



2021 Washington Natural Gas Energy Efficiency Annual Conservation Plan

November 13, 2020

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Such risks, uncertainties, and other factors include, among others, those included 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.

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EXECUTIVE SUMMARY



EXECUTIVE SUMMARY

This natural gas *Annual Conservation Plan (ACP)* is intended to be a continuous planning process for Avista's natural gas energy-efficiency program. The company is committed to maintaining and enhancing meaningful stakeholder involvement within this process. Over the course of the coming year, revisions and updates to the plan are to be expected as part of adaptively managing the energy-efficiency portfolio. Based on the 2021 natural gas *Integrated Resource Plan (IRP)*, the Washington natural gas conservation potential for 2021 is estimated to be 781,459 therms. The 2021 *ACP's* expected acquisition is 785,347 therms.

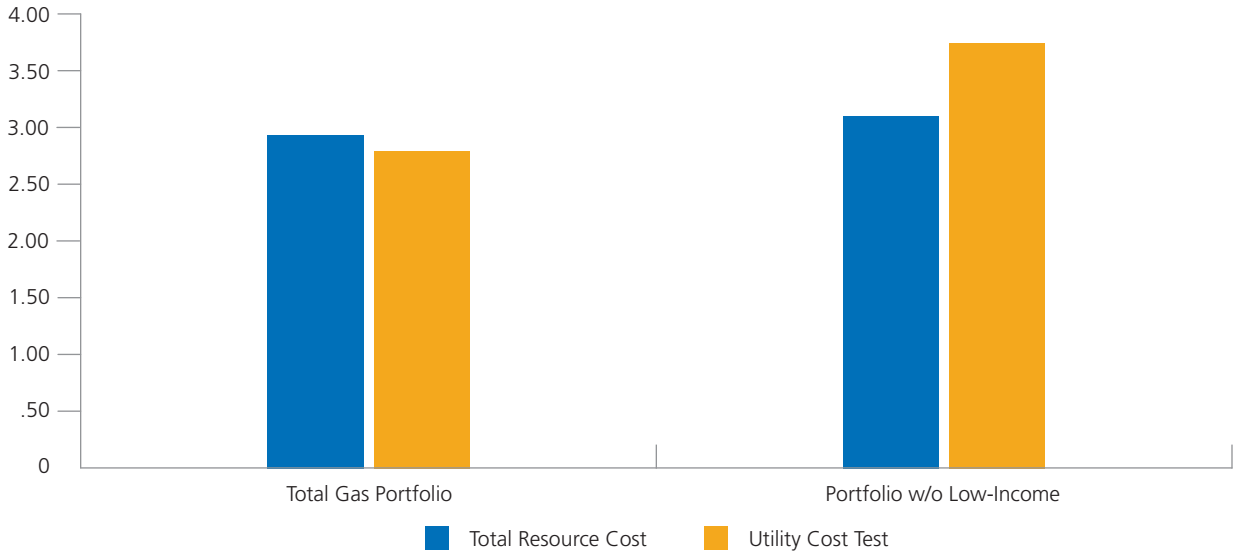
Table 1 illustrates the savings and total budget per sector for the 2021 program year. Note that budgeted numbers are inclusive of non-incentive utility costs.

TABLE 1: PORTFOLIO SAVINGS AND BUDGET BY SECTOR

Sector	Therms	Budget
Low-Income	24,275	\$ 1,763,957
Residential	435,994	\$ 2,576,627
Commercial/Industrial	325,078	\$ 1,044,632
NEEA, CPA, EM&V	–	\$ 611,314
Total	785,347	\$ 5,996,530

Cost-effectiveness is a key indicator of Avista’s energy-efficiency portfolio performance, and while the company pursues all cost-effective measures, it also retains flexibility in its program design so that meaningful energy-efficiency can be achieved by all customers. Avista’s energy-efficiency program is inclusive of a segment that targets efforts toward low-income qualified customers, providing a higher level of benefit (incentive) to these more vulnerable populations. See Figure 1 for a summary.

FIGURE 1: PORTFOLIO COST-EFFECTIVENESS



	Total Gas Portfolio	Gas Portfolio w/o Low-Income
Total Resource Cost	2.78	3.19
Utility Cost Test	2.68	3.74

Introduction

The 2021 *ACP* outlines Avista's conservation offerings and its approach to energy efficiency, as well as details on verifying and reporting savings. The company's plan is based on two key principles. The first is to pursue all cost-effective therms savings by offering financial incentives for energy-saving measures (with a simple financial payback over one year); the second is to use the most effective mechanism to deliver energy-efficiency services to customers. These mechanisms are varied, and include (1) prescriptive programs or standard offers such as high-efficiency appliance rebates, (2) site-specific or customized analyses at customer premises, (3) market transformational or regional efforts with other utilities, (4) low-income weatherization services through local Community Action Partnership (CAP) agencies, (5) low-cost/no-cost advice through a multi-channel communication effort, and (6) support for cost-effective appliance standards and building codes.

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

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

The business planning process builds on the electric and natural gas *IRP* and Conservation Potential Assessment (CPA) processes – overall resource planning, completed every two years, which integrates energy efficiency and generation resources into a preferred resource scenario. It is the purpose of the business plan to create an operational strategy for reaching the aggregate targets identified within the *IRP* in a manner that is cost-effective and with due consideration to all aspects of customer value.

The annual planning process also leads to the identification of infrastructure and support needs such as:

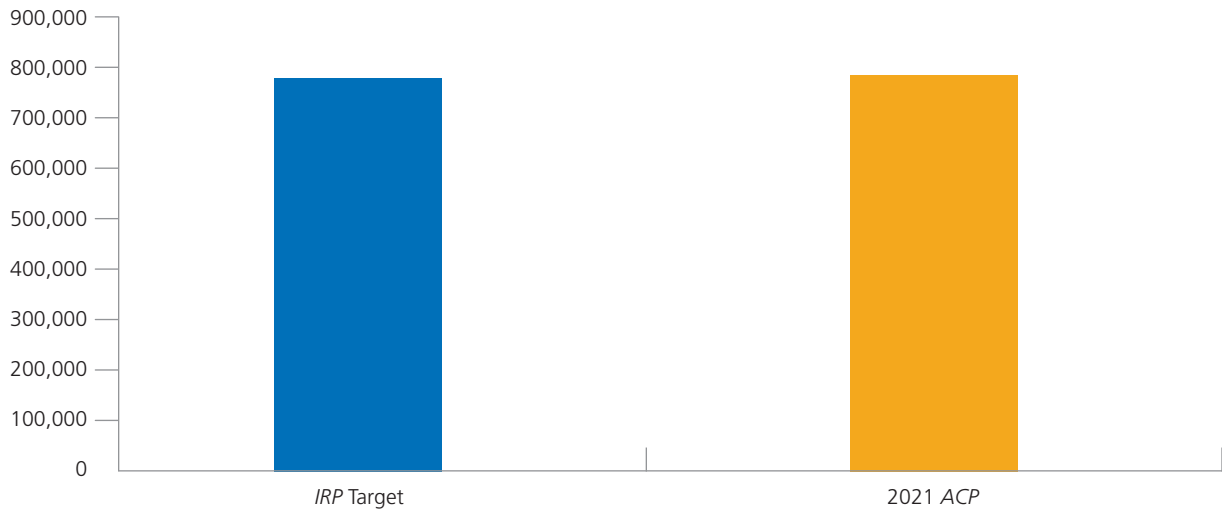
- ◆ defining the necessary labor complement
- ◆ establishment of an annual budget
- ◆ review of and modification to the Evaluation, Measurement, and Verification (EM&V) plan
- ◆ identification of outreach requirements
- ◆ organization of a marketable customer-facing portfolio

The budgetary projections established within the plan are applied in a separate mid-year process to revise the conservation tariff rider funding mechanisms contained within the Schedule 191 natural gas tariffs. The tariff rider surcharges are periodically adjusted with the objective of moving these balances toward zero.

2021 Natural Gas IRP Target

Avista based its 2021 natural gas target on the CPA Study that will be included in the upcoming 2021 *IRP*. For 2021, the overall potential identified in the study was 781,459 therms. While the 2021 natural gas *IRP* is not finalized, Avista will update its *IRP* target at the conclusion of the *IRP* process. The 2021 *ACP*'s expected acquisition is 785,347 therms.

