated with your project? = Yes* The process of conducting the inspection (8)	O	O	O	O	O
Display This Choice: *If Did you contact CAP agency staff with questions about your project? = Yes* How long it took the CAP agency to address your questions or concerns (17)	O	O	O	O	O

Display This Choice: If Did you contact CAP agency staff with questions about your project? = Yes How thoroughly the CAP agency addressed your questions or concerns (18)	O	O	O	O	O
Display This Choice: If Did you contact CAP agency staff with questions about your project? = Yes Overall performance of the CAP agency you worked with (19)	O	O	O	O	O
The program overall (9)	O	O	O	O	O

Page Break

Display This Question:

If Please rate your satisfaction with the following: [Very dissatisfied] (Count) > 0

Or Please rate your satisfaction with the following: [Somewhat dissatisfied] (Count) > 0

Q94 You indicated some dissatisfaction. Please provide details about why you were dissatisfied.

_____

Page Break

Q95 How satisfied are you with Avista as your energy service provider?

- O Very dissatisfied (1)
- O Somewhat dissatisfied (2)
- O Neither dissatisfied nor satisfied (3)
- O Somewhat satisfied (4)
- O Very satisfied (5)

Q96 How has your participation in Avista's Energy Efficiency Programs changed your satisfaction with Avista?

- O Greatly decreased your satisfaction with Avista (1)
- O Somewhat decreased your satisfaction with Avista (2)
- O Did not affect your satisfaction with Avista (3)
- O Somewhat increased your satisfaction with Avista (4)
- O Greatly increased your satisfaction with Avista (5)

Q97 How likely is it that you would recommend the Avista's Energy Efficiency Programs to a friend, relative, or colleague?

- O Not at all likely (1)
- O Somewhat likely (2)
- O Moderately likely (3)
- O Very likely (4)
- O Extremely likely (5)

Page Break

Q98 Please rate your level of health and safety concern with allowing contractors or others into your home for the following:

	Not at all concerned (1)	Somewhat concerned (2)	Moderately concerned (3)	Very concerned (4)	Extremely concerned (5)
Repairs/maintenance of equipment (1)	O	O	O	O	O
Identifying energy savings opportunities (2)	O	O	O	O	O

Page Break

Display This Question:

If Please rate your level of health and safety concern with allowing contractors or others into your... [Not at all concerned] (Count) < 2

Q99 You indicated some health and safety concerns about allowing contractors or others into your home. What are the reasons for your concern?
(Please select all that apply.)

- ☐ COVID-19 (1)
- ☐ Concerns about other transmissible diseases (2)
- ☐ Personal safety concerns (3)
- ☐ Other, please specify (4) _____
- ☐ ⊗ No specify reasoning (98)
- ☐ ⊗ Prefer not to answer (99)

End of Block: Satisfaction

Start of Block: Willingness to Pay

Q100 How likely would you have been to complete the same energy efficiency upgrades, if the incentive was **75%** of what you received?

- O Very unlikely (1)
- O Somewhat unlikely (2)
- O Neither likely nor unlikely (3)
- O Somewhat likely (4)
- O Very likely (5)

Display This Question:

If How likely would you have been to complete the same energy efficiency upgrades, if the incentive... = Very unlikely

Q101 How likely would you have been to complete the same energy efficiency upgrades, if the incentive was **50%** of what you received?

- O Very unlikely (1)
- O Somewhat unlikely (2)
- O Neither likely nor unlikely (3)
- O Somewhat likely (4)
- O Very likely (5)

Display This Question:

If How likely would you have been to complete the same energy efficiency upgrades, if the incentive... = Very unlikely

Q102 How likely would you have been to complete the same energy efficiency upgrades, if the incentive was **25%** of what you received?

- O Very unlikely (1)
- O Somewhat unlikely (2)
- O Neither likely nor unlikely (3)
- O Somewhat likely (4)
- O Very likely (5)

End of Block: Willingness to Pay

Start of Block: Demographics

Q103 This last set of questions will help Avista develop more effective programs that may best serve the needs of the community. Your answers will remain anonymous and aggregated, so no information will be linked with you or your household. You may choose “Prefer not to answer.”

Do you own or rent the home at **${e://Field/ADDRESS}**?

- O Own (1)
- O Rent (2)
- O Own and rent to someone else (3)
- O I don’t know (98)
- O Prefer not to answer (99)

Display This Question:

If This last set of questions will help Avista develop more effective programs that may best serve t... = Own

Or This last set of questions will help Avista develop more effective programs that may best serve t... = Own and rent to someone else

Q104 When was your home built?

- O Before 1950 (1)
- O 1950 to 1959 (2)
- O 1960 to 1969 (3)
- O 1970 to 1979 (4)
- O 1980 to 1989 (5)
- O 1990 to 1999 (6)
- O 2000 to 2009 (7)
- O 2010 to 2019 (8)
- O 2020 to Present (9)
- O I don't know (98)
- O Prefer not to answer (99)

Q105 How many square feet is your home?
(Your best estimate is fine.)

- O Square Feet: (1) _____
- O I don't know (98)
- O Prefer not to answer (99)

Q106 What is the main fuel used to heat your home?

- O Electricity (1)
- O Natural Gas (2)
- O Propane (3)
- O Other, please specify (4) _____
- O I don't heat my home (5)
- O I don't know (98)
- O Prefer not to answer (99)

Q107 Do you use a central air conditioning system in your home?

- O Yes (1)
- O No (2)
- O I don't know (98)
- O Prefer not to answer (99)

Display This Question:

If Do you use a central air conditioning system in your home? = Yes

Q108 Is the central air conditioning system part of a heat pump?

- O Yes (1)
- O No (2)
- O I don't know (98)
- O Prefer not to answer (99)

Q109 What type of fuel does your water heater use?

- O Natural Gas (1)
- O Electricity (2)
- O Propane (3)
- O Other, please specify (4) _____
- O None (5)
- O I don't know (98)
- O Prefer not to answer (99)

Q110 Which best describes your home?

- O Single-family house detached (1)
- O Single-family house attached to one or more other houses *(e.g., duplex, condominium, townhouse, etc.)* (2)
- O Mobile or manufactured home (3)
- O Apartment with 2 to 4 units (4)
- O Apartment with 5+ units (5)
- O Other, please specify (6) _____
- O I don't know (98)
- O Prefer not to answer (99)

Q111 Including yourself, how many people live in your house year-round?

▼ 1 person (1) ... Prefer not to answer (99)

Q112 What is your age?

▼ 18 to 24 (1) ... Prefer not to answer (99)

Display This Question:

If What is your age? = 18 to 24

Or What is your age? = 25 to 34

Or What is your age? = 35 to 44

Or What is your age? = 45 to 54

Or What is your age? = 55 to 64

Q113 Is any member of your household age 65 or older?

- O Yes (1)
- O No (2)
- O Prefer not to answer (99)

Q114 Including all money earned from wages, salaries, tips, commissions, workers' compensation, unemployment insurance, child support, or other sources, about how much was your total annual household income before taxes in 2022?

▼ Less than $10,000 (1) ... Prefer not to answer (99)

Q115 What is the highest level of education you have completed?

- O Did not graduate high school (1)
- O High school graduate (2)
- O Associates degree, vocation/ technical school, or some college (3)
- O Four-year college degree (4)
- O Graduate or professional degree (5)
- O Prefer not to answer (99)

End of Block: Demographics

Start of Block: Incentive

Q116 This is the end of the survey. As a thank you for your time answering our questions, we would like to provide you a $20 gift card for all respondents that qualify.

The email address we have for you is **${e://Field/EMAIL}**. Please let us know if you would like us to send your electronic gift card to this address or a different address.

- O Please send my electronic gift card to the **above** email address (1)
- O Please send my electronic gift card to the **following** email address: (2)

_____

End of Block: Incentive

6.1.2 Residential MFDI Survey (Property Managers)

Avista- Residential Participant Survey (MFDI)

Start of Block: Screener

QA What is your name?

_____

QB What is the name of the building you manage?

_____

QC How many units are in the building you manage?

_____

Q1 To start off this survey, we will ask you about your participation in the program.

Our program records indicate that your apartment building participated in one of Avista's Residential Energy Efficiency Program in 2022. Is that correct?

O Yes (1)

O No (4)

Skip To: End of Survey If To start off this survey, we will ask you about your participation in the program. Our program re... = No

End of Block: Screener

Start of Block: Program Awareness

Q2 In this section we will ask you questions about your awareness of the program.

How did you learn about **Avista's Residential Energy Efficiency Program**?
(Please select all that apply.)

- ☐ Mailed information from Avista (1)
- ☐ Email from Avista (2)
- ☐ Newspaper or magazine article or advertisement (3)
- ☐ Contractor (4)
- ☐ Community Action Program (CAP Agency) (5)
- ☐ Tribal Housing Authority (6)
- ☐ Food Bank (7)
- ☐ Energy fair or other community events (8)
- ☐ Word of mouth from a personal contact *(e.g., family member, friend, neighbor, colleague, etc.)* (9)
- ☐ Radio advertisement (10)
- ☐ Utility bill message (11)
- ☐ Utility website (12)
- ☐ Another website (13)
- ☐ Social media*(i.e., Facebook, Instagram, Twitter, Tik Tok, etc.)* (14)

- ☐ Avista program staff (15)
- ☐ Information at a retailer (16)
- ☐ Other, please specify: (96) _____

Q3 How much did each of the following contribute to your decision to install the energy efficient equipment you received through the program?

	Not at all (1)	A little (2)	A moderate amount (3)	A lot (4)	A great deal (5)	Not applicable (97)
Reducing your monthly utility bill (1)	O	O	O	O	O	O
Helping the environment (2)	O	O	O	O	O	O
Other benefits, please specify: (3)	O	O	O	O	O	O

Q4 When thinking about purchasing/installing the energy efficient equipment you received through the program, what sources of information where important in your decision making?
(Please select all that apply.)

- ☐ Contractor recommendation (1)
- ☐ Utility recommendation or information (2)
- ☐ Recommendation from a person contact *(e.g., family member, friend, neighbor, colleague, etc.)* (3)
- ☐ Other, please specify: (96) _____
- ☒ None of the above (97)
- ☒ I don't know (98)

Q5 How important was the Avista funding in your decision to install the energy efficient equipment you received through the program?

- ○ Not at all important (1)
- ○ Somewhat important (2)
- ○ Moderately important (3)
- ○ Very important (4)
- ○ Extremely important (5)

Q6 What is your level of awareness about Avista's home audit/assessment program?

- O I have never heard of it before now (1)
- O I have heard of it but don't know anything about it (2)
- O I know a little about it (3)
- O I know a lot about it (4)

End of Block: Program Awareness

Start of Block: Satisfaction

Q7 In this section of the survey, we will ask you questions about your satisfaction with the service and offerings related to Avista's Residential Energy Efficiency Program.

How interested are you in making improvements in your home that would...

	Not at all interested (1)	Somewhat interested (2)	Moderately interested (3)	Very interested (4)	Extremely interested (5)
Increase its energy efficiency? (1)	O	O	O	O	O
Improve your comfort? (2)	O	O	O	O	O
Improve your health and safety? (3)	O	O	O	O	O

Q8 What is the likelihood you would **install** insulation yourself if you were able to receive a rebate?

- O Not at all likely (1)
- O Somewhat likely (2)
- O Moderately likely (3)
- O Very likely (4)
- O Extremely likely (5)

Q9 How reliable is Avista as a source for information about saving energy in your home?

- O Not at all reliable (1)
- O Somewhat reliable (2)
- O Moderately reliable (3)
- O Very reliable (4)
- O Extremely reliable (5)

Q10 Did you contact Avista staff with questions about completing your project?

- O Yes (1)
- O No (2)

Q12 Did an Avista representative ever visit your building to inspect any work associated with your project?