FIGURE 2: 2021 INTEGRATED RESOURCE PLAN VS. 2021 ANNUAL CONSERVATION PLAN (THERMS)



	IRP Target	2021 ACP
Therm Savings	781,459	785,347

Key Impacts

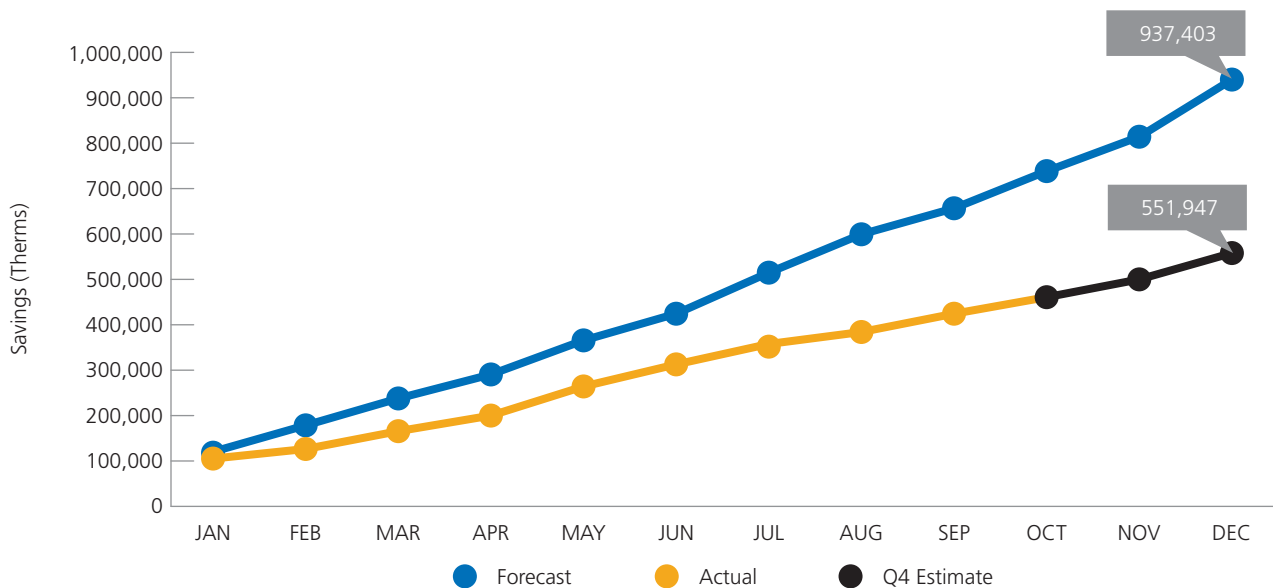
Impacts of COVID-19 on Avista Customers and Programs

The impact of COVID-19 has been felt by all customers, businesses, and community associations within Avista's service territory. In addition to remaining focused on providing care, concern, compassion, and empathy through all interactions, the company will continue to work toward an increase in the number of customers receiving energy assistance, and will also explore methods to continue to provide customers with access to energy-efficiency opportunities.

During 2020, Avista modified its rate assistance program and established a hardship grant available to customers who experience COVID-related hardship regardless of income. In addition, Avista voluntarily stopped all collection activities within its service territory, thereby halting the distribution of past-due and final notices, discontinuing fees for late bill payments, and ceasing all service disconnections resulting from customer non-payment.

For Avista's energy efficiency program, COVID-19 has presented several challenges and opportunities that have had an impact on the program's overall conservation achievements. State and company requirements around social distancing, curtailment of commercial/industrial customer operations, and apprehension around investments at a time of uncertainty have all contributed to lower-than-anticipated throughput for Avista's energy-efficiency program in 2020. Since March, the program has trailed behind its estimates through the year. Figure 3 compares the company's estimated conservation achievements against its actual achievements from January through September 2020.

FIGURE 3: YEAR-TO-DATE CUMULATIVE CONSERVATION SAVINGS (THERMS)



The majority of Avista's programs rely on some type of direct interaction, in close proximity, between customers and program implementers. Low-income programs partner with CAP agencies, direct-installation programs rely on business partners, and most prescriptive and site-specific programs rely on either physical installation or verification of measures, both of which require on-site presence. This is just one among many factors contributing to lower program participation in 2020.

In response to these challenges, Avista has looked for ways to keep customers engaged in conservation programs. Below are a few of the approaches the company has taken to adaptively manage its programs during COVID-19:

1. For commercial/industrial projects, Avista temporarily implemented a virtual option for installation verifications. Customers and vendors were asked to provide photos of projects or provide a live stream of the installed measures to verify and document their proper and intended use. This was applicable for projects over \$25,000 in Washington.
2. For the new home energy audits program, originally scheduled to launch in 2020 by offering in-person, in-home audits, Avista is offering a virtual audit with follow-up phone discussions on customer data inputs and report recommendations, using the same reporting tool for the normal audit service. Avista is also testing other technology in an effort to provide a professional guided phone audit that can be performed remotely. When available, it too will be offered to customers as an option until the normal service can be resumed.

Conservation Targets for Natural Gas Companies

Avista, along with other Washington utilities offering natural gas service, will be required to establish a two-year natural gas target that includes the effect of greenhouse gas emissions. Per RCW 80.28.380, "Each gas company must identify and acquire all conservation measures that are available and cost-effective. Each company must establish an acquisition target every two years and must demonstrate that the target will result in the acquisition of all resources identified as available and cost-effective. The cost-effectiveness analysis required by this section must include the costs of greenhouse gas emissions established in RCW 80.28.395. The targets must be based on a conservation potential assessment prepared by an independent third party and approved by the commission. Conservation targets must be approved by order by the commission. The initial conservation target must take effect by 2022."

Washington House Bill 1257

The newly enacted House Bill 1257¹ (HB 1257) issues new efficiency and reporting requirements for buildings and building operators that heat with natural gas and have a building size of over 50,000 square feet. Throughout 2021, Avista will continue to work with outside stakeholders, members of its account executive team, representatives from the Department of Commerce, and the Washington Utilities and Transportation Commission to stay well informed on the rule-making for HB 1257.

1) Per RCW 19.27

Summary of 2021 Budget

Overall Energy-Efficiency Budget Projections

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

The overall 2021 budget projection is summarized in Table 2, which includes elements of the energy-efficiency budget that have been designated as *supplemental* to indicate that they are unrelated to the current-year operations and are not included in the cost-effectiveness calculation. These supplemental costs include the funding associated with regional programs like Northwest Energy Efficiency Alliance (NEEA) and the cost to perform CPA studies and EM&V.

TABLE 2: ENERGY-EFFICIENCY BUDGET SUMMARY

	2021 Washington Natural Gas Budget	Supplemental Budget	Non-Supplemental Budget
Total Incentives	\$ 4,606,953	\$ 0	\$ 4,606,953
Administrative Labor	\$ 198,054	\$ 0	\$ 198,054
Direct Benefit to Customer Labor	\$ 66,960	\$ 0	\$ 66,960
Total Non-Labor/Non-Incentive	\$ 1,124,562	\$ 611,314	\$ 513,249
Total	\$ 5,996,530	\$ 611,314	\$ 5,385,216

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

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

TABLE 3: PROPORTION OF FUNDS RETURNED TO CUSTOMERS THROUGH DIRECT BENEFITS

Utility Expenditures Returned to Customers via Direct Benefits	77%
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The program-by-program details of the expected incentive expenditures for 2021 are provided in greater detail in Table 4. The direct incentive expenditures represent the estimated incentives that will be paid to customers directly or indirectly for participation in energy-efficiency programs. The overall level of expense is correlated to the program's throughput and energy acquisition, and, based on customer participation, the amounts are subject to change.

TABLE 4: CUSTOMER DIRECT INCENTIVE EXPENDITURE DETAIL

Energy Efficiency Program	Direct Incentive Expenditures
Low-Income Programs	
Low-Income	\$ 1,339,828
Total Low-Income Incentives	\$ 1,339,828
Residential Programs	
Residential Prescriptive	\$ 2,299,300
Multifamily Weatherization	\$ 30,275
Total Residential Incentives	\$ 2,329,575
Commercial/Industrial Programs	
HVAC	\$ 180,300
Prescriptive Shell	\$ 87,500
Food Service Equipment	\$ 69,750
Site-Specific	\$ 600,000
Total Commercial/Industrial Incentives	\$ 937,550
Total of All Incentives	\$ 4,606,953

The non-incentive expense, including both non-supplemental and supplemental expenditures, is detailed to a lower level of aggregation and broken out by portfolio in Table 5. These expenses are allocated by the percentage of value provided by each program. The policy regarding assigning costs is based on the source of the requirement or justification for the expense – and the portfolio benefiting from the outcome of that expense.

TABLE 5: NON-INCENTIVE UTILITY EXPENSE DETAIL

Expense Type	Washington Natural Gas Portfolio	Supplemental Budget	Non-Supplemental Budget
Third-Party Non-Incentive Payments	\$ 401,949	\$ 0	\$ 401,949
Labor	\$ 265,014	\$ 0	\$ 265,014
EM&V	\$ 205,314	\$ 205,314	\$ 0
Memberships	\$ 7,000	\$ 0	\$ 7,000
Customer Outreach	\$ 14,000	\$ 0	\$ 14,000
Training/Travel	\$ 350	\$ 0	\$ 350
Marketing	\$ 45,500	\$ 0	\$ 45,500
Regulatory	\$ 350	\$ 0	\$ 350
Studies and Research	\$ 7,000	\$ 0	\$ 7,000
Software Implementation	\$ 16,100	\$ 0	\$ 16,100
Conservation Potential Assessment	\$ 0	\$ 0	\$ 0
General Implementation	\$ 21,000	\$ 0	\$ 21,000
NEEA Fees	\$ 406,000	\$ 406,000	\$ 0
Total	\$ 1,389,576	\$ 611,314	\$ 778,263

Projections of expected labor requirements by job classification are made by managers within the energy-efficiency team, and labor overheads are applied. Labor is allocated to programs based on the weighted value of benefits the program brings to the overall portfolio.

Framework Topics

Evaluation, Measurement, and Verification Commitments

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

For 2021, Avista will engage with two separate EM&V vendors: one for the commercial/industrial customer segment and the other for the residential and low-income sectors. This approach adds the benefit of more diversity in impact recommendations to further improve the company's programs. Avista issued a Request for Proposals (RFP) for the residential and low-income programs in September 2020 and is currently in the process of determining its selection for those programs. The EM&V for the commercial/industrial customer sectors will be served by Cadmus. After the 2020-21 engagement, a new RFP process will begin.

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

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

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

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

Cost-Effectiveness Metrics, Methodology, and Objectives

Avista's planning approach aims to maximize cost-effective conservation acquired by analyzing the cost-effectiveness of each segment (residential, low-income, and commercial/industrial), as well as the ways in which measures within programs contribute to the cost-effectiveness of that segment and eventually the individual portfolios. Non-energy impacts (NEIs) are a common topic of discussion in many energy-evaluation circles. Avista is appreciative of the valuable work the RTF has done to quantify NEIs for the region. In this plan, NEIs were identified from the RTF (converted to therms) and also sources outside the region. The company will continue to follow and participate in RTF activities around NEIs, and will include NEIs in the cost-effectiveness calculation when appropriate.

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

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

Details regarding how Avista applies the avoided costs and cost-effectiveness methodologies to the estimation of the 2021 portfolio are contained in Appendix B – Cost Effectiveness Methodology.

Schedule 190 – Energy-Efficiency Programs

Avista's natural gas energy-efficiency operations are governed by Schedule 190 tariff requirements. These tariffs (attached within Appendix C) detail the eligibility and allowable funding that the company provides for energy-efficiency measures. Though the tariff allows for considerable flexibility in how programs are designed and delivered – and accommodates a degree of flexibility around incentives for prescriptive programs subject to reasonable justification – there remains the occasional need to modify the tariff to meet current and future market conditions and opportunities.

Schedule 191 – Demand Side Management Rate Adjustment

Avista evaluates the need for revisions to its Schedule 191 – Demand Side Management Rate Adjustment tariff on an annual basis with revisions occurring each June 1. For electric Schedule 91, WAC 480-100-130(2) requires the utility to file on or before June 1 every year to true up the rider balance with an August 1 effective date. At this time, Avista evaluates the balances within the natural gas tariff to determine whether an adjustment is required.

On May 21, 2019, the company filed Docket No. UE-190406, revising Schedule 91 to reflect a decrease in the customer rate collected to fund Avista's energy-efficiency program; this filing was the fifth revision of Sheet 91A of the tariff rider. Concurrent with this filing, Avista did not adjust its natural gas tariff rider.

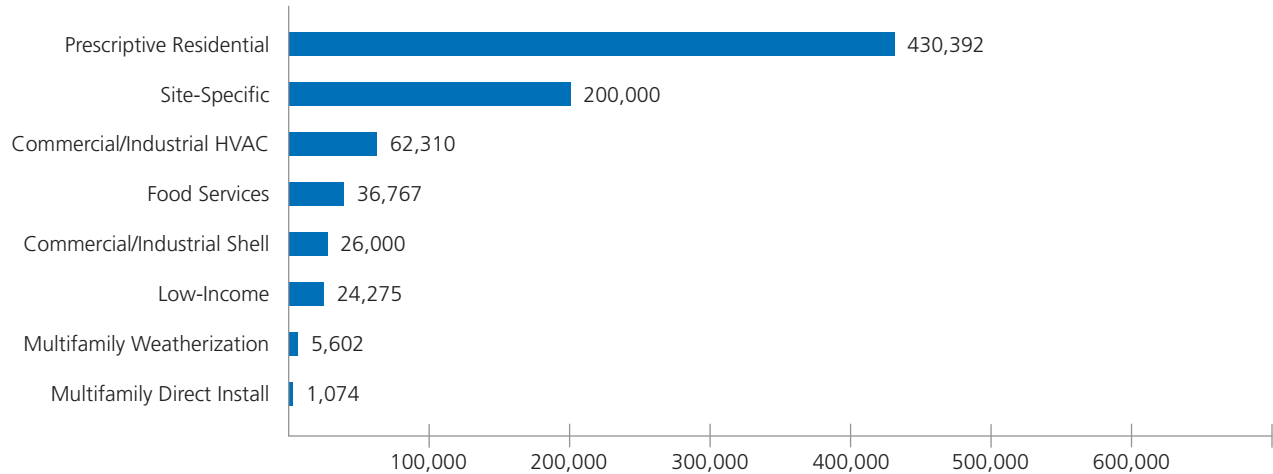
ENERGY-EFFICIENCY PORTFOLIO OVERVIEW



ENERGY-EFFICIENCY PORTFOLIO OVERVIEW

Avista’s energy-efficiency portfolio is composed of residential, low-income, and commercial/industrial programs. For 2021, the company anticipates savings of approximately 785,347 therms from its program offerings. Figure 4 illustrates the major categories from which savings are achieved.

FIGURE 4: SAVINGS FROM ENERGY-EFFICIENCY PROGRAMS (THERMS)



Residential Portfolio Overview

Avista’s residential portfolio is composed of several approaches to engage and encourage customers to consider energy-efficiency improvements within their homes. Prescriptive rebate programs are the main component of the portfolio, augmented by other interventions – such as the multifamily direct install program – and supplemented by educational and outreach efforts, e.g. the residential home energy audit. While the audit program is instrumental in identifying the need for weatherization intervention, the associated savings from those efforts are captured within the residential shell program.

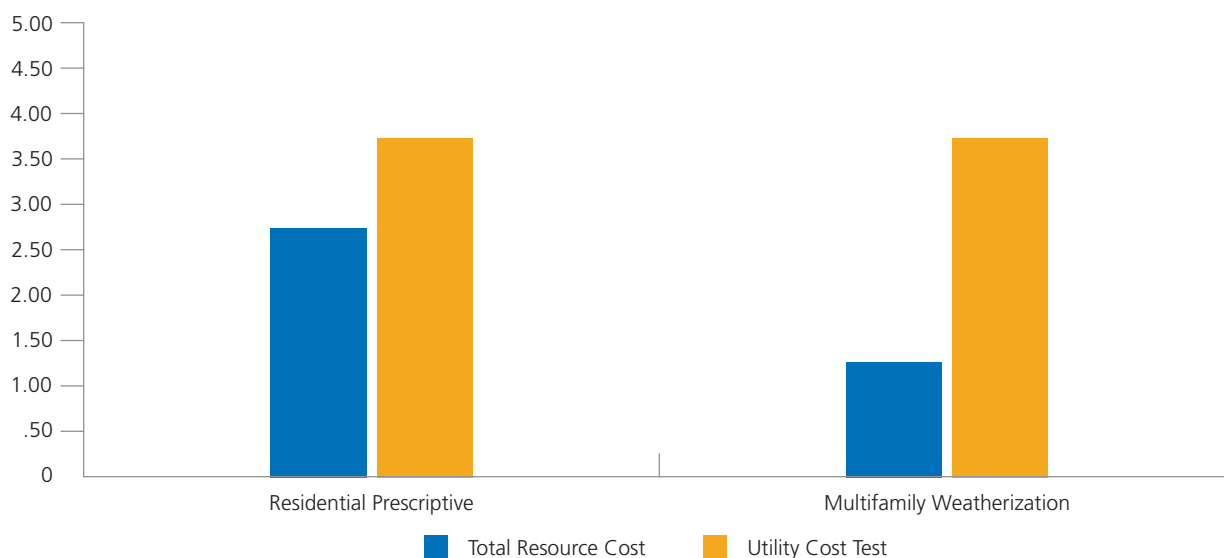
For the 2021 program year, Avista anticipates approximately 435,994 therms to be achieved through residential programs with an expected spend of \$2,576,452. Table 6 summarizes the 2021 residential program estimates. Note that due to recent code revisions to low-flow showerheads, the multifamily direct install program does not anticipate activity for 2021.