- O Yes (1)
- O No (2)
- O I don't know (98)

Q13 Please rate your satisfaction with the following:

	Very dissatisfied (1)	Somewhat dissatisfied (2)	Neither dissatisfied nor satisfied (3)	Somewhat satisfied (4)	Very satisfied (5)	N/A (6)
The program participation process (3)	O	O	O	O	O	O
Energy saving equipment you received (4)	O	O	O	O	O	O
The contractor who did the installation (5)	O	O	O	O	O	O
The process of scheduling the inspection (7)	O	O	O	O	O	O
The program overall (10)	O	O	O	O	O	O

Display This Question:

If Please rate your satisfaction with the following: [Very dissatisfied] (Count) > 0

Or Please rate your satisfaction with the following: [Somewhat dissatisfied] (Count) > 0

Q14 You indicated some dissatisfaction. Please provide details about why you were dissatisfied.

_____

Q15 How satisfied are you with Avista as your energy service provider?

- O Very dissatisfied (1)
- O Somewhat dissatisfied (2)
- O Neither dissatisfied nor satisfied (3)
- O Somewhat satisfied (4)
- O Very satisfied (5)

Q16 How has your participation in Avista's Residential Energy Efficiency Program changed your satisfaction with Avista?

- O Greatly decreased your satisfaction with Avista (1)
- O Somewhat decreased your satisfaction with Avista (2)
- O Did not affect your satisfaction with Avista (3)
- O Somewhat increased your satisfaction with Avista (4)
- O Greatly increased your satisfaction with Avista (5)

Q17 How likely is it that you would recommend the Avista Residential Energy Efficiency Program to a friend, relative, or colleague?

- O Not at all likely (1)
- O Somewhat likely (2)
- O Moderately likely (3)
- O Very likely (4)
- O Extremely likely (5)

End of Block: Satisfaction

Start of Block: Incentive

Q33 This is the end of the survey. As a thank you for your time answering our questions, we would like to provide you a $10 gift card for all respondents that qualify.

Please let us know what email you would like us to send your electronic gift card to.

_____

End of Block: Incentive

6.1.3 Residential Non-Participant Survey

Avista Residential Nonparticipant

Start of Block: Default Question Block

Q2 Welcome! Thanks for agreeing to provide your feedback about your experience using Avista's service and programs. Your feedback is very important to us and will help us improve programs for customers like you. This survey should take about 15 minutes. Your responses are confidential and will be used for research purposes only. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. Upon completion of the survey we will collect your email address to send a $10 electronic gift card as a token of our thanks.

To start, we have a few questions about your awareness of some of Avista's programs and services.

Page Break

Q1 According to program records, Avista provides electric and/or gas services to your residence at ${e://Field/ADDRESS}. Is that correct?

O Yes (1)

O Yes, but address is incorrect (please write in correct address) (2)
_____

O No (3)

End of Block: Default Question Block

Start of Block: Block 2

Q3 To the best of your knowledge have you had a home energy assessment, HVAC tune-up, or replaced or upgraded equipment that requires electricity, in the last three years? This could have been related to lighting, HVAC, or refrigeration equipment.

O Yes (1)

O No (2)

O Don't know (98)

Page Break

Display This Question:

If To the best of your knowledge have you had a home energy assessment, HVAC tune-up, or replaced or... = Yes

Q4 What types of services or equipment upgrades have you done in the last three years? Select all that apply

- ☐ Lighting (1)
- ☐ HVAC equipment (98)
- ☐ A/C tune-up (99)
- ☐ Smart thermostat(s) (100)
- ☐ Low flow faucet aerator(s) (101)
- ☐ Low flow showerhead(s) (102)
- ☐ Advanced power strip(s) (103)
- ☐ Home energy assessment (104)
- ☐ Other – please specify (105) _____

Page Break

Display This Question:

If To the best of your knowledge have you had a home energy assessment, HVAC tune-up, or replaced or... = Yes

Q5 Did you receive an incentive from Avista for any of those upgrades or services?

- O Yes (1)
- O No (2)
- O I don't know (98)

End of Block: Block 2

Start of Block: Block 1

Q7 Before today, have you heard that Avista offers a Residential Energy Efficiency Program?

- O Yes (1)
- O No (2)
- O I don’t know (98)

Page Break

Display This Question:

If Before today, have you heard that Avista offers a Residential Energy Efficiency Program? = Yes

Q8 How did you learn about Avista's energy efficiency program offerings? Select all that apply

- ☐ Mailed information from Avista (1)
- ☐ Email from Avista (2)
- ☐ Newspaper or magazine article or advertisement (3)
- ☐ Contractor (4)
- ☐ Word of mouth from a personal contact (e.g., family member, friend, neighbor, colleague, etc.) (5)
- ☐ Radio advertisement (6)
- ☐ Utility bill message (7)
- ☐ Utility website (8)
- ☐ Another website (9)
- ☐ Social media (i.e., Facebook, Instagram, Twitter, Tik Tok, etc.) (10)
- ☐ Avista program staff (11)
- ☐ Information at a retailer (12)
- ☐ Other, please specify (13) _____
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If Before today, have you heard that Avista offers a Residential Energy Efficiency Program? = Yes

Q9 What programs or services were you already aware of? Select all that apply

- ☐ Incentives to replace inefficient equipment in your home (1)
- ☐ Incentives to incorporate energy efficiency into new construction designs (2)
- ☐ Incentives for heating and cooling equipment (3)
- ☐ Free home energy audit (4)
- ☐ Other – please specify (5) _____
- ☐ ⊗ Don't know (6)

Page Break

Q10 Are you interested in making any energy efficiency upgrades and participating in any of Avista's energy efficiency programs?

- O Yes (1)
- O No (2)
- O Don't know (98)

Page Break

Q11 What energy efficiency upgrades or programs are you interested in? Select all that apply

- ☐ Lighting (1)
- ☐ HVAC equipment (2)
- ☐ HVAC fuel switching (3)
- ☐ Water heater (4)
- ☐ Water heater conversion (5)
- ☐ Smart thermostats (6)
- ☐ Low flow faucet aerators (7)
- ☐ Low flow showerheads (8)
- ☐ ENERGY STAR Homes Program (9)
- ☐ ENERGY STAR Room Air Conditioners (10)
- ☐ Home energy audit or assessment (11)
- ☐ ENERGY STAR Appliances (e.g., washer, dryer, refrigerator, freezer) (12)
- ☐ Home weatherization (e.g., pipe wrap insulation, attic insulation, insulated door) (13)
- ☐ On Bill Repayment Program (14)

☐ Always On Home Energy Report Program (15)

☐ Other – please specify (96)

_____

☐ ⊗ Don't know (98)

Page Break

Q12 On a scale of 1 through 5, where 1 means “not at all interested” and 5 means “very interested”, how interested are you in participating in Avista’s energy efficiency programs?

- O 1 – Not at all interested (1)
- O 2 (2)
- O 3 (3)
- O 4 (4)
- O 5 – Very interested (5)
- O Don’t know (98)

Page Break

Q6 What might prevent you from participating in Avista's programs? Select all that apply

- ☐ Don't know enough about the program (1)
- ☐ Energy savings from the equipment replacements or upgrades was not worth the trouble (2)
- ☐ Unlikely to replace any equipment (3)
- ☐ Too much time or trouble required to fill out the required paperwork (4)
- ☐ Incentives are not high enough to offset the cost of high efficiency equipment, compared to standard efficiency equipment (5)
- ☐ Prefer not to deal with Avista (6)
- ☐ I am financially able to make the upgrades without the incentives (7)
- ☐ Not interested in what Avista is offering (8)
- ☐ Don't have the authority to participate in any of the Avista programs (9)
- ☐ Other – please specify (96)

_____

- ☐ ⊗ Don't know (98)

Page Break

Q14 We understand that it is not always possible to make improvements and energy efficiency upgrades to your home. Which of the following best describes your authority to make decisions?

- O No authority – as a renter I am not permitted to make improvements and energy efficiency upgrades (1)
- O Some authority – as a renter I am permitted to make some improvements or upgrades (2)
- O Full authority – I am the owner (3)
- O Full authority – as part of my rental agreement I am required to maintain/repair the home (4)
- O Don't know (98)

Page Break

Q15 What do you feel is the largest energy consumer in your home?

- O Computer equipment (1)
- O Refrigeration (2)
- O HVAC (3)
- O Lighting (4)
- O Other – please specify (96) _____
- O Don't know (98)

Page Break

Q16 Are you aware of the current lighting type(s) installed in your home?

O Yes (1)

O No (2)

Page Break

Display This Question:

If Are you aware of the current lighting type(s) installed in your home? = Yes

Q17 Which of the following lighting technologies are currently installed? Select all that apply

- ☐ Incandescent (1)
- ☐ Halogen (2)
- ☐ Fluorescent (3)
- ☐ CFL bulbs or fluorescent tubes (4)
- ☐ LED (5)

Page Break

X→

Q18 Is your home air conditioned?

- O Yes (1)
- O No (2)
- O Don't know (98)

Page Break

Display This Question:

If Is your home air conditioned? = Yes

Q19 What type of A/C do you currently have in your home?

- O Central A/C (1)
- O Heat pump (2)
- O Mini-split (3)
- O Wall or window mounted A/C unit (4)
- O Don't know (98)

Page Break

Display This Question:

If What type of A/C do you currently have in your home? != Don't know

Q20 Approximately how old is the air conditioning system?

- O Less than 10 years old (1)
- O 10 to 20 years old (2)
- O More than 20 years old (3)
- O Don't know (98)

Page Break

Q21 What type of heating system do you currently have in your home?

- O Electric resistance (i.e. baseboard) (1)
- O Gas furnace (2)
- O Heat pump (3)
- O Mini-split (4)
- O Don't heat the home (5)
- O Don't know (98)

Page Break

Display This Question:

If What type of heating system do you currently have in your home? != Don't know

And What type of heating system do you currently have in your home? != Don't heat the home

Q22 Approximately how old is the heating system?

- O Less than 10 years old (1)
- O 10 to 20 years old (2)
- O More than 20 years old (3)
- O Don't know (98)

Page Break

Display This Question:

If What type of heating system do you currently have in your home? != Don't heat the home

Q23 When was the last time your heating and/or cooling system was serviced?

- O Less than 1 year ago (1)
- O 1 to 3 years ago (2)
- O More than 3 years ago (3)
- O It's never been serviced (4)
- O Don't know (98)

Page Break

Q24 What type of thermostat do you use?

- O Manual (1)
- O Programmable (2)
- O Smart thermostat (3)
- O Don't know (98)

Page Break

Q25 This last set of questions will help Avista develop more effective programs that may best serve the needs of the community. Your answers will remain anonymous and aggregated, so no information will be linked with you or your household. You may choose “Prefer not to answer.”

Page Break

Q41 What type of energy services do you receive from Avista? *Please select all that apply*

- ☐ Electricity (1)
- ☐ Natural gas (2)

Page Break

Q26 Do you own or rent the home at ${e://Field/ADDRESS}?

- O Own (1)
- O Rent (2)
- O Own and rent to someone else (3)
- O Don't know (98)
- O Prefer not to answer (99)

Page Break

Display This Question:

If Do you own or rent the home at ${e://Field/ADDRESS}? = Own

Or Do you own or rent the home at ${e://Field/ADDRESS}? = Own and rent to someone else

Q32 When was your home built?

- O Before 1950 (1)
- O 1950 to 1959 (2)
- O 1960 to 1969 (3)
- O 1970 to 1979 (4)
- O 1980 to 1989 (5)
- O 1990 to 1999 (6)
- O 2000 to 2009 (7)
- O 2010 to 2019 (8)
- O 2020 to Present (9)
- O Don't know (98)
- O Prefer not to answer (99)

Page Break

Q33 How many square feet is your home? (Your best estimate is fine)

_____

Page Break

Q34 What is the main fuel used to heat your home?