TABLE 6: RESIDENTIAL PROGRAM OVERVIEW

Residential Programs	Natural Gas Program Savings (Therms)	Expected Spend
ENERGY STAR Homes	1,340	\$ 6,952
HVAC	344,973	\$ 1,978,883
Water Heat	27,593	\$ 152,221
Shell	56,486	\$ 404,952
Multifamily Weatherization	5,602	\$ 33,444
Total Residential	435,994	\$ 2,576,452

The program-by-program cost-effectiveness of the portfolio is graphically represented in Figure 5.

FIGURE 5: RESIDENTIAL PROGRAMS COST-EFFECTIVENESS



	Residential Prescriptive	Multifamily Weatherization
Total Resource Cost	2.77	1.26
Utility Cost Test	3.67	3.63

Residential Programs

Residential Prescriptive Programs

Prescriptive rebate programs use financial incentives to encourage customers to adopt qualifying energy-efficiency measures. Customers must complete installation and apply for a rebate, submitting proper proof of purchase, installation, and/or other documentation to Avista, typically within 90 days from project completion. Customers can submit this form in hard copy; several prescriptive measures are also available to submit online at myavista.com.

Residential prescriptive programs typically cover single-family homes up to a four-plex. For multifamily situations (five-plex or larger), owners and developers may choose to treat the entire complex with an efficiency improvement.

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

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

Residential ENERGY STAR Homes Program

General Program Description

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

Program Manager

Camille Martin

TABLE 7: RESIDENTIAL ENERGY STAR HOMES PROGRAM METRICS

Projected Program Metrics		
Overall Therm Savings		1,340
Incentives	\$	6,000
Non-Incentive Utility Costs	\$	953
Total Costs	\$	6,953
Cost-Effectiveness		
Total Resource Cost		1.65
Utility Cost Test		5.25

Program Implementation

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

The current customer descriptions of the programs with primary requirements are available per myavista.com: ECO-Rated Manufactured Homes Rebate form.

Program Eligibility

Any Washington residential customer with a certified ENERGY STAR manufactured home that has Avista residential natural gas (Schedule 101) services is eligible.

TABLE 8: RESIDENTIAL ENERGY STAR HOMES PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit Therm Savings	Incentive
ENERGY STAR Homes	10 Unit	134 \$	600

TABLE 9: RESIDENTIAL ENERGY STAR HOMES PROGRAM INCENTIVE REVISIONS FOR 2021

Measure Description	2020	2021
ENERGY STAR Homes – Manufactured, Natural Gas Only	\$ 400	\$ 600

Residential HVAC Program

General Program Description

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

Overall, residential customers continue to respond well to the program. High-efficiency natural gas furnaces provide the largest portion of the natural gas savings for the residential portfolio.

Program Manager

Camille Martin

TABLE 10: RESIDENTIAL HVAC PROGRAM METRICS

Projected Program Metrics	
Overall Therm Savings	342,173
Incentives	\$ 1,772,050
Non-Incentive Utility Costs	\$ 174,719
Total Costs	\$ 1,946,769
Cost-Effectiveness	
Total Resource Cost	3.71
Utility Cost Test	3.44

Program Eligibility and Incentives

Washington or Idaho residential natural gas customers (Schedule 101) are eligible for a rebate for a contractor-installed high-efficiency natural gas forced-air or wall furnace or boiler. High-efficiency natural gas furnaces and boilers are required to have an Annual Fuel Utilization Efficiency (AFUE) of 90 percent or greater.

TABLE 11: RESIDENTIAL HVAC PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit Therm Savings	Incentive
Smart Thermostat – DIY	700 Unit	26.64	\$ 150
Smart Thermostat – Contractor Installed	1,300 Unit	26.64	\$ 125
Natural Gas Furnace (AFUE 90%)	3,500 Unit	81.66	\$ 450
Wall Insulation	40,000 Sq Ft	0.07	\$ 0.75
Natural Gas Boiler (AFUE 96%)	20 Unit	112.40	\$ 450
High-Efficiency Wall Furnace (AFUE 90%)	10 Unit	81.66	\$ 450

TABLE 12: RESIDENTIAL HVAC PROGRAM INCENTIVE REVISIONS FOR 2021

Measure Description	2020	2021
Smart Thermostat – DIY	\$ 75	\$ 125
Smart Thermostat – Contractor Installed	\$ 100	\$ 150

Both smart thermostat measures increased by \$50 to support broader adoption. Avista anticipates the need for more smart thermostats in people’s homes to enable future demand response programs.

Residential Water Heat Program

General Program Description

Washington customers who heat their homes with Avista natural gas may be eligible for rebates for the installation of high-efficiency water heat units. Efficiencies for space- and water-heating equipment are verified according to the contractor invoice or the Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

Program Manager

Camille Martin

TABLE 13: RESIDENTIAL WATER HEAT PROGRAM METRICS

Projected Program Metrics	
Overall Therm Savings	27,593
Incentives	\$ 140,500
Non-Incentive Utility Costs	\$ 11,729.49
Total Costs	\$ 152,229
Cost-Effectiveness	
Total Resource Cost	1.24
Utility Cost Test	2.95

Program Eligibility

Washington customers who heat their homes with natural gas (Schedule 101) are eligible for rebates for the installation of a high-efficiency heat pump water heater (≥ 1.8 UEF), natural gas tankless water heater, natural gas high-efficiency water heater (≥ 0.82 UEF), or ≤ 55 -gallon natural gas water heater (≥ 0.65 UEF). Supporting documentation is required for participation, such as copies of contractor invoices or AHRI certification. Efficiencies for space and water-heating equipment are verified according to the contractor invoice or the AHRI.

TABLE 14: RESIDENTIAL WATER HEAT PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit Therm Savings	Incentive
Natural Gas Tankless Water Heater (0.82+)	330 Unit	78	\$ 400
Natural Gas High-Efficiency Water Heater (≤ 55)(.65 or greater)	85 Unit	22	\$ 100

Incentive Revisions for 2021

None.

Residential Shell Program

Description

The shell program encourages residential customers to improve their home’s shell or exterior envelope with upgrades to windows, storm windows, and insulation. This prescriptive rebate approach issues payment to the customer after the measure has been installed. Energy-efficiency marketing efforts build considerable awareness of opportunities in the home and drive customers to the website for rebate information. Vendors generate participation in the program by using rebates as a sales tool for their services. Utility website promotion, vendor training, retail location visits, and presentations at various customer events throughout the year are some of the other communication methods that encourage program participation.

Program Manager

Camille Martin

TABLE 15: RESIDENTIAL SHELL PROGRAM METRICS

Projected Program Metrics	
Overall Therm Savings	59,286
Incentives	\$ 380,750
Non-Incentive Utility Costs	\$ 56,481
Total Costs	\$ 437,231
Cost-Effectiveness	
Total Resource Cost	1.36
Utility Cost Test	4.95

Program Eligibility

Washington residential customers using electric (Schedule 1) and natural gas (Schedule 101) customers will no longer have a usage requirement of ≥ 340 therms. Storm windows (interior/exterior) must be new, the same size as the existing window, and not in direct contact with the existing window. Exterior windows’ low-e coating must be facing the interior of the home. Glazing material emissivity must be less than .22 with a solar transmittance greater than .55.

TABLE 16: RESIDENTIAL SHELL PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit Therm Savings	Incentive
Windows Single Pane <0.30 U-value	36,500 Sq Ft	0.52	\$ 4.00
Windows Dual Pane <0.30 U-value	36,500 Sq Ft	0.24	\$ 1.50
Storm Windows	350 Sq Ft	0.34	\$ 3.00
Floor Insulation	15,000 Sq Ft	0.06	\$ 0.75
Attic Insulation	185,000 Sq Ft	0.15	\$ 0.75

Low-Income Portfolio Overview

General Program Description

Avista’s low-income programs are offered in a cooperative effort with CAP agencies under annual contract to Avista. The funding contracts allow for considerable flexibility for the agencies to deliver to each individual low-income client a mix of measures customized to that particular home.

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

The seven agencies in Avista’s service territory receive an aggregate annual funding amount of \$3 million, an increase over previous years to support rising costs as well as additional spending for health and safety. The agencies are authorized to use 10 percent of their funds for administration cost reimbursement and 20 percent for program support reimbursement. The company also permits them to use up to 30 percent of their contract to fund health, safety, and repairs in qualified homes. Health, safety, and repair spending is at the agency’s discretion and offers flexibility in preserving the integration of the improvements that have been installed in the home.