- O Electricity (1)
- O Natural Gas (2)
- O Propane (3)
- O Pellet/wood stove (100)
- O Other, please specify (4) _____
- O I don't heat my home (5)
- O Don't know (98)
- O Prefer not to answer (99)

Page Break

Q35 Do you use a central air conditioning system in your home?

- O Yes (1)
- O No (4)
- O Don’t know (5)
- O Prefer not to answer (6)

Page Break

Display This Question:

If Do you use a central air conditioning system in your home? = Yes

Q36 Is the central air conditioning system part of a heat pump?

- O Yes (1)
- O No (2)
- O Don't know (98)
- O Prefer not to answer (99)

Page Break

Q37 What type of fuel does your water heater use?

- O Natural Gas (1)
- O Electricity (2)
- O Propane (3)
- O Other, please specify (4) _____
- O None (5)
- O Don't know (98)
- O Prefer not to answer (99)

Page Break

Q38 Which best describes your home?

- O Single-family house detached (1)
- O Single-family house attached to one or more other houses (e.g., duplex, condominium, townhouse, etc.) (2)
- O Mobile or manufactured home (3)
- O Apartment with 2 to 4 units (4)
- O Apartment with 5+ units (5)
- O Other, please specify (6) _____
- O Don't know (98)
- O Prefer not to answer (99)

Page Break

Q39 Including yourself, how many people live in your house year-round?

- O 1 person (1)
- O 2 people (2)
- O 3 people (3)
- O 4 people (4)
- O 5 people (5)
- O 6 people (6)
- O 7 people (7)
- O 8 or more people (8)
- O Prefer not to answer (99)

Page Break

Q40 What is your age?

- O 18 to 24 (1)
- O 25 to 34 (2)
- O 35 to 44 (3)
- O 45 to 54 (4)
- O 55 to 64 (5)
- O 65 to 75 (6)
- O 75 or older (7)
- O Prefer not to answer (99)

Page Break

Q42 Is there anything else you would like Avista to know?

_____

_____

_____

_____

_____

Page Break

Q30 Thank you for taking the time to provide us with this valuable information. As a thank you for completing this survey, we will send you a $10 gift card. You should expect to receive your gift card within 5-10 business days via email. Please be sure to check your spam and junk folders. To confirm, the correct email address to send the gift card to is ${e://Field/EMAIL}?

O Please send my electronic gift card to the above email address (1)

O Please send my electronic gift card to the following email address: (2)
_____

End of Block: Block 1

6.1.4 Nonresidential Participant Survey

Avista - Nonresidential Participant Survey

Start of Block: Screening

Q77 Welcome! Thank you for taking this survey to tell us about your experience with Avista's Non-Residential programs! Your feedback is very important to us and will help us improve programs for customers like you. This survey should take about 15 minutes. Your responses are confidential and will be used for research purposes only. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. Upon completion of the survey we will collect your email address to send a $20 electronic gift card as a token of our thanks.

Q1 Our program records indicate your organization received a rebate through Avista's **${e://Field/PROGRAM}** Program for installing **${e://Field/ALL_MEASURES}**. Is that correct?

O Yes (1)

O No (2)

Display This Question:

If Our program records indicate your organization received a rebate through Avista's ... = No

Q2 Is there someone else in your business who may be able to answer questions about your business's participation in the program?

O Yes (1)

O No (2)

Skip To: End of Block If Is there someone else in your business who may be able to answer questions about your business's... = No

Display This Question:

If Is there someone else in your business who may be able to answer questions about your business's... = Yes

Q3 Can you provide me with their contact information?

O Name (1) _____

O Phone Number (2) _____

O Email (3) _____

End of Block: Screening

Start of Block: Background

Q4 Which of the following most closely represents your job title/ role?
(Note, if your job title/role is not listed below please use "Other, please specify.")

- O Facilities Manager (1)
- O Energy Manager (2)
- O Other facilities management/ maintenance position (3)
- O Chief Financial Officer (4)
- O Other financial/ administrative position (5)
- O Proprietor/ Owner (6)
- O President/ CEO (7)
- O Manager (8)
- O Other, please specify: (9) _____

Q5 Does your company have any of the following policies or procedures in place?

	Yes (1)	No (2)	I don't know (98)
A person or people responsible for monitoring and/ or managing energy usage (1)	O	O	O
Defined energy savings goals (2)	O	O	O
A specific policy requiring that energy efficiency be considered when purchasing equipment (3)	O	O	O
Carbon reduction goals (4)	O	O	O

Q6 How did you **FIRST** learn about Avista's rebates for efficient equipment upgrades?

- O From a contractor, equipment vendor, or energy consultant (1)
- O From an Avista account representative (2)
- O From a program representative or Avista staff member (3)
- O From a search engine (Google, Yahoo, Bing, etc.) (4)
- O At an event or tradeshow (5)
- O Received an email blast or electronic newsletter (6)
- O Received an informational brochure (7)
- O From Avista's website (8)
- O From a personal contact (e.g., friend, family member, colleague, neighbor, etc.) (9)
- O Other, please specify: (10) _____
- O I don't know (98)

Q7 How long have you known about Avista's commercial rebates program?

- O Less than a year (1)
- O More than 1 year to 2 years (2)
- O More than 2 years to 3 years (3)
- O More than 3 years (4)
- O I don't know (98)

Q8 Besides the rebate for installing **${e://Field/ALL_MEASURES}**, are you aware of any other offerings from Avista for commercial and industrial customers?

- O Yes (1)
- O No (2)

Display This Question:

If Besides the rebate for installing ${e://Field/ALL_MEASURES}, are you aware of any other offerings... = Yes

Q9 Which of the other programs are you aware of?
(Please select all that apply.)

- ☐ Site-specific (1)
- ☐ Prescriptive lightning (2)
- ☐ HVAC (Gas) (3)
- ☐ HVAC (variable frequency drive) (4)
- ☐ Shell (5)
- ☐ Food Service (6)
- ☐ Green Motors (7)
- ☐ Grocer Programs (8)
- ☐ Fleet Heat (9)
- ☐ Compressed Air (10)
- ☐ Business Partners Program (11)
- ☐ Washington State Clean Building Act Early Adopter Pilot Program (12)
- ☐ Energy Use Index Retrofit Pilot Program (13)
- ☐ Smart Buildings Center Tool Lending Pilot Program (14)

☐ Active Energy Management Pilot Program (15)

☐ ⊗ None of the above (16)

Q10 How important was each of the following in your organization's decision to replace existing equipment with the new equipment?

	Not at all important (1)	Somewhat important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Reducing energy costs (1)	O	O	O	O	O
Reducing energy consumption for reasons other than cost (2)	O	O	O	O	O
Improving equipment performance (3)	O	O	O	O	O
Improving equipment aesthetics (4)	O	O	O	O	O
Improving customer and/or employee comfort (5)	O	O	O	O	O

Q11 What are the best ways to reach companies like yours with information about rebates for energy savings opportunities?
(Please select all that apply.)

- ☐ Visits from contractors or program staff (1)
- ☐ Target the owners or upper management of the business (2)
- ☐ Bill inserts (3)
- ☐ Email (4)
- ☐ Direct mail (5)
- ☐ Phone (6)
- ☐ Other, please specify: (7) _____

Q12 Which of the following considerations helped you decide to purchase energy efficient equipment instead of standard efficiency equipment?
(Please select all that apply.)

- ☐ Saving money on your energy bills (1)
- ☐ Saving energy (2)
- ☐ Protecting the environment (3)
- ☐ Recommendation from a contractor (4)
- ☐ Recommendation from Avista program staff (5)
- ☐ Financial incentive (6)
- ☐ Replacing equipment that was broken (7)
- ☐ The participation process was easy (8)
- ☐ Other, please specify: (9) _____

Q13 Before participating in the program, had you installed any other energy efficient equipment or measures?

- ○ Yes (1)
- ○ No (2)

End of Block: Background

Start of Block: Program Efficiency

Q15 When you were first approached about the program, did you have any concerns about participating or was it an easy decision?

- O I had some concerns (1)
- O It was an easy decision (2)
- O I don't know (98)

Display This Question:

If When you were first approached about the program, did you have any concerns about participating o... = I had some concerns

Q16 What were your concerns?

_____

Display This Question:

If When you were first approached about the program, did you have any concerns about participating o... = I had some concerns

Q17 Why did you decide to participate despite your concerns?

_____

Q20 Who helped you complete the application for the program?
(Please select all that apply.)

- ☐ Another member of your company (1)
- ☐ A contractor (2)
- ☐ An equipment vendor (3)
- ☐ Other, please specify: (4) _____
- ☒ None, I completed the application myself (5)

Q21 How clear was the application to complete?

- ○ Extremely unclear (1)
- ○ Somewhat unclear (2)
- ○ Neither clear nor unclear (3)
- ○ Somewhat clear (4)
- ○ Extremely clear (5)

Display This Question:

If How clear was the application to complete? = Extremely unclear

Or How clear was the application to complete? = Somewhat unclear

Q22 What additional information would need to be provided to make the application process more clear?

_____

Q23 Please rate how acceptable the following were:

	Not all acceptable (1)	Somewhat acceptable (2)	Moderately acceptable (3)	Very acceptable (4)	Completely acceptable (5)
The ease of finding the information needed on the Avista website. (1)	O	O	O	O	O
The ease of completing the application process. (2)	O	O	O	O	O
The time it took for your application to be approved. (3)	O	O	O	O	O
The effort required to provide the required supporting documentation. (4)	O	O	O	O	O
The overall application processes. (5)	O	O	O	O	O

Q24 Did you have a clear sense of whom you could go to for assistance with the application process?

- O Yes (1)
- O No (2)

X→

Q25 How did the rebate amount compare to what you expected?

- O It was much less (1)
- O It was somewhat less (2)
- O It was about the amount expected (3)
- O It was somewhat more (4)
- O It was much more (5)
- O I don't know (98)

Display This Question:

If How did the rebate amount compare to what you expected? = It was much less

Or How did the rebate amount compare to what you expected? = It was somewhat less

Q26 You indicated the rebate amount was **less than** what you expected. What led you to believe you would get a higher rebate than you did?

_____

Q27 Once the project was complete, how much time passed until your organization received the rebate payment?

- O Less than 2 weeks (1)
- O 2 to 4 weeks (5)
- O More than 4 weeks to 6 weeks (2)
- O More than 6 weeks to 8 weeks (3)
- O Other, please specify: (4) _____

Q28 How satisfied were you with the amount of time it took to receive the rebate?

- O Very dissatisfied (1)
- O Somewhat dissatisfied (2)
- O Neither satisfied nor dissatisfied (3)
- O Somewhat satisfied (4)
- O Extremely satisfied (5)

Display This Question:

If How satisfied were you with the amount of time it took to receive the rebate? = Very dissatisfied

Or How satisfied were you with the amount of time it took to receive the rebate? = Somewhat dissatisfied

Q29 You indicated some dissatisfaction with the time it took to receive the rebate. What could be improved

_____

End of Block: Program Efficiency

Start of Block: Measurement and Verification

Display This Question:

If LIGHTING = 1

Q30 In this section we will ask you about the **lighting** you installed.

Is the lighting you purchased currently installed and operating?

- O Yes, all (1)
- O Some, but not all (100)
- O No (98)
- O Don't know (101)

Display This Question:

If LIGHTING = 1

Q31 Did the lighting that you received a rebate for replace an existing lamps/fixtures?

- O Yes (1)
- O No (2)
- O I don’t know (98)

Page Break

Display This Question:

If VFD = 1

Q32 In this section we will ask you about the **Variable Frequency Drive (VFD)** you installed.

Is the VFD currently installed and operating?

O Yes (1)

O No, please explain: (2) _____

O I don't know (3)

Display This Question:

If In this section we will ask you about the Variable Frequency Drive (VFD) you installed. Is the VF... = Yes

X→

Q33 What type of equipment is the VFD installed on?

O Cooling Pump (1)

O Fan (2)

O Heating pump or combo (3)

O I don't know (98)

Page Break

Display This Question:

If FURNACE = 1

Q34 In this section we will ask you about the ${e://Field/ALL_MEASURES} i you installed.

Is the equipment currently installed and operating?

- O Yes (1)
- O No. please explain: (2) _____
- O I don't know (3)

Display This Question:

If In this section we will ask you about the ${e://Field/ALL_MEASURES} i you installed. Is the equip... = Yes

X→

Q35 What type of equipment is it?

- O Single stage furnace (1)
- O Multi stage furnace (2)
- O Boiler (3)
- O Unit heater (4)
- O Smart thermostat (99)
- O I don't know (98)

Display This Question:

If In this section we will ask you about the ${e://Field/ALL_MEASURES} i you installed. Is the equip... = Yes

Q36 What is the capacity of the equipment?
(Please provide numeric value, if you are unsure please state "I don't know.")

_____

Page Break

Display This Question:

If INSULATION = 1

Q37 In this section we will ask you about the **insulation** you installed.

Approximately how many square feet of insulation was installed?
(Please provide numeric value, if you are unsure please state "I don't know.")

_____

Display This Question:

If INSULATION = 1

Q38 What is the final R-value of the insulation?

- O R11-R18 (1)
- O R19+ (2)
- O R30-R44 (3)
- O I don't know (98)

Page Break

Display This Question:

If MOTOR = 1

Q39 In this section we will ask you about the **motor** you had rewound.

Is the newly rewound motor currently installed in operating?

- O Yes (1)
- O No, please explain: (2) _____
- O I don't know (98)

Display This Question:

If MOTOR = 1

Q40 Is the motor being used for industrial or agricultural needs?

- O Industrial (1)
- O Agricultural (2)
- O I don't know (98)

Page Break

Display This Question:

If BLOCK_HEATER = 1

Q41 In this section we will ask you about the **block heater controls** you installed.

Are the block heater controls currently installed in operating?

- O Yes (1)
- O No, please explain: (2) _____
- O I don't know (98)

Display This Question:

If BLOCK_HEATER = 1

Q42 Are the controls engine-mounted or wall-mounted?

- O Engine-mounted (1)
- O Wall-mounted (2)
- O I don't know (98)

Page Break

Display This Question:

If FS_EQP = 1

Q43 In this section we will ask you about the **food service equipment** you installed.

Is the ${e://Field/ALL_MEASURES} installed OR in regular use?

- O Yes (1)
- O No, please explain: (2) _____
- O I don't know (98)

Display This Question:

If FS_EQP = 1

Q44 Did the ${e://Field/ALL_MEASURES} that you received a rebate for replace existing equipment?

- O Yes (1)
- O No (2)
- O I don't know (98)

Page Break

Display This Question:

If REFRIGERATION_EQP = 1

Q45 In this section we will ask you about the **refrigeration equipment** you installed.

Is the ${e://Field/ALL_MEASURES} installed and currently operating?

- O Yes (1)
- O No, please explain: (2) _____
- O I don't know (98)

Display This Question:

If REFRIGERATION_EQP = 1

Q46 Did the ${e://Field/ALL_MEASURES} that you received a rebate for replace existing equipment?

- O Yes (1)
- O No (2)
- O I don't know (98)

Page Break

Display This Question:

If SITESPECIFIC = 1

Q75 In this section we will ask you about the **site specific equipment** you installed.

Is the ${e://Field/ALL_MEASURES} installed and currently operating?

- O Yes (1)
- O No, please explain: (2) _____
- O I don't know (98)

Display This Question:

If SITESPECIFIC = 1

Q76 Did the ${e://Field/ALL_MEASURES} equipment that you received a rebate for replace existing equipment?

- O Yes (1)
- O No (2)
- O I don't know (98)

Page Break

Q47 After your project was complete, did a program representative inspect the work completed through the program?

- O Yes (1)
- O No (2)
- O I don't know (98)

Q48 Please indicate your agreement with the following statements:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
The inspector was courteous. (1)	O	O	O	O	O
The inspector was efficient. (2)	O	O	O	O	O
The inspector was knowledgeable. (3)	O	O	O	O	O
The inspector was professional. (4)	O	O	O	O	O

End of Block: Measurement and Verification

Start of Block: Small Business Direct Install

Q63 Program records indicate that your business received lighting equipment through Avista's Small Business Direct Install program. Is this correct?

- O Yes (1)
- O No (2)
- O I don't know if we received lighting equipment (98)

Page Break

Display This Question:

If Program records indicate that your business received lighting equipment through Avista's Small Bu... = I don't know if we received lighting equipment

Q64 Is there someone else we should speak with that might know about the lighting equipment receiving through the Small Business Direct Install Program?

O Yes – Please provide their name and email address or phone number (1)
_____

O No (4)

O Don't know (5)

Page Break

Q65 Did you receive a project proposal/assessment through the program? A project proposal/assessment may have been provided if someone from the SBDI program team completed an assessment of the lighting in your facility prior to installation.

- O Yes (1)
- O No (2)
- O Don't know (98)

Page Break

Q66 Using the scale below, how helpful was that project proposal to you?

- O 1 – Not at all helpful (1)
- O 2 (2)
- O 3 (3)
- O 4 (4)
- O 5 – Very helpful (5)
- O Don't know (98)

Page Break

Display This Question:

If Using the scale below, how helpful was that project proposal to you? = 1 – Not at all helpful

Or Using the scale below, how helpful was that project proposal to you? = 2

Q67 Why do you think the project proposal was not helpful?

_____

_____

_____

_____

_____

Page Break

Q68 Are you interested in making additional energy efficiency improvements?

- O Yes (1)
- O No (2)
- O Don't know (3)

Page Break

Display This Question:

If Are you interested in making additional energy efficiency improvements? = Yes

Q69 What additional improvements are you most interested in? Select all that apply

- ☐ HVAC equipment (1)
- ☐ Demand Control Ventilation (4)
- ☐ Commercial A/C tune-up (5)
- ☐ Pool Covers (6)
- ☐ Pumps (7)
- ☐ Heat Pump Water Heaters (8)
- ☐ Custom projects (9)
- ☐ Other – please specify (10) _____

Page Break

Q70 Have any of the bulbs from SBDI been removed since initial installation?

O Yes – how many have been removed: (1) _____

O No (4)

O Don't know (5)

Page Break

Display This Question:

If Have any of the bulbs from SBDI been removed since initial installation? = Yes – how many have been removed:

Q71 Why were the bulbs removed? Select all that apply

- O They were too bright (1)
- O They were too dim (4)
- O They stopped working (5)
- O They flickered (6)
- O Didn't like the color of the light (7)
- O For another reason – please specify (8)

_____

Page Break

Q72 Did the contractors who installed the lighting, leave behind any uninstalled, spare equipment (e.g., lighting, lamps, bulbs)?

O Yes (1)

O No (2)

O Don't know (3)

Page Break

Display This Question:

If Did the contractors who installed the lighting, leave behind any uninstalled, spare equipment (e.... = Yes

Q73 What kind of uninstalled equipment did they leave behind?

_____

End of Block: Small Business Direct Install

Start of Block: Barriers and Satisfaction

Q49 What are the most significant challenges that your organization faces when making energy efficient improvements?
(Please select all that apply.)

- ☐ High initial cost (1)
- ☐ Understanding the potential areas for improvement *(i.e., lack of technical knowledge)* (2)
- ☐ Funding competition with other investments or improvements (3)
- ☐ Long payback period or return on investment (4)
- ☐ Lack of awareness about available rebates for energy efficient equipment (5)
- ☐ Lack of corporate support for energy efficiency investments (6)
- ☐ Lack of staff time dedicated to energy efficiency upgrades (7)
- ☐ We do not own the building(s) (8)
- ☐ Other, please specify: (9) _____
- ☐ ⊗ No challenges or barriers (10)
- ☐ ⊗ I don't know (98)

Q50 How much of a barrier have supply chain issues been on your organization's ability to:

	Not a barrier (1)	Somewhat of a barrier (2)	Moderate barrier (3)	Major barrier (4)	Extreme barrier (5)
Purchase new equipment (1)	O	O	O	O	O
Receive new equipment (2)	O	O	O	O	O
Install new equipment (3)	O	O	O	O	O

Q51 During your project did you interact or contact any Avista staff?

O Yes (1)

O No (2)

Q52 Please provide your satisfaction with each of the following:

Display This Choice:

If During your project did you interact or contact any Avista staff? = Yes

Display This Choice:

If During your project did you interact or contact any Avista staff? = Yes

	Very dissatisfied (1)	Somewhat dissatisfied (2)	Neither satisfied nor dissatisfied (3)	Somewhat satisfied (4)	Very satisfied (5)
Display This Choice: If During your project did you interact or contact any Avista staff? = Yes How long it took program staff to address your questions or concerns (1)	O	O	O	O	O
Display This Choice: If During your project did you interact or contact any Avista staff? = Yes How thoroughly they addressed your questions or concerns (2)	O	O	O	O	O
The equipment that was installed (3)	O	O	O	O	O
The quality of the installation (4)	O	O	O	O	O

The steps you had to take to get through the program (5)	O	O	O	O	O
The amount of time it took to your rebate (6)	O	O	O	O	O
The range of equipment that qualifies for a rebate (7)	O	O	O	O	O
The amount of time it took to install the new equipment (8)	O	O	O	O	O
How well the service provider explained the program rules and processes (9)	O	O	O	O	O
The program overall (10)	O	O	O	O	O

Display This Question:

If Please provide your satisfaction with each of the following: [Very dissatisfied] (Count) > 0

Or Please provide your satisfaction with each of the following: [Somewhat dissatisfied] (Count) > 0

Q53 You indicated some dissatisfaction; can you please provide further details?

_____

Q54 What is your level of satisfaction with Avista as your service provider?

- O Very dissatisfied (1)
- O Somewhat dissatisfied (2)
- O Neither satisfied nor dissatisfied (3)
- O Somewhat satisfied (4)
- O Very satisfied (5)

Q55 How has your participation in the program affected your satisfaction with Avista as your service provider?

- O Greatly decreased your satisfaction with Avista as your service provider (1)
- O Somewhat decreased your satisfaction with Avista as your service provider (2)
- O Did not affect your satisfaction with Avista as your service provider (3)
- O Somewhat increased your satisfaction with Avista as your service provider (4)
- O Greatly increased your satisfaction with Avista as your service provider (5)

Q56 How likely is it that you would recommend the program to a personal contact, such as a friend, family member, neighbor, or colleague?

- O Not at all likely (1)
- O Somewhat likely (2)
- O Moderately likely (3)
- O Very likely (4)
- O Extremely likely (5)

End of Block: Barriers and Satisfaction

Start of Block: Firmographics

Q57 What best describes the facility located **${e://Field/ADDRESS}**?

- O Your company's only location (1)
- O One of several locations owned by your company (2)
- O The headquarter location of a company with several locations (3)
- O I don't know (98)

Q58 What is the status of your organization's facility where the installation of **${e://Field/ALL_MEASURES}** took place?

- O We own and occupy the facility (1)
- O We own the facility and rent it to someone else (2)
- O We rent the facility (3)
- O I don't know (98)
- O Prefer not to answer (99)

Page Break

Q59 Do you have any other comments that you would like to provide to Avista about energy efficiency in the commercial or industrial sector and/or the programs they offer?

_____

Q74 Do you have any other comments about your satisfaction and participation in Avista's Energy Efficiency programs?

_____

End of Block: Firmographics

Start of Block: Incentive

Q60 Thank you for taking the time to provide us with this valuable information. As a thank you for completing this survey, we will send you a $20 gift card. You should expect to receive your gift card within 5-10 business days via email. Please be sure to check your spam and junk folders. To confirm, the correct email address to send the gift card to is ${e://Field/EMAIL}?