Program Manager

Renee Coelho

TABLE 17: LOW-INCOME PROGRAM METRICS

Projected Program Metrics		
Overall Therm Savings		24,275
Incentives	\$	1,339,828
Non-Incentive Utility Costs	\$	424,128
Total Costs	\$	1,763,957
Cost-Effectiveness		
Total Resource Cost		1.08
Utility Cost Test		0.48

TABLE 18: LOW-INCOME PROGRAM FUNDING BY CAP AGENCY

CAP Agency	County	Funding
Spokane Neighborhood Action Partners (SNAP)	Spokane	\$ 1,950,000
Rural Resources Community Action	Ferry, Lincoln, Pend Oreille, Stevens	\$ 270,000
Community Action Center	Whitman	\$ 210,000
Opportunities Industrialization Council	Adams, Grant	\$ 120,000
Spokane Indian Housing Authority	Stevens County	\$ 30,000
Community Action Council of Lewis, Mason & Thurston Counties	Klickitat, Skamania	\$ 60,000
Community Action Partnership	Asotin	\$ 360,000
Total		\$ 3,000,000

The program will continue to fully fund the majority of energy-efficiency electric and natural gas improvements. These include utility-approved measures as well as those contained in the Washington State Department of Commerce's *Weatherization Manual*, July 2019 edition. A list of 2021 approved measures can be found in the table below.

TABLE 19: LOW-INCOME PROGRAM 2021 APPROVED MEASURES

Natural Gas Efficiency Measures
Air Infiltration
Duct Sealing
Attic Insulation
Duct Insulation
Floor Insulation
Wall Insulation
ENERGY STAR Rated Doors
ENERGY STAR Windows
High-Efficiency Furnace (95% AFUE)
High-Efficiency Water Heater <= 55 Gal (.82 EF)
High-Efficiency Boiler (96% AFUE)

The agencies may choose to use their health, safety, and repair allocation toward covering the full cost of the rebated measure if they do not have other funding sources to make up the difference. A list of 2021 fully funded and qualified rebate measures can be found in Table 20.

TABLE 20: LOW-INCOME PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit Therm Savings	Funding	Incentive
Air Infiltration – Natural Gas	100	Unit	16.09	Fully Fund	\$ 979.20
ENERGY STAR Rated Doors	100	Unit	12.32	Fully Fund	\$ 704.40
Windows	10,000	Sq Ft	0.31	Fully Fund	\$ 30.74
High-Efficiency Natural Gas Furnace	100	Unit	73.55	Fully Fund	\$ 3,612.67
Water Heater	20	Unit	7.74	Fully Fund	\$ 2,515.62
Attic Insulation	100,000	Sq Ft	0.04	Fully Fund	\$ 1.87
Duct Insulation	1,500	Sq Ft	0.17	Fully Fund	\$ 2.92
Floor Insulation	50,000	Sq Ft	0.05	Fully Fund	\$ 2.67
Wall Insulation	50,000	Sq Ft	0.06	Fully Fund	\$ 2.12
Duct Sealing	10	Unit	20.17	Fully Fund	\$ 793.95
Tankless Water Heater	10	Unit	66.50	Fully Fund	\$ 573.00
High-Efficiency Boiler	10	Unit	20.17	Fully Fund	\$ 793.95

2021 Program Planning

The majority of natural gas measures will continue to be fully funded through Avista’s low-income program. Ten natural gas tankless water heaters will be rebated the amount equal to the avoided cost of energy. The company will continue in the same vein as its 2020 implementation by reimbursing the agencies the full cost of the measures that appear on the state priority list as presented in the Washington State Department of Commerce’s *Weatherization Manual*, July 2019 edition.

Measures that are not a priority of the state or are not cost-effective by utility measurements will be reimbursed at the amount of Avista’s avoided cost-of-energy savings. Agencies are encouraged to work with the company when considering the installation of energy-efficiency opportunities that are not found on either the approved or the rebate list.

Community Energy Efficiency Program

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

Avista received a \$750,000 CEEP allocation for the 2020-21 funding year that is set to complete in June 2021. The company is providing a \$750,000 match along with in-kind program administrative support. Three CAP agencies have partnered with Avista to implement the CEEP funds under two programs: energy efficiency improvements for multifamily housing, and converting income-qualified homes with alternative heat sources (e.g. wood or oil) to a heat pump system. In addition, CEEP funds are being used to match utility rebates for energy-efficiency work done in small businesses in rural communities.

Commercial/Industrial Portfolio Overview

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

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

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

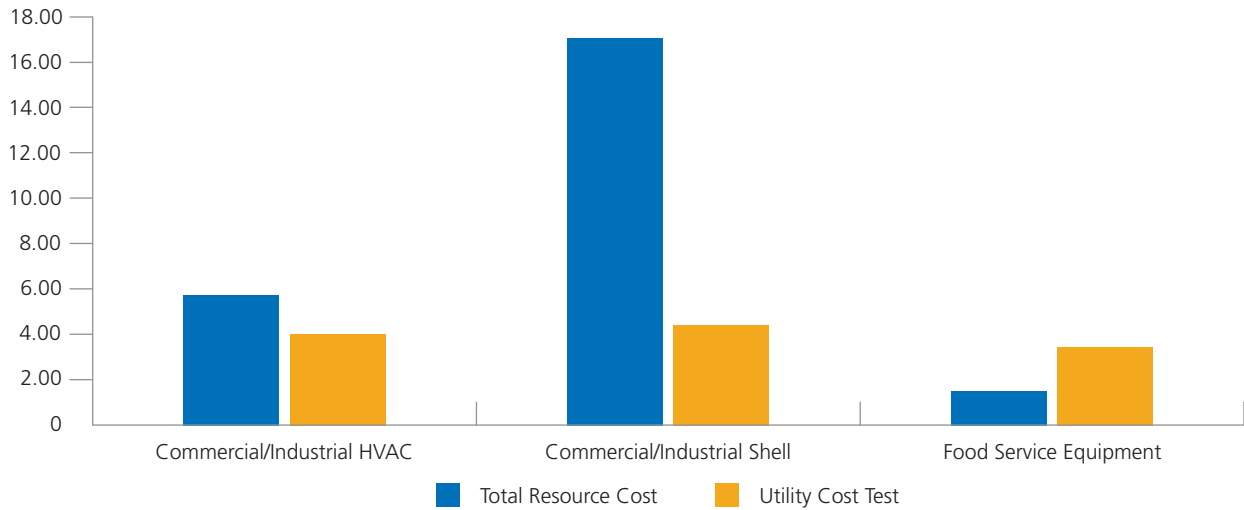
For the 2021 program year, Avista anticipates approximately 325,075 therms to be achieved through commercial/industrial programs with an expected spend of \$1,044,556. Table 21 summarizes the 2021 commercial/industrial program estimates.

TABLE 21: COMMERCIAL/INDUSTRIAL PROGRAM OVERVIEW

Commercial/Industrial Programs	Natural Gas Program Savings (therms)	Expected Spend
HVAC	62,310	\$ 201,463
Prescriptive Shell	26,000	\$ 99,251
Food Service Equipment	36,767	\$ 77,476
Site-Specific	200,000	\$ 666,365
Total Commercial/Industrial	325,078	\$ 1,044,556

Quantifiable non-energy benefits are included in the Total Resource Cost (TRC) calculation, including but not limited to reductions in maintenance, water, sewer, and non-utility energy costs. All assigned and allocated non-incentive utility costs have been incorporated into the cost-effectiveness calculation. Figure 6 identifies the TRC and Utility Cost Test (UCT) cost-effectiveness for the prescriptive commercial/industrial program.