O Please send my electronic gift card to the **above** email address (1)

O Please send my electronic gift card to the **following** email address: (2)

_____

End of Block: Incentive

6.1.5 Nonresidential Non-Participant Survey

Avista Nonresidential Nonparticipant

Start of Block: Default Question Block

Q2 Welcome! Thanks for agreeing to provide your feedback about your experience using Avista's service and programs. Your feedback is very important to us and will help us improve programs for customers like you. This survey should take about 15 minutes. Your responses are confidential and will be used for

research purposes only. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. Upon completion of the survey we will collect your email address to send a $10 electronic gift card as a token of our thanks.

To start, we have a few questions about your awareness of some of Avista's programs and services.

Page Break

X→

Q1 According to program records, Avista provides electric and/or gas services to your business at ${e://Field/PREMISE_ADDRESS}. Is that correct?

O Yes (1)

O Yes, but address is incorrect (please write in correct address): (2)
_____

O No (3)

Skip To: End of Survey If According to program records, Avista provides electric and/or gas services to your business at ... = No

Page Break

Q3 To the best of your knowledge has your organization replaced or upgraded equipment that requires electricity, in the last three years? This could have been lighting, HVAC equipment, or refrigeration?

O Yes (1)

O No (2)

O Don't know (98)

Page Break

Display This Question:

If To the best of your knowledge has your organization replaced or upgraded equipment that requires... = Yes

Q4 What types of equipment or upgrades did your organization replace or upgrade in the last three years? Select all that apply

- ☐ Lighting (1)
- ☐ Lighting controls (2)
- ☐ HVAC equipment (3)
- ☐ Kitchen equipment (4)
- ☐ A/C tune-up (5)
- ☐ Smart thermostat(s) (6)
- ☐ Low flow faucet aerators (7)
- ☐ Low flow showerheads (8)
- ☐ Advanced power strips (9)
- ☐ Other – please specify (97)

_____

Page Break

Display This Question:

If To the best of your knowledge has your organization replaced or upgraded equipment that requires... = Yes

Q5 Did your organization receive an incentive from Avista for any of that equipment?

- O Yes (1)
- O No (2)
- O I don't know (98)

End of Block: Default Question Block

Start of Block: Block 1

Q7 Before today, have you heard that Avista offers incentives to businesses that install energy-efficient equipment?

- O Yes (1)
- O No (2)
- O I don’t know (98)

Page Break

Display This Question:

If Before today, have you heard that Avista offers incentives to businesses that install energy-effi... = Yes

Q8 How did you learn about Avista's energy efficiency program offerings? Select all that apply

- ☐ Mailed information from Avista (1)
- ☐ Email from Avista (2)
- ☐ Newspaper or magazine article or advertisement (3)
- ☐ Contractor (4)
- ☐ Word of mouth from a personal contact (e.g., family member, friend, neighbor, colleague, etc.) (5)
- ☐ Radio advertisement (6)
- ☐ Utility bill message (7)
- ☐ Utility website (8)
- ☐ Another website (9)
- ☐ Social media (i.e., Facebook, Instagram, Twitter, Tik Tok, etc.) (10)
- ☐ Avista program staff (11)
- ☐ Information at a retailer (12)
- ☐ Other, please specify (13) _____
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If Before today, have you heard that Avista offers incentives to businesses that install energy-effi... = Yes

Q9 What programs or services were you already aware of? Select all that apply

- ☐ Incentives to replace inefficient equipment in your business (1)
- ☐ Incentives to incorporate energy efficiency into new construction designs (2)
- ☐ Incentives for heating and cooling equipment (3)
- ☐ Incentives for lighting and lighting controls (4)
- ☐ Incentives for commercial kitchen equipment (5)
- ☐ Other – please specify (6) _____
- ☐ ⊗ Don't know (7)

Page Break

Q10 Are you interested in making any energy efficiency upgrades through Avista's energy efficiency programs?

- O Yes (1)
- O No (2)
- O Don't know (98)

Page Break

Display This Question:

If Are you interested in making any energy efficiency upgrades through Avista's energy efficiency pr... = Yes

Q11 What energy efficiency upgrades or programs are you interested in? Select all that apply

- ☐ Lighting (1)
- ☐ Lighting controls (2)
- ☐ HVAC equipment (3)
- ☐ Commercial kitchen equipment (4)
- ☐ Water heater (5)
- ☐ Smart thermostats (6)
- ☐ Low flow faucet aerators (7)
- ☐ Low flow showerheads (8)
- ☐ ENERGY STAR room air conditioners (9)
- ☐ Energy audit or assessment (10)
- ☐ ENERGY STAR appliances (i.e. washer, dryer, refrigerator, freezer) (11)
- ☐ Weatherization (i.e. pipe wrap insulation, attic insulation, insulated door) (12)
- ☐ Other – please specify (96)

_____

- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If Are you interested in making any energy efficiency upgrades through Avista's energy efficiency pr... = Yes

Q12 On a scale of 1 through 5, where 1 means "not at all interested" and 5 means "very interested", how interested are you in participating in Avista's energy efficiency programs?

- O 1 – Not at all interested (1)
- O 2 (2)
- O 3 (3)
- O 4 (4)
- O 5 – Very interested (5)

Page Break

Q13 What might prevent you from participating in Avista's programs? Select all that apply

- ☐ Don't know enough about the program (1)
- ☐ Energy savings from the equipment replacements or upgrades was not worth the trouble (2)
- ☐ Unlikely to replace any equipment (3)
- ☐ Too much time or trouble required to fill out the required paperwork (4)
- ☐ Incentives are not high enough to offset the cost of high efficiency equipment, compared to standard efficiency equipment (5)
- ☐ Prefer not to deal with Avista (6)
- ☐ I am financially able to make the upgrades without the incentives (7)
- ☐ Not interested in what Avista is offering (8)
- ☐ Don't have the authority to participate in any of the Avista programs (9)
- ☐ Other – please specify (96)

_____

- ☐ ⊗ Don't know (98)

Page Break

Q14 We understand that it is not always possible to make improvements and energy efficiency upgrades to your building. Which of the following best describes your authority to make decisions?

O No authority – as a renter I am not permitted to make improvements and energy efficiency upgrades (1)

O Some authority – as a renter I am permitted to make some improvements or upgrades (2)

O Full authority – I am the owner (3)

O Full authority – as part of my rental agreement I am required to maintain/repair the facility (4)

O Don't know (98)

Page Break

Q15 What do you feel is the largest energy consumer in your facility?

- O Computer equipment (1)
- O Refrigeration (2)
- O HVAC (3)
- O Lighting (4)
- O Kitchen equipment (5)
- O Other – please specify (96) _____
- O Don't know (98)

Page Break

Q16 Are you aware of the current lighting type(s) installed in your facility?

O Yes (1)

O No (2)

Page Break

Display This Question:

If Are you aware of the current lighting type(s) installed in your facility? = Yes

Q17 Which of the following lighting technologies is currently installed? Select all that apply

- ☐ Incandescent (1)
- ☐ Halogen (2)
- ☐ Fluorescent (3)
- ☐ CFL bulbs or fluorescent tubes (4)
- ☐ LED (5)

Page Break

Q18 Is your facility air conditioned?

- O Yes (1)
- O No (2)
- O Don't know (98)

Page Break

Display This Question:

If Is your facility air conditioned? = Yes

Q19 What type of A/C do you currently have in your facility? Please choose all that apply

- ☐ Central A/C (1)
- ☐ Heat Pump (2)
- ☐ Mini-split (3)
- ☐ Wall or window mounted a/c unit (4)
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If What type of A/C do you currently have in your facility? Please choose all that apply != Don't know

Q20 Approximately how old is the air conditioning system?

- O Less than 10 years old (1)
- O 10 to 20 years old (2)
- O More than 20 years old (3)
- O Don't know (98)

Page Break

Q21 What type of heating system do you currently have in your facility? Please choose all that apply

- ☐ Electric resistance (i.e. baseboard) (1)
- ☐ Gas furnace (2)
- ☐ Heat Pump (3)
- ☐ Mini split (4)
- ☐ ⊗ Don't heat the facility (5)
- ☐ ⊗ Don't know (98)

Page Break

Display This Question:

If What type of heating system do you currently have in your facility? Please choose all that apply != Don't know

And What type of heating system do you currently have in your facility? Please choose all that apply != Don't heat the facility

Q22 Approximately how old is the heating system?

- O Less than 10 years old (1)
- O 10 to 20 years old (2)
- O More than 20 years old (3)
- O Don't know (98)

Page Break

Q23 When was the last time your heating and/or cooling system was serviced?

- O Less than 1 year ago (1)
- O 1 to 3 years ago (2)
- O More than 3 years ago (3)
- O It's never been serviced (4)
- O Don't know (98)

Page Break

Q24 What type of thermostat do you use?

- O Manual (1)
- O Programmable (2)
- O Smart thermostat (3)
- O Don’t know (98)

Page Break

Q25 This last set of questions will help Avista develop more effective programs that may best serve the needs of the community. Your answers will remain anonymous and aggregated, so no information will be linked with you or your household. You may choose “Prefer not to answer.”

Page Break

Q32 What type of energy services does Avista provide to your business at ${e://Field/PREMISE_ADDRESS}? *Please select all that apply*

- ☐ Electricity (1)
- ☐ Natural gas (2)

Q26 Does your organization own or rent the facility at ${e://Field/PREMISE_ADDRESS}?

- ○ Rent (1)
- ○ Own and occupy (2)
- ○ Own and rent to someone else (3)
- ○ I don't know (98)
- ○ Prefer not to answer (99)

Page Break

Display This Question:

If Does your organization own or rent the facility at ${e://Field/PREMISE_ADDRESS}? = Rent

Or Does your organization own or rent the facility at ${e://Field/PREMISE_ADDRESS}? = Own and rent to someone else

Q27 Which describes your facility at ${e://Field/PREMISE_ADDRESS}? Would you say the facility is…

- O Your company's only location (1)
- O One of several locations owned by your company (2)
- O The headquarter location of a company with several locations (3)
- O Don't know (98)
- O Prefer not to answer (99)

Page Break

Q31 What are your building(s)' hours of operations?

_____

Page Break

Q28 Which of the following best describes how your organization is billed for electricity/gas used at this location?

O We are billed directly by Avista (1)

O We are NOT billed directly by Avista, our bill is handled by another part of our company or a third-party service provider (2)

O We are NOT billed directly by Avista, the cost for our utilities is included in our rent/lease (3)

O I don't know (98)

O Prefer not to answer (99)

Page Break

Q29 What type of building is the facility at ${e://Field/PREMISE_ADDRESS}?

- O Industrial/manufacturing (1)
- O Agricultural (2)
- O Warehouse or distribution center (3)
- O Education - College (4)
- O Education - K-12 (5)
- O Education – Pre-K (6)
- O Daycare/childcare center (7)
- O Government building (8)
- O Fast food restaurant (9)
- O Restaurant (sit down) (10)
- O Grocery (11)
- O Hospital (12)
- O Health clinic (13)
- O Small office (14)
- O Large office (15)
- O Lodging (16)
- O Religious worship (17)
- O Assembly hall/gathering space (18)

- O Retail (19)
- O Parking garage (20)
- O Vacant lot (21)
- O Other – please specify (96) _____
- O I don't know (98)
- O Prefer not to answer (99)

Page Break

Q30 Thank you for taking the time to provide us with this valuable information. As a thank you for completing this survey, we will send you a $10 gift card. You should expect to receive your gift card within 5-10 business days via email. Please be sure to check your spam and junk folders. To confirm, the correct email address to send the gift card to is ${e://Field/EMAIL}?