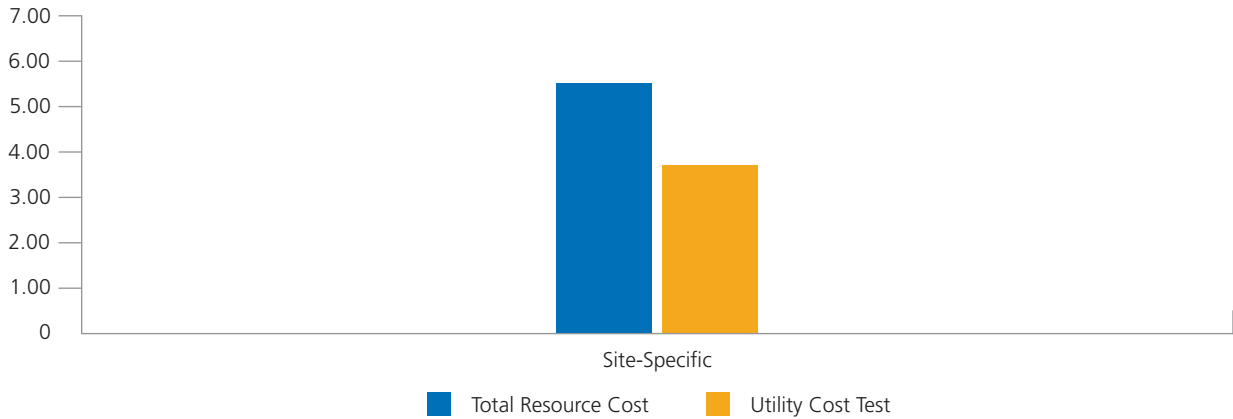
FIGURE 6 – COMMERCIAL/INDUSTRIAL PRESCRIPTIVE PROGRAMS COST-EFFECTIVENESS



	Commercial/ Industrial HVAC	Commercial/ Industrial Shell	Food Service Equipment
Total Resource Cost	5.86	16.95	1.50
Utility Cost Test	4.03	4.54	3.82

Avista’s site-specific program has historically been one of the largest and frequently one of the more cost-effective programs. Any measure with documentable and verifiable energy savings that is not otherwise covered by a prescriptive program is eligible for the site-specific program. The all-encompassing nature of the program has led to the participation of a number of projects that would not otherwise have been incorporated within the portfolio. Figure 7 identifies the cost-effectiveness for the site-specific program.

FIGURE 7 – COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM COST-EFFECTIVENESS



Site-Specific	
Total Resource Cost	5.43
Utility Cost Test	3.82

Program marketing relies heavily on Avista’s account executive infrastructure, as well as commercial/industrial energy-efficiency outreach, which includes print advertising, customer newsletters, customer meetings, and vendor engagement. While account executives have actively managed accounts, they’re also available to any customer based on the geographic location or industry, and serve as their liaison for all energy needs. Part of each account executive’s effort is expended on coordinating the customer involvement in both the site-specific and prescriptive energy-efficiency programs. The program delivery and engineering teams perform additional outreach to customer groups and support program marketing, as well as serve their functions within the program implementation process.

Commercial/Industrial Programs

Commercial/Industrial Site-Specific Program

General Program Description

The site-specific program is a major component in Avista's commercial/industrial portfolio. Customers receive technical assistance and incentives in accordance with Schedule 190. The company's program approach strives for a flexible response to energy-efficiency projects that have demonstrable therm savings within program criteria. The majority of site-specific therm savings are composed of custom lighting projects that do not fit the prescriptive path, along with appliances, compressed air, HVAC, industrial process, motors, shell measures, and natural gas multifamily market transformation. The site-specific program is available to all commercial/industrial retail natural gas customers. It typically brings in the largest portion of savings to the overall energy-efficiency portfolio.

Program Manager

Lorri Kirsten

TABLE 22: COMMERCIAL/INDUSTRIAL SITE-SPECIFIC PROGRAM METRICS

Projected Program Metrics	
Overall Therm Savings	200,000
Incentives	\$ 600,000
Non-Incentive Utility Costs	\$ 66,413
Total Costs	\$ 666,413
Cost-Effectiveness	
Total Resource Cost	5.43
Utility Cost Test	3.82

Program Implementation

This program will offer an incentive for any qualifying natural gas energy-saving measure up to the incremental efficiency measure cost that has a simple payback which is less than the life of the measure being installed. Avista will make adjustments to the percent of incremental cost paid to attempt to obtain the greatest energy savings at the lowest cost. A cap of 70 percent of the incremental cost and a 15-year measure simple payback based on energy cost savings is used unless a business need to increase either parameter is articulated¹. Site-specific program savings can be difficult to predict due to the large nature of the projects and the long sales cycles. General economy shifts may also affect customer willingness to fund efficiency improvements. Increases in process, eligibility complexity, customer costs to participate beyond the capital investment, and costs for post-measurement activities are kept in mind and managed in order to continue to successfully engage customers.

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

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

TABLE 23: COMMERCIAL/INDUSTRIAL SITE-SPECIFIC MEASURES AND INCENTIVES

	Estimated Therm Savings	Incentives
Site-Specific Programs	200,000	\$ 600,000

Commercial/Industrial Business Partner Program

The Business Partner Program (BPP) is a new outreach effort designed to target Avista’s rural small business customers by bringing awareness of utility programs and services that can assist in managing their energy bills. When it comes to participating in energy-efficiency programs, small businesses are chiefly focused on ways to save money, and often have neither the time nor the capital to make improvements. The BPP provides advice and tools customers can use to educate and empower both business owners and employees to use less energy.

This high-touch initiative provides a free energy-efficiency assessment, along with awareness about other services such as billing options and energy efficiency rebates. Once customers are educated about potential improvements, the challenge is to encourage them to act on these enhancements. To further support the BPP, a proposal is currently under review with CEEP for financial assistance. If the CEEP proposal is accepted, the funding would be used toward assisting only rural small business customers with financing the coordination and installation of identified energy-efficiency measures (e.g. lighting retrofits) that may have been identified during an energy assessment. With customers participating in these energy assessments, understanding their utility bill, and seeing the results of energy-efficiency improvements, this program will provide a comprehensive approach to serving this hard-to-reach customer.

Commercial/Industrial Prescriptive HVAC Program

General Program Description

The commercial/industrial natural gas HVAC program offers incentives to customers who are installing highly efficient natural gas heating equipment. Installing highly efficient equipment helps lower operating costs and save energy. This program encourages customers to select a high-efficiency solution when making energy upgrades to their businesses. This year Avista will be adding back natural gas unit heaters. The prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial/industrial customers who heat with Avista natural gas are eligible for this program.

Program Manager

Greta Zink

TABLE 24: COMMERCIAL/INDUSTRIAL PRESCRIPTIVE HVAC PROGRAM METRICS

Projected Program Metrics	
Overall Therm Savings	62,310
Incentives	\$ 180,300
Non-Incentive Utility Costs	\$ 21,178
Total Costs	\$ 201,478
Cost-Effectiveness	
Total Resource Cost	5.86
Utility Cost Test	4.03

Program Implementation

This is a prescriptive program with seven measures offered. Customers must submit a completed rebate form, invoices, and an AHRI certificate within 90 days after the installation has been completed. Each rebate will be qualified and processed within iEnergy with the current-year calculator. Avista will send an incentive check to the customer or a designee after the project is approved. Rebates will not exceed the total amount on the customer invoice. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. The Avista website is also used to communicate program requirements, incentives, and forms.

TABLE 25: COMMERCIAL/INDUSTRIAL PRESCRIPTIVE HVAC PROGRAM MEASURES AND INCENTIVES

	Projected Participation		Per-Unit Therm Savings		Incentive
Natural Gas Boiler <300 kBTU .85-.89 AFUE	1,500	Unit	\$	1.77	\$ 5.00
Natural Gas Boiler <300 kBTU .90+ AFUE	3,200	Unit	\$	2.87	\$ 9.00
Multi-Stage Furnace <225 kBTU .90-.95 AFUE	1,200	Unit	\$	3.67	\$ 11.00
Multi-Stage Furnace <225 kBTU .95+ AFUE	1,200	Unit	\$	4.22	\$ 13.00
Single-Stage Furnace <225 kBTU .90-.95 AFUE	2,700	Unit	\$	2.87	\$ 5.00
Single-Stage Furnace <225 kBTU .95+ AFUE	2,700	Unit	\$	3.67	\$ 11.00
Unit Heater (100 kBTU, 0.90) – Small Unit	20	Unit	\$	194.54	\$ 600.00
Unit Heater (200 kBTU, 0.90) – Small Unit	20	Unit	\$	389.09	\$ 1,200.00
Unit Heater (300 kBTU, 0.90) – Small Unit	20	Unit	\$	583.63	\$ 1,800.00

Incentive Revisions for 2021

For 2021, unit heater incentives have been added to the program. The incentive amount is \$6.00 per kBTU for heaters up to 300 kBTU.

Commercial/Industrial Prescriptive Shell Program

The commercial/industrial prescriptive shell program provides incentives to customers who improve the envelope 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/industrial customers must have an annual heating footprint for a fuel provided by Avista.

Program Manager

Greta Zink

TABLE 26: COMMERCIAL/INDUSTRIAL PRESCRIPTIVE SHELL PROGRAM METRICS

Projected Program Metrics	
Overall Therm Savings	26,000
Incentives	\$ 87,500
Non-Incentive Utility Costs	\$ 11,760
Total Costs	\$ 99,260
Cost-Effectiveness	
Total Resource Cost	16.95
Utility Cost Test	4.54

Program Implementation

This is a prescriptive program with five measures offered. Customers must submit a completed rebate form, invoices, and an insulation certificate within 90 days after the installation has been completed. Avista will send an incentive check to the customer or a designee after the project is approved. Rebates will not exceed the total amount on the customer invoice. Each rebate will be qualified and processed within iEnergy with the current-year calculator. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. The Avista website is also used to communicate program requirements, incentives, and forms.

TABLE 27: COMMERCIAL/INDUSTRIAL PRESCRIPTIVE SHELL PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit Therm Savings	Incentive
Less than R11 Attic Insulation (E/G) to R30-R44 Attic Insulation	20,000 Sq Ft	0.09 \$	0.75
Less than R11 Attic Insulation (E/G) to R45+ Attic Insulation	20,000 Sq Ft	0.13 \$	0.85
Less than R11 Roof Insulation (E/G) to R30+ Roof Insulation	30,000 Sq Ft	0.12 \$	0.60
Less than R4 Wall Insulation (E/G) to R11-R18 Wall Insulation	30,000 Sq Ft	0.24 \$	0.60
Less than R4 Wall Insulation (E/G) to R19+ Wall Insulation	30,000 Sq Ft	0.36 \$	0.65

TABLE 28: COMMERCIAL/INDUSTRIAL PRESCRIPTIVE SHELL PROGRAM INCENTIVE REVISIONS FOR 2021

Measure Description	2020	2021
Wall Less than R4 to R11-R18	\$ 0.35	\$ 0.60
Wall Less than R4 to R19 or Greater	\$ 0.45	\$ 0.65
Attic Less than R11 to R30-R44	\$ 0.50	\$ 0.75
Attic Less than R11 to R45 or Greater	\$ 0.60	\$ 0.85
Roof Less than R11 to R30 or Greater	\$ 0.40	\$ 0.60

Commercial/Industrial Prescriptive Food Services Program

General Program Description

The commercial/industrial food service equipment program offers incentives for customers who purchase or replace food service equipment with qualified ENERGY STAR equipment. Energy-efficient equipment helps customers save money on energy costs. This prescriptive rebate approach issues payment to the customer after the measure has been installed. Commercial customers who use an Avista fuel to operate the equipment are eligible for this program.

Program Manager

Greta Zink

TABLE 29: COMMERCIAL/INDUSTRIAL PRESCRIPTIVE FOOD SERVICES PROGRAM METRICS

Projected Program Metrics	
Overall Therm Savings	36,767
Incentives	\$ 69,750
Non-Incentive Utility Costs	\$ 7,732
Total Costs	\$ 77,482
Cost-Effectiveness	
Total Resource Cost	1.50
Utility Cost Test	3.82

Program Implementation

This is a prescriptive program with 32 measures offered. Customers must submit a completed rebate form and invoices within 90 days after the installation has been completed. Avista will send an incentive check to the customer or a designee after the project is approved. Rebates will not exceed the total amount on the customer invoice. Each rebate will be qualified and processed within iEnergy with the current-year calculator. This program is promoted by trade allies, Avista account executives, the Avista website, and Avista marketing efforts. The Avista website is also used to communicate program requirements, incentives, and forms.

TABLE 30: COMMERCIAL/INDUSTRIAL PRESCRIPTIVE FOOD SERVICES PROGRAM MEASURES AND INCENTIVES

	Projected Participation	Per-Unit Therm Savings	Incentive
0.81 to 1 GPM Natural Gas Pre-rinse Sprayer	10 Unit	17 \$	50
3 Pan Natural Gas Steamer	2 Unit	586 \$	1,300
4 Pan Natural Gas Steamer	2 Unit	780 \$	1,700
5 Pan Natural Gas Steamer	2 Unit	974 \$	2,200
6 Pan Natural Gas Steamer	2 Unit	1,167 \$	2,600
10 Pan or Larger Natural Gas Steamer	2 Unit	3,043 \$	3,200
Efficient Combination Oven (>= 16 Pan and <= 20 Pan) Natural Gas	3 Unit	500 \$	1,000
Efficient Combination Oven (>= 6 Pan and <= 15 Pan) Natural Gas	3 Unit	403 \$	1,000
Efficient Convection Oven, Full Size	5 Unit	450 \$	700
H.E. Natural Gas Convection Oven, 40% Efficient or Better	5 Unit	323 \$	700
Natural Gas Rack Oven	5 Unit	1,034 \$	2,000
ENERGY STAR 50% Efficient Natural Gas Fryer	20 Unit	505 \$	1,000
H.E. Natural Gas Griddle, 40% Efficient or Better	5 Unit	88 \$	250
High Temp Natural Gas Hot Water Dishwasher	5 Unit	103 \$	300
Low Temp Natural Gas Hot Water Dishwasher	5 Unit	140 \$	300

Incentive Revisions for 2021

None.

REGIONAL MARKET TRANSFORMATION



REGIONAL MARKET TRANSFORMATION

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

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

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

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

For 2021, the company's portion of the NEEA's Washington natural gas budget is expected to be approximately \$406,000. NEEA funding requirements are incorporated within the budget, but are considered to be supplementary expenditures outside of the scope of the current year's local portfolio. The NEEA portfolio has not been incorporated within either the acquisition projection or the cost-effectiveness of the 2021 local portfolio developed within this plan.

Eastside Market Transformation

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

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

2020 is focused on pilot planning, and the collaborative will test the viability of this localized market transformation approach by conducting a short-term ductless heat pump pilot that is expected to launch in 2021. The team has created a market transformation strategy, identified key market indicators of success, and is working to secure relevant data and engage with manufacturers and distributors to discuss ductless heat pump potential and specific barriers to adoption found in both companies' service territories.

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

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

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PILOT PROJECTS AND NEW PROGRAM OFFERINGS



PILOT PROJECTS AND NEW PROGRAM OFFERINGS

Avista is continuously evaluating new technologies and new approaches for attaining energy conservation. As the company pursues all cost-effective kWh and therms, piloting new programs allows both it and its customers to explore new avenues for obtaining energy savings. For 2021, Avista is exploring multiple pilot programs for both residential and commercial/industrial customers. The company will also offer two new programs: small home weatherization, and early adopter incentives for the Washington Clean Buildings Act. The progress of these new and pilot programs is shared regularly with the advisory group.

The timeline in Table 31 illustrates a current target implementation date for each program. Because there are a number of dependencies – and because of the ongoing uncertainty due to the COVID-19 pandemic – these dates should be considered preliminary. Avista updates these projections regularly and shares these updates with the advisory group.

TABLE 31: PILOT PROJECTS AND NEW PROGRAM OFFERINGS

Program/Offering	2021				2022			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Residential Home Energy Audit Pilot Program	Implementation							
Small Home and Multifamily Residential Weatherization	Implementation							
WA State Clean Buildings Act Early Adopter Incentives	Planning	Implementation						
Active Energy Management Pilot Program	Planning	Implementation						
Energy Use Index Retrofit Pilot	Planning	Implementation						
Smart Buildings Center Tool Lending Pilot	Planning	Implementation						
On-Bill Repayment/Financing Program	Planning			Implementation				
				Planning				
				Implementation				

Residential Home Energy Audit Pilot Program

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

Figure 8 is an example of recommendations for one audit customer. Each solution may include several measure options the customer can implement.

FIGURE 8: RESIDENTIAL HOME ENERGY AUDIT PILOT PROGRAM EXAMPLE



Key to the success of this program are the direct incentives to encourage customer interest, marketing efforts to drive customers to the program, and ongoing work with trade allies to ensure that customer demand can be met. The Avista website also communicates program requirements and highlights opportunities for customers.

Program Implementation

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

During the suspended period, Avista has responded to requests for audits by offering a virtual audit with follow-up phone discussions on customer data inputs and report recommendations, using the same reporting tool for the normal audit service. Those customers have declined the offer and have opted to wait for an in-person audit. Avista is also testing other technology in an effort to provide a professional guided phone audit that can be performed without setting foot in customers' homes. When available, it too will be offered as an option until the normal service can be resumed.

Program Eligibility

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

Avista Program Manager

Leona Haley

Key Avista Support Staff

Annette Long, Tom Lienhard, Bryce Eschenbacher, Matt Iris, Colette Bottinelli, and the Avista customer service team

Measures and Incentives

A comprehensive and detailed *Home Energy Assessment Report* that includes specific energy savings measures targeted to the specific home, as well as direct installation and leave-behind materials.

Small Home and Multifamily Residential Weatherization

General Program Description

For 2021, Avista has put forth additional efforts to target customers with significant barriers to entry for participation in energy efficiency-related programs. New for 2021 is a segment of the residential program dedicated to providing weatherization measures for both small homes and multifamily dwellings. Avista's programs have historically had a minimum-use requirement for participation that ensured that weatherization programs remained cost-effective. Since bringing back weatherization measures in our last biennium, the company has observed that some customers who request a weatherization measure have not been able to participate because of the minimum-use requirements. The small home and multifamily weatherization program does not have a minimum-use requirement and is able to offer shell measures based on unit energy savings from the RTF. Included in this program are also line voltage thermostats, which allow customers to have more control over their heating use. While the thermostats are not considered a weatherization measure, they have been included in the program as an offering.

TABLE 32: SMALL HOME AND MULTIFAMILY WEATHERIZATION PROGRAM METRICS

Projected Program Metrics	
Overall Therm Savings	5,602
Incentives	\$ 30,275
Non-Incentive Utility Costs	\$ 3,169
Total Costs	\$ 33,444
Cost-Effectiveness	
Total Resource Cost	1.26
Utility Cost Test	3.63

Program Eligibility

The small home and multifamily weatherization program is designed to provide an opportunity for customers who have not been able to participate because of minimum annual energy use or dwelling-type restrictions for residential units with five or more units. To be eligible, you must be an Avista customer with natural gas service through Schedule 101.

TABLE 33: SMALL HOME AND MULTIFAMILY WEATHERIZATION PROGRAM MEASURES & INCENTIVES

	Projected Participation	Per-Unit Therm Savings	Incentive
Attic Insulation R0-R38 HZ2 Zonal	3,000 Sq Ft	0.03	\$ 0.75
Attic Insulation R0-R49 HZ2 Zonal	3,000 Sq Ft	0.04	\$ 0.75
Wall Insulation R0-R11 HZ2 Zonal	2,000 Sq Ft	0.09	\$ 0.75
Floor Insulation R0-R19 HZ2 Zonal	1,000 Sq Ft	0.04	\$ 0.75
Floor Insulation R0-R30 HZ2 Zonal	1,000 Sq Ft	0.06	\$ 0.75
Insulated Door R2.5-R5 HZ2 Zonal (ENERGY STAR Rated or Insulated R5)	1,500 Sq Ft	0.07	\$ 0.60
Low-e Storm Window	3,500 Sq Ft	0.69	\$ 4.05
Windows	3,500 Sq Ft	0.74	\$ 2.20

Washington State Clean Buildings Act Early Adopter Incentives

General Program Description

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

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

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

The Department of Commerce is responsible for assuring compliance and determining early-adopter incentive fund allocations. They've published recommendations for affected building owners that include benchmarking their buildings through the portfolio manager and developing and executing an energy-efficiency plan. Utilities in Washington play a vital role in working cooperatively with the Department of Commerce to execute the new law and to support building owners as they navigate the compliance process. Avista has identified the three key areas of support in Table 34.

TABLE 34: WASHINGTON STATE CLEAN BUILDINGS ACT EARLY ADOPTER INCENTIVES

Service	Start Date	Prior Service
Pay Early Adopter Incentive	June 2021	Renewable incentives
Portfolio Manager	In place	Current program offering since January 2009
Energy-Efficiency Engineering Services	In place	Current service offered since Avista began energy-efficiency programs

Avista preparations completed, identified, or underway:

1. actively participate in Department of Commerce rule-making meetings
2. actively participate in HB1257 utility working group meetings
3. provide preliminary information and gain customer feedback at two Spokane Building Owners & Managers Association (BOMA) meetings
4. identify affected buildings in service area
 - initial search with internal GIS tools
 - work with Department of Commerce
5. identify current portfolio manager customers affected by the law
6. determine potential additional program offerings to help customers meet targets

7. create an outreach and communications plan
 - target known affected customers
 - provide broader awareness
8. create payment process and procedures
 - set up proper internal accounting
 - develop reporting tools and process

Avista Program Manager

Leona Haley

Key Avista Support Staff

Tom Lienhard, Bryce Eschenbacher, and Colette Bottinelli

Active Energy Management Pilot Program

General Program Description

The Clean Energy Transformation Act, passed in 2019, places aggressive targets on decarbonization of the electric grid and overall energy-efficiency of the building sector. This legislation will increase the renewable mix on the grid, and could have significant operational impacts on utilities in managing more distributed and variable generation resources. To minimize impacts on customers' energy rates, Avista seeks innovative programs to cost-effectively reduce energy consumption. One potential way to take advantage of efficiency programs is to implement continuous monitoring to improve building performance in real time, a concept referred to as Active Energy Management (AEM). The goal is a deeper understanding of how building energy demand may shift or flex based on potential tariffs, incentives, technologies, and building occupant behaviors.

The AEM pilot program will use the communication networks in Avista's eco-district¹, as well as cloud services and data mining algorithms, to capture, process, and disseminate information on ways to improve a building's energy usage to participants in the program. Potential building efficiency actions will be generated based on data from the Scott Morris Center for Energy Innovation and the Catalyst building, both of which are located inside the eco-district, as well as data from up to 10 participating pilot program buildings located outside of the eco-district. Information that helps increase energy-efficiency will be shared with participating pilot program buildings.

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

This pilot program will seek to achieve the following objectives:

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

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

Energy Use Index Retrofit Pilot

The energy use index retrofit pilot will encourage customers to use their energy more efficiently. The pilot will utilize a pay-for-performance approach with the goal of achieving 50 percent of the customer's previous energy use. The facility must do at least 25 percent of its square footage and there must be a way to accurately measure at a sub-panel for performance. Limited to five customers, this pilot is modeled on the energy use index new construction pilot recently completed and can play a part in the satisfaction of HB 1257 for buildings smaller than the law currently targets.

Smart Buildings Center Tool Lending Pilot

The tool lending pilot will be a two-year program allowing tool lending to Avista customers from a public space in the eco-district. The library of tools will include the company's current stock of energy-efficiency-related equipment, as well as some newer technologies that provide more insight into energy use. In addition to shipping the tools and training materials to customers who are not in the immediate area, the pilot will include training. Work is underway to make this an extension of the NEEC program in order to take advantage of the work that has already been done in the Northwest and limit the cost to Avista while offering a more effective tool set.

On-Bill Repayment/Financing Program

General Program Description

For almost four decades Avista has offered financing options for customers' energy-efficiency projects throughout its service territory, with the last program ending in 2016. While the company no longer offers On-Bill Repayment/Financing (OBR) programs, it has been asked to review offering a new OBR program in 2021 for its Washington residential and small business customers. The request was made as part of the Settlement Stipulation in Avista's 2019 Washington General Rate Case and is shown here:

On-Bill Repayment/Financing Program – Avista will provide a proposal for the Energy Efficiency Advisory Group (EEAG) for on-bill repayment/financing programs for residential and small business customers (Schedules 1, 11, and 101). Avista will incorporate feedback from the EEAG in the final program designs by January 2, 2021. If Avista and the EEAG reach agreement on program terms and design, the company will file the programs with the Commission such that the programs are implemented by September 30, 2021. Based on the outcome of discussions with the EEAG, the company may file small business and residential programs together or individually with the Commission. The company will file a status report with the Commission if agreement is not reached with the EEAG for programs offered to the enumerated customer classes by September 30, 2021. Development costs associated with this program will be recoverable from customers and means of recovery will be addressed in a future GRC.

Avista is currently researching options that will meet these requirements to best serve customers.

TABLE 35: PRIOR LOAN PROGRAM EXPERIENCE

Program	OBR	Duration	Eligible Customers	Lender
Loan in Lieu of Rebate	Yes	state inception – 2016	OR – Residential	Avista
Energy-Efficiency Credit Enhancement	No	2010 – 2014	WA – Residential & C/I	third-party
Easy Pay	Yes	mid to late 1990s	ID & WA – Residential	third-party
Products & Services	Yes	mid to late 1990s	ID & WA – Residential	third-party
Switch Saver	Yes	late 1980s-mid 90s	ID & WA – Residential	third-party

Research and evaluation efforts of OBR program options take advantage of this experience. In addition, guidance and assistance from the EEAG in this process will help determine the OBR program offering, the decision for which, for 2021 and beyond, is expected to be made by the end of 2020.

The business case for OBR programs is based on supporting the increase of energy-efficiency adoption in the built environment, the reduction of greenhouse gas emissions, and more program opportunities to vulnerable populations by helping to make energy-efficiency choices more affordable. Residential and small business customers are often challenged with the lack of available capital to fund an energy-efficient retrofit project. Small business owners often want to use their available capital to grow their business rather than fund a retrofit. Both residential and small business customers generally grasp the benefits of energy-efficiency retrofits, but the path to project implementation is not always simple. OBR helps to overcome the up-front cost hurdle and allows the benefits of an energy-efficiency project to occur now and be paid for over time. Through an OBR program, a customer's energy-efficiency project would typically be funded either by a third-party lender or through a tariff mechanism, with costs paid directly on the customer's Avista utility bill. Avista would then collect