O Please send my electronic gift card to the above email address (1)

O Please send my electronic gift card to the following email address: (2)
_____

End of Block: Block 1

6.2 INTERVIEW GUIDES

6.2.1 Residential Trade Allies

6.2.1.1 Introduction and General Program Information

To begin with, I have a few questions about your firm.

Q1. How would you describe your business? Are you a(n)…
1. Distributor
2. Contractor/Installer
3. Designer/Engineer
4. Energy Service Company
5. Builder
5. Other, please specify: _____
98. I don't know
99. Refuse to answer

Q2. What services does your company provide to residential customers as an Avista Trade ally?
1. Water heaters (gas or electric)
2. HVAC equipment (gas or electric)
3. Smart thermostats
3. Building shell/weatherization (insulation, windows, doors, air sealing, etc.)
4. New construction ENERGY STAR homes
5. Lighting
6. Faucet aerators; showerheads
7. Power strips
8. Washer/Dryer Appliances
9. Refrigerator/Freezer
10. Other (please specify)

98. I don't know
99. Refuse

Q3. Which state(s) do you operate in?
1. Washington
2. Idaho

Q4. How would you describe your typical customer? [multifamily homes, single family homes, low-income homes]

6.2.1.2 Program Experience & Participation

My next few questions are about your experiences and satisfaction with using Avista programs and services.

Q5. How long have you been working with Avista? How did you first become involved?

Q6. In the last year, how often have you incorporated Avista incentives into project bids and sales pitches? Would you say you….
1. Almost always incorporate Avista incentives (90% to 100%)
2. Mostly (60% to 89%)
3. Sometimes (40% to 59%)
4. Rarely (10% to 39%)
5. Almost Never (0% to 9%)
98. Don't know
99. Refuse
NOTES: *(probe for why they don't incorporate incentives; types of people who do not qualify)*

Q7. How many projects have you completed in the last year that received support from Avista? *(total number and % of total work)*

Q8. What are some of the primary reasons customers provide for not wanting to enroll in the Avista programs and install energy efficient equipment?

Q9. We've heard a lot about supply chain disruptions affecting programs across the U.S. Have you observed any such disruptions? If so, what types of equipment do they involve? Where is the disruption occurring? (Manufacturing, transportation, etc.). What impact, if any, have supply chain disruptions had on your work with Avista?

6.2.1.3 Program Implementation & Incentives

Q10. APPLICATION PROCESS

- Do you submit the rebate application? (*or do you provide the customer with the information they need and they submit the application)*

- ***If they submit the application…***

- How satisfied have you been with the **process of applying** for incentives over the last year?
- What changes, if any, would you make to the **process of applying** for Avista incentives? Why would you make those changes?
- How long does it take for you to receive an incentive once you submit an application?

Q11. INCENTIVES

- Is there any energy-saving equipment that is not currently being **incentivized** through Avista's residential program, that you would like to see incentivized? What equipment is that?
- Are there any specific types of qualifying program equipment for which the **incentive** payments are not high enough to encourage your customers to install it? What type of equipment?
- Are there any specific types of qualifying program equipment for which the **incentive** payments are higher than they need to be to encourage your customers to install it? What type of equipment?
- Do you have any recommendations for how Avista might improve the incentive process?

Q12. What are your **quality assurance** procedures? Does Avista conduct any review of your projects after you have completed them?

Q13. Are there any differences in program experience based on the measures provided or jurisdictions?

6.2.1.4 Marketing & Communications

Q14. How does your company handle marketing of high efficiency equipment? Do you have a specific sales approach? (Do you promote the benefits of high efficiency equipment? What benefits do customers most respond to?)

Q15. Does Avista provide your firm with any marketing materials to assist with program participation and customer engagement? If yes, how do you feel about the materials provided?

Q16. How do you typically acquire projects? Are you generally cold calling to customers, are customers seeking you out, are you providing marketing materials by mail, something else?

6.2.1.5 Satisfaction & Conclusion

Q17. On a scale of 1 to 5 where 1 means not at all satisfied, and 5 means completely satisfied, how would you rate the following factors? *(N/A if not applicable)*

1. The program application process
2. The range of measures that qualify for the program
3. The amount of time it takes to receive the incentive
4. Communication with program staff

5. Marketing materials you received from Avista
6. Training materials you received from Avista
7. The program overall

Q18. [Ask only if any of the above factors are <3] What are the reasons for your dissatisfaction with those aspects of the program?

Q19. What do you think works particularly well about the Avista program that you participated in?

Q20. What do you find challenging about working with Avista program?

Q21. Do you have any suggestions for improving Avista program?

6.2.2 Nonresidential Trade Allies

6.2.2.1 Introduction to Interview

Thanks for taking time to talk with me today about your experience with Avista. We will cover topics such as how well, or not, Avista has supported your customer's projects and your experience with Avista staff and forms.

Our chat will take about 30 minutes. All your responses will be treated as confidential. We will report only the overall findings to Avista, not any individual responses.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture what you are telling me accurately. The recording is confidential. Is it ok that I record the call?

[IF YES] Start recording

[IF NO] Take notes as best as possible

6.2.2.2 Introduction and General Program Information

To begin with, I have a few questions about your firm.

Q22. How would you describe your business? Are you a(n)…
1. Distributor
2. Contractor/Installer
3. Designer/Engineer
4. Energy Service Company
5. Other, please specify: _____
98. I don't know
99. Refuse to answer

Q23. What services does your company provide to commercial customers as an Avista Trade ally?
1. Water heaters (gas or electric)
2. HVAC equipment (gas or electric)
3. Smart thermostats
4. Building shell/weatherization (insulation, windows, air sealing, etc.)
5. Lighting

6. Grocer equipment
7. Food service equipment
8. Motors
9. Air compressors
10. Other (please specify)
98. I don't know
99. Refuse

Q24. Which state(s) do you operate in?
1. Washington
2. Idaho

Q25. How would you describe your typical customer? [For example, are you serving small businesses, serving large Fortune 500-type companies, government entities, schools, manufacturing facilities, or something else?]

6.2.2.3 Program Experience & Participation

My next few questions are about your experiences and satisfaction with using Avista programs and services.

Q26. How long have you been working with Avista? How did you first become involved?

Q27. In the last year, how often have you incorporated Avista incentives into project bids and sales pitches? Would you say you….
1. Almost always incorporate Avista incentives (90% to 100%)
2. Mostly (60% to 89%)
3. Sometimes (40% to 59%)
4. Rarely (10% to 39%)
5. Almost Never (0% to 9%)
98. Don't know
99. Refuse
NOTES: *(probe for why they don't incorporate incentives; types of people who do not qualify)*

Q28. How many projects have you completed in the last year that received support from Avista? *(total number and % of total work)*

Q29. What are some of the primary reasons customers provide for not wanting to enroll in the Avista programs and install energy efficient equipment?

Q30. We've heard a lot about supply chain disruptions affecting programs across the U.S. Have you observed any such disruptions? If so, what types of equipment do they involve? Where is the disruption occurring? (Manufacturing, transportation, etc.). What impact, if any, have supply chain disruptions had on your work with Avista?

6.2.2.4 Program Implementation & Incentives

Q31. APPLICATION PROCESS

- Do you submit the rebate application? (*or do you provide the customer with the information they need and they submit the application)*

- ***If they submit the application…***
  - How satisfied have you been with the **process of applying** for incentives over the last year?
  - What changes, if any, would you make to the **process of applying** for Avista incentives? Why would you make those changes?
  - How long does it take for you to receive an incentive once you submit an application?

Q32. INCENTIVES

- Is there any energy-saving equipment that is not currently being **incentivized** through Avista's residential program, that you would like to see incentivized? What equipment is that?
- Are there any specific types of qualifying program equipment for which the **incentive** payments are not high enough to encourage your customers to install it? What type of equipment?
- Are there any specific types of qualifying program equipment for which the **incentive** payments are higher than they need to be to encourage your customers to install it? What type of equipment?
- Do you have any recommendations for how Avista might improve the incentive process?

Q33. What are your **quality assurance** procedures? Does Avista conduct any review of your projects after you have completed them?

6.2.2.5 Marketing & Communications

Q34. How does your company handle marketing of high efficiency equipment? Do you have a specific sales approach? (Do you promote the benefits of high efficiency equipment? What benefits do customers most respond to?)

Q35. Does Avista provide your firm with any marketing materials to assist with program participation and customer engagement? If yes, how do you feel about the materials provided?

Q36. How do you typically acquire projects? Are you generally cold calling to customers, are customers seeking you out, are you providing marketing materials by mail, something else?

6.2.2.6 Satisfaction & Conclusion

Q37. On a scale of 1 to 5 where 1 means not at all satisfied, and 5 means completely satisfied, how would you rate the following factors? *(N/A if not applicable)*

1. The program application process
2. The range of measures that qualify for the program
3. The amount of time it takes to receive the incentive
4. Communication with program staff
5. Marketing materials you received from Avista
6. Training materials you received from Avista

7. The program overall

Q38. [Ask only if any of the above factors are <3] What are the reasons for your dissatisfaction with those aspects of the program?

Q39. What do you think works particularly well about the Avista program that you participated in?

Q40. What do you find challenging about working with Avista program?

Q41. Do you have any suggestions for improving Avista program?

Q42. Confirm email for gift card:

6.2.3 Midstream Distributors

6.2.3.1 Background, Roles & Responsibilities

1. Can you tell me a little bit about your organization and the type of work you do?
2. What types of equipment or services do you work with?
3. What type of customers do you typically work with through Avista's Midstream program? (*probe for contractors, direct sales to businesses, types of businesses, etc.)*
4. About what share of your program sales are to contractors versus customers making the installation or upgrades themselves?
5. Does your company work with national or regional chains?
6. Approximately how much of your work is with repeat clients?

6.2.3.2 Awareness & Motivation

7. How long have you been with the Avista program?
8. How did you first get involved with the program?
9. What motivated you to participate?
10. What interactions do you have with program staff throughout the program process?
11. How, if at all, did you expect that participating in the program would affect your sales? Has your participation met those expectations?

6.2.3.3 Marketing & Customer Interactions

12. How do you market the program to your customers?
    1. Do you use any marketing or informational materials provided through the program?

13. Are there additional materials or support you would like to receive through the program?

14. What kinds of strategies do you use to sell the program-qualified equipment?

15. What concerns or barriers exist, prohibiting customers from purchasing program-qualifying equipment/participating in the program?

16. What kinds of questions do customers usually ask around energy-efficiency equipment?

6.2.3.4 Program Influence

17. Have you increased your stocking of program-qualified equipment because of the program?

18. **[IF YES]** Can you tell me a little bit about how the program led you to increase stocking for that equipment?

19. Do you believe you would have sold the same amount of program-qualifying equipment if the program was not available? Why or why not?

20. How has participating in the program affected your business?

6.2.3.5 Program Satisfaction & Feedback

21. What was the process to enroll in the program like? Anything confusing?

22. What aspects of the program works well?

23. What aspects of the program are challenging?

24. Are there any parts of the program that customers seem to find challenging?

25. Is there any equipment that should be added into the program?

26. Do you have any suggestions or recommendations to improve the program?

Memorandum

3/20/2024

TO: Nicole Hydzik, Director of Energy Efficiency, Avista Utilities; Meghan Pinch, Manager of Program Managers, Avista Utilities; Kim Boynton, Manager of Planning and Analytics, Avista Utilities

FROM: Christina Steinhoff, NEEA Principal Planning Analyst

CC: Stephanie Rider, Director, NEEA Data, Planning, and Analytics; Susan Hermenet, Vice President, Research, Evaluation and Analytics, NEEA; Virginia Mersereau, Vice President, Corporate Strategy, Relationships and Communication

SUBJECT: Avista Utilities' 2023 Annual Savings Report for Washington (Electric)

NEEA is an alliance of utilities and energy efficiency organizations that pools resources and shares risks to transform markets toward energy efficiency that benefits consumers in the Northwest. The alliance works together to accelerate the innovation and adoption of energy-efficient products, services, and practices in the Northwest. By pooling together regional resources, NEEA:

- Leverages relationships with the Department of Energy, trade allies, and national and regional manufacturers to identify and advance new efficient technologies, product designs, test procedures, product specifications and standards to increase the availability and demand for energy-efficient products, services and practices,
- Conducts research and energy use analysis, market characterization studies, and stock assessments to help the region identify the best efficiency opportunities and inform utilities resource planning efforts,
- Defines and executes program strategies to remove market barriers leading to increased adoption of the most energy efficient products available,
- Builds relationships with midstream supply chain partners such as distributors, retailers, and trade allies to collect regional data and build market capability and infrastructure to increase availability within the Northwest of the most efficient products,
- Gathers, cleans, and analyzes sales, shipment, and distributor data to track markets and inform regional investment decisions.

NEEA's end goal is to make energy efficiency a self-sustaining standard of practice in markets. Codes and standards are a core element of locking in that permanent market change, so NEEA works at state and national levels to influence more efficient building codes and equipment efficiency standards to save customers energy and ensure that Northwest needs are represented in the process.

Utilities, energy efficiency administrators, and the Regional Technical Forum all benefit from NEEA's work through knowledge sharing, the development of new energy efficiency measures, and the resulting market changes leading to energy savings.

As such, Washington investor-owned utilities (WA IOUs) have asked NEEA to forecast and track savings in two-year periods as one benefit from the alliance's work. This memo reports these savings for 2022-2023 along with the two-year forecast NEEA provided in August 2021.

NEEA allocates the savings based on each utility's funding share[1] of NEEA's regional investment. The savings are above a common baseline established by the WA IOUs and are net of savings claimed through regional utility programs[2]. Appendix A documents NEEA's methodology to estimate savings. Details about baseline and technical assumptions are in the attached Excel spreadsheet.

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

2022-2023 Savings Estimate

NEEA estimates that Avista Washington's savings for the 2022-2023 Biennium is 1.15 aMW. The results are within range of the original forecast (Table 1). The *2022-2023 Summary* worksheet in the attached spreadsheet documents the variances from the original forecast by program.

[1] Funding share is the portion of NEEA budget provided by each stakeholder. NEEA calculates the shares using each electric funding utility's regional customer count and retail sales from the Energy Information Administration.

[2] Regional utility programs comprise programs run by the Bonneville Power Administration, the Energy Trust of Oregon and local utility programs. These programs provide NEEA an estimate of their annual incented units. NEEA multiplies savings rate and baseline saturation assumptions by the units to estimate local program savings. NEEA subtract these values prior to reporting savings to its funders to avoid double counting.

Table 1: 2022-2023 aMW Savings[3]

	2022	2023	Total	Forecasted (August 2021)
Total	0.54	0.61	1.15	1.20
Program Measures	0.42	0.48	0.90	0.92
Residential	0.36	0.42	0.77	0.77
Commercial	0.06	0.05	0.11	0.13
Industrial/Agricultural	0.01	0.01	0.02	0.02
New Construction (Codes)	0.10	0.10	0.20	0.27
Residential	0.08	0.06	0.14	0.23
Commercial	0.02	0.04	0.06	0.04
Products (Standards)	0.03	0.03	0.05	0.02
Residential	0.01	0.01	0.02	0.02
Non-residential	0.02	0.02	0.04	0.00

These are site-based, first-year savings. NEEA allocates the regional savings (Idaho, Montana, Oregon, and Washington) using funder shares. To avoid double counting savings, these values net out an estimate of savings the Bonneville Power Administration, the Energy Trust of Oregon and local utilities claim through their local programs.

2023 Highlights

The first-year energy savings are the result of NEEA's multi-year efforts on behalf of Avista Utilities to transform markets to be more energy efficient through work that spans in-market programs, codes and standards, emerging technology, as well as complementary data collection and research efforts. The sections below highlight NEEA's work in 2023 to maintain the savings stream over time.

In-market Programs

NEEA operates a portfolio of Market Transformation programs in seven cross-sector groups—consumer products, building envelope, HVAC, lighting, motors, new construction, and water heating. The programs within these sectors intervene in markets to create lasting change by removing barriers and leveraging opportunities.

Consumer Products

Dryers

NEEA's role as a founding member in a national coalition of efficiency advocates (Super-Efficient Dryer Initiative) promoted the introduction of advanced clothes dryers in North America. This work led to the first ENERGY STAR specification for dryers as well as the ENERGY STAR Emerging Technology Award for heat pump dryers in 2012. ENERGY STAR leveraged NEEA data to support revisions to the dryer testing protocol,

[3] The funders requested NEEA group savings as Program Measures, New Construction Codes, or Products Standards. Program Measures refers to energy savings from market transformation programs, where the savings associated with a change in an energy code or standard has been netted out, as requested by the funder. Codes and Standards refers to savings associated with either a Market Transformation program or adjacent market work covered by a state building energy code or a federal/state appliance standard where NEEA's market influence, technical knowledge and data are relevant and influence the proceedings.

and more recently, the establishment of an ENERGY STAR Most Efficient specification for heat pump dryers. In 2023, two manufacturers introduced combination washer/dryer units that utilize heat pump drying technology into the market.

Televisions

At the beginning of 2023, NEEA and other efficiency advocates secured all major TV manufacturers to sign on to a voluntary agreement to meet standby mode power of <2 watts and to establish an on-mode power compliance level in early 2024. This was enabled through several years of NEEA's work funding development of a new test procedure that has now been adopted by ENERGY STAR, the DOE and the California Energy Commission and is currently in use by TV manufactures worldwide.

Retail Products Portfolio (RPP)

During 2023, three new utility sponsors joined the ENERGY STAR RPP program, bringing the share of US households represented by program sponsors up to 24.2%. Achieving greater scale is one way NEEA and the ESRPP program increases the collective influence that the program can have on retailer assortment decisions and ultimately manufacturer product roadmaps and new ENERGY STAR specifications.

New Construction

Manufactured Homes

NEEA completed a Transition Market Progress Evaluation Report to assess the market progress of the Northwest Energy Efficient Manufactured Housing (NEEM+)+ specification—a certification NEEA supports that is more stringent than ENERGY STAR. The study found that home sales of NEEM+ has been steady over the past two years and that NEEA should continue to monitor the market to ensure that the homes remain a viable alternative on an ongoing basis.

Standards and Test Procedures

To speed up the rule-making process, NEEA and energy efficiency advocates entered into a multi-product agreement with the Association of Home Appliance Manufacturers (AHAM) to negotiate several appliance standards. AHAM agreed to more stringent efficiency levels in most cases. Meanwhile, NEEA and the advocates conceded more time for manufacturers to comply. The agreement helped avoid lawsuits that could have delayed the standards process for many products, including clothes washers, clothes dryers, and refrigerators.

Overall, NEEA responded to more than 27 requests for comment from the Department of Energy regarding Federal standards and test methods. These comment letters covered more than 25 products including consumer furnaces, water heaters, circulating pumps, and clothes dryers. NEEA's comments provided regional data and recommendations to help the DOE set appropriate rules that provide Northwest benefits and are supportable by the market.

Notably, the DOE adopted a new Electric Motors standard. NEEA influence the development of this standard through working with the National Electrical Manufacturers Association (NEMA) to find common ground and through providing comments throughout the rule-making process based on its experience with motor market transformation programs in the Northwest. NEEA now is planning for savings modeling and influence evaluation work to quantify the value of this achievement.

Building Energy Codes

Draft results of a third-party review of NEEA's work show that NEEA is influencing code development both nationally and in the region by bringing proposals to decision makers in Oregon, Washington and to the Internal Energy Conservation Code (IECC), which is the basis for Montana and Idaho codes. NEEA is also filling gaps in the energy code process in each state. Additionally, more than half of commercial and residential market actors report that NEEA-supported training is positively influencing their knowledge, behaviors, or attitudes. NEEA expects to publish the report in Q2 2024.

Emerging Technology

Six ENERGY STAR product categories went into effect, which NEEA provided input. Most significantly, Residential HVAC products, including central and ductless AC and heat pumps, went into effect in January 2023, and ENERGY STAR integrated several key pieces of feedback from NEEA. ENERGY STAR Version 5.0 for water heaters went into effect in April 2023, encompassing heat pump water heaters, whole home tankless, and high efficiency gas storage units. Work on updating the water heater specification began in 2021, and ENERGY STAR incorporated NEEA feedback on performance and connectivity in the final specification. The updated residential Windows, Doors, and Skylights specification went into effect in October 2023. NEEA played a significant role in advancing the specification through our leadership in the Partnership for Advanced Window Solutions. Residential Dishwashers and Light Commercial HVAC also went into effect in 2023, and ENERGY STAR added Residential Cooking products as a category in 2023. Lastly, a Clothes Dryers revision and a new Micro Heat Pump specification opened in late 2023.

Data Collection and Research

Building Stock Assessments

NEEA finished collecting building characteristic and energy consumption data on single-family and multi-family homes and will publish data and reports in Q1 2024. The Residential Building Stock Assessment (RBSA) provides data on the existing housing stock in the Northwest to help with planning. The 2022 RBSA includes the addition of tracking solar panels, electric vehicle chargers, presence of electric vehicles and accessory dwelling units. NEEA also began planning for the next Commercial Building Stock Assessment, which will be in field in 2024.

Market Data and Research

Several programs are in the midst of their first market progress evaluation report, including the Commercial HVAC programs (High-Performance HVAC and gas Efficient Rooftop Units) and the Extended Motor Products program. These evaluations will bring increased understanding of the market opportunity for these measures, as well as NEEA's progress toward its Market Transformation goals. NEEA is also conducting several state energy code compliance and standard influence evaluations in the field.

Monitoring & Tracking

NEEA is monitoring the progress in the ductless heat market. NEEA formally began its DHP program in 2008 with a goal to displace inefficient electric heating (such as baseboard heaters and inefficient electric forced-air furnaces) from single-family homes. NEEA's Long-term Monitoring and Tracking Report showed that the total number of counties with access to DHP installers has continued to increase to a total of 135, incented installations for DHPs continues to increase, and the total proportion of HVAC contractors installing DHPs in the Northwest has maintained a steady level.

Appendix A: Methodology

Background

Avista Washington, Puget Sound Energy, and Pacific Power developed a joint approach[4] to calculate savings from NEEA initiatives. As part of the utilities' biennium savings updates, NEEA provides a two-year electric energy savings forecast. The utilities subtract the savings from their conservation forecast to develop their Biennium Conservation Target.

Savings Rates

This report uses:

- Savings rates and technical assumptions from the Regional Technical Forum (RTF) approved prior to September 1, 2021 for 2022 estimates and prior to October 2022 for 2023 estimates.
- If RTF savings rates are not available, the report uses savings rates from the *2021 Power Plan*.
- If those rates are not available, NEEA calculates savings rates an approximation of the *2021 Power Plan* baseline assumptions.

Table 2

[4] The utilities agreed that NEEA would develop a Total Regional Savings estimate using baseline and technical assumptions from the most recent Power Plan. NEEA would remove estimated savings counted by the utilities, the Bonneville Power Administration and the Energy Trust of Oregon. NEEA would allocate the remaining savings to the utilities based on their NEEA funder share percentage.

Table 1 sources the savings rates.

Table 2: Savings Rate Sources for 2022-2023 Savings Report

Product	Savings Rate Source
Ductless Heat Pumps	The 2023 assumptions for FAF come from version 3.1 updated in September 2021. The 2022 assumptions come from version v2 updated in 2018. The 2022 assumptions for single-family zonal-heated homes come from version 5.1 updated in 2020. The 2023 DHP Zonal source is Residential DHP for Existing Zonal v6.0, which was updated in April 2022.
Extended Motor Products	RTF. Jun 14, 2017. Efficient Pumps v 1.1 RTF. Aug 10, 2020. Circulator Pumps v 2.1
Heat Pump Water Heaters	The 2023 assumptions come from version 6.2 updated in June 2022. The 2022 assumptions come from version 4.2 updated in June 2019.
Manufactured Homes	RTF. 2020. ResMHNewHomesandHVAC_v4_1.xlsm. RTF. 2022. ResMHNewHomesandHVAC_v5_0.xlsm.
Refrigerators	NEEA calculates the savings rate using the same methodology as the RTF (RTF. January 2019. Residential Refrigerators and Freezers v5.1). However, NEEA includes savings from ENERGY STAR's Emerging Tech Award in the ENERGY STAR Most Efficient category. NEEA updated the baseline efficiency mix to match the 2021 sales weighted average efficiency mix. For more information go to neea.org→Portal Login→Savings Reports→Consumer Products.
Clothes Washers	RTF. 2020. ResClothesWashers_v7_1.xlsm.
Clothes Dryers	RTF. 2020. ResClothesDryers_v4.0.xlsm
Room Air Conditioners	NEEA calculation the savings using the sales weighted efficiency mix in 2021 as the baseline. For more information go to neea.org→Portal Login→Savings Reports→Consumer Products.
High Performance HVAC	Where available, installation-specific energy analysis is used to determine energy savings for observed units. Otherwise, energy savings rates established by Red Car Analytics (2022) are applied based on the characteristics of each installation. Red Car Analytics. 2022. Analysis of Expanded Efficiency Parameters for Very High Efficiency DOAS For more information go to neea.org→Portal Login→Savings Reports→HVAC
Luminaire Level Lighting Controls	NEEA uses the RTF Non-Residential Lighting Standard Protocol versions published in 2020 and 2021. The protocols reference estimates of hours of use and control savings fraction for Non-Residential applications analyzed in NonResidentialLighting_CSFandHOU_v2_1. NEEA assumes a 10% baseline to align with the 2021 Power Plan.
Televisions	NEEA has begun tracking the savings based on model-matching using purchased TV sales data for the Northwest and publicly available TV test data (tested by NEEA and other efficiency advocates in 2020-2022). The Savings rates are based on calculations reviewed by TRC Engineers in alignment with the 2021 Power Plan baseline period. Televisions: ENERGY STAR Version 9 Specification Influence Assessment and Baseline Assumptions Review
Reduced Wattage Lamp Replacement	NEEA sources the Draft 2021 Power Plan. The final plan assumes 28W & 25W T8 Linear Fluorescent Lamps are part of the baseline. NEEA will still report the savings from these lamps because they were included in the targets set in August 2021.

Note: The RTF updated all its workbooks in 2022 with the new ProCost tool. This table references the prior version to better show the date of the decision.

For comparison against the targets, NEEA updates the savings rates if:

- The RTF makes an update after Sept. 1 of the year prior to the Biennium (e.g. 2021) and before Oct. 1 of the first year of the biennium (e.g. 2022); then, NEEA will update the forecast for the second year (e.g. 2023) with the new RTF UES.
- The UES is weighted based on tracked units (e.g. commercial building type, installs by climate zone, fuel mix, etc.).

- NEEA finalized savings analysis for a code or standard.

The attached spreadsheet contains sources and additional information regarding the savings rate calculations.

New Measures

NEEA adds new measures to the savings analysis if:

1. NEEA worked on the measure.
2. NEEA did not have enough data to include the measure in the original target.

These include NEEA's High-Performance HVAC program, which began after the original targets were set, and the Uninterruptible Power Supplies federal standard, which count against the *2021 Power Plan* targets.[5]

Avoiding Double Counting

NEEA avoids reporting savings from units already counted through local utility programs by subtracting an estimate of the incentives associated with its Market Transformation efforts. NEEA surveys the Bonneville Power Administration, Energy Trust of Oregon and local utilities to estimate the overlap at a regional level and removes the utility's funder share of this overlap prior to reporting energy savings.

Allocation

NEEA allocates the savings using funder shares. The shares vary based on the funding cycle. Savings from previous investments receive the previous funder share. Savings from current investments receive the current funder share. Table 3 shows the funder shares.

Table 3: Funder Share (Washington)

Business Plan	Funding Share
2020-2024	3.95%
2015-2019	4.04%

[5] NEEA and its partners' influence on the UPS standard occurred primarily through their engagement in the California state standard for UPS, because the passing of the state standard led the U.S. Department of Energy to open proceedings for a federal standard. Michaels Energy. 2022. Uninterruptible Power Supplies Standard Evaluation.

Memorandum

April 3, 2024

TO: Nicole Hydzik, Director of Energy Efficiency, Avista Utilities; Meghan Pinch, Manager of Program Managers, Avista Utilities; Kim Boynton, Manager of Planning and Analytics, Avista Utilities

CC: Peter Christeleit, Manager of Natural Gas Portfolio and Strategy, NEEA; Stephanie Rider, Director, Data, Planning, and Analytics, NEEA; Becky Walker, NEEA, Vice President, Market Development and Transformation, NEEA; Susan Hermenet, Vice President, Research, Evaluation and Analytics, NEEA; Virginia Mersereau, Vice President of Corporate Strategy and Communications, NEEA

FROM: Christina Steinhoff, Principal Planning Analyst, NEEA

SUBJECT: Avista Utilities' 2023 Annual Savings Report for Washington (Natural Gas)

NEEA is an alliance of utilities and energy efficiency organizations that pools resources and shares risks to transform markets toward energy efficiency that benefits consumers in the Northwest. The alliance works together to accelerate the innovation and adoption of energy-efficient products, services, and practices in the Northwest. By pooling together regional resources, NEEA:

- Leverages relationships with the Department of Energy, trade allies, and national and regional manufacturers to identify and advance new efficient technologies, product designs, test procedures, product specifications and standards to increase the availability and demand for energy-efficient products, services and practices,
- Conducts research and energy use analysis, market characterization studies, and stock assessments to help the region identify the best efficiency opportunities and inform utilities resource planning efforts,
- Defines and executes program strategies to remove market barriers leading to increased adoption of the most energy efficient products available,
- Builds relationships with midstream supply chain partners such as distributors, retailers, and trade allies to collect regional data and build market capability and

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infrastructure to increase availability within the Northwest of the most efficient products,
- Gathers, cleans, and analyzes sales, shipment, and distributor data to track markets and inform regional investment decisions.

NEEA's goal is to make energy efficiency a self-sustaining standard of practice in markets. Codes and standards are a core element of locking in that permanent market change, so NEEA works at state and national levels to influence more efficient building codes and equipment efficiency standards to save customers energy and ensure that Northwest needs are represented in the process.

Utilities, energy efficiency administrators, and the Regional Technical Forum all benefit from NEEA's work through knowledge sharing, the development of new energy efficiency measures, and the resulting market changes leading to energy savings.

NEEA reports these energy savings to Avista Utilities (Washington) as they develop over time. Because most programs in the gas portfolio are still in the early stages of Market Transformation, the savings are mostly comprised of early work on building energy codes. NEEA is focused on advancing new technologies, implementing strategies to remove market barriers and leveraging market opportunities to increase the adoption of new efficient products, which should lead to additional savings over time. The attached *Frequently Asked Questions* document provides an overview of this work.

NEEA tracks energy savings based on the work described as a lagging indicator of progress. This memo provides energy savings estimates for 2023. Details about baseline and technical assumptions are in the attached Excel spreadsheet. Please contact Christina Steinhoff at csteinhoff@neea.org with any questions.

2023 Savings Estimate Summary

Avista Utilities' (Washington) share of the 2023 natural gas energy savings associated with NEEA's initiatives is 63,554 annual therms[1] (Table 1). To calculate the savings, NEEA removes an estimate of savings occurring from naturally occurring adoption based on baseline trends in the Northwest, and savings reported through regional local incentive programs. Appendix A provides more details about the calculation and allocation methodology.

[1] Annual therms represent first-year savings and a sustained reduction in load.

Table 1: 2023 Energy Savings* (Annual Therms)

Residential New Construction	Commercial New Construction	Products (Standards)	Total Savings
49,580	10,619	3,355	63,554

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

Regional Gas Savings Portfolio

NEEA is developing and advancing new energy efficiency measures to add to its savings portfolio. Annual gas savings will increase over time as programs in the portfolio advance into full-scale market development. Table 2 lists NEEA's expectations for gas savings.

Table 2: Savings Expectations

Program	Products	Year Expected for Reporting*
Commercial Code	WSEC 2018	2021 (savings forecast phases out with adoption of WSEC 2021)
Residential Code	WSEC 2018	2021 (savings forecast phases out with adoption of WSEC 2021)
Efficient Rooftop Units	Efficient Rooftop Units	2022 (expected to ramp up in 2026/2027)
Products (Standards)	WA Commercial Kitchen Equipment, Commercial Boilers, Residential Gas Furnaces,	2021, 2023, 2029
High-Performance Windows*	ENERGY STAR version 7, where U-Factor ≤ 0.22	2025
Efficient Gas Water Heater*	Gas Heat Pump Water Heater	2025

**Years are pending program advancements.*
The table above only includes programs that were in the portfolio for the whole year. Advanced Commercial Gas Water Heating was advanced in December of 2023 and other potential programs are expected to be part of the portfolio in Cycle 7 starting in 2025.

Appendix A: Methodology to Estimate Energy Savings

Allocation Methodology

NEEA allocates code savings for gas measures using a state/service territory approach. NEEA models code savings rates by state and applies the state-level savings rates to state-level new construction square footage estimates from Dodge Data & Analytics and units from the U.S. Housing and Urban Development to calculate energy savings. NEEA allocates the state-level savings to service territories based on the utility's share of the state residential customers (Residential Codes) and commercial energy sales (Commercial Codes) from the Energy Information Administration (EIA-861).

Table 3: State Code Savings Allocation Share for Avista Utilities (Washington)

Sector	WA	OR	ID
Residential	12.65%	0.00%	0.00%
Commercial	15.82%	0.00%	0.00%

For voluntary programs, NEEA allocates regional savings (Idaho, Oregon, and Washington) using the utility's share of investment in NEEA's natural gas portfolio (Table 4).

Table 4: Avista Utilities' (Washington) Share of Regional Savings

Business Plan	Share of NEEA's Regional Funding
2020-2024	8.49%

Naturally Occurring Baseline

NEEA approximates the share of the savings that would have occurred without market intervention. To calculate these savings, NEEA forecasts the naturally occurring baseline adoption at the regional level for energy efficiency measures within each Market Transformation program. NEEA uses the best available data—historical sales data, industrial reports, market studies, etc. A third-party evaluation reviews the methodology as well as provides recommendations for adjustments. NEEA also presents the methodology and forecast to its Cost Effectiveness Advisory Committee, which includes funder representatives from each funder in the alliance, state regulators from across the region, and the Northwest Power and Conservation Council.

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Local Programs

NEEA avoids reporting savings from units already counted through local utility programs by subtracting an estimate of the incentives associated with NEEA's Market Transformation efforts. NEEA surveys its gas funders annually to estimate the overlap at the regional level and removes the utility's funder share of this overlap prior to reporting energy savings.

Technical Assumptions

The technical assumptions are assumptions NEEA uses when calculating the savings rates such as hours of operation, HVAC interaction factors, and climate zone weights. NEEA uses the best available information such as regional stock assessments, the Regional Technical Forum, third-party research, and the 2021 Power Plan. NEEA also presents the assumptions to its Cost Effectiveness Advisory Committee.

The savings rate is measured against the energy consumption of the alternative. In cases where NEEA works on different efficiency levels of the same product, the savings rate is incremental to the lower efficiency measure. The resulting value represents the incremental energy savings of the measure in comparison to the alternative.

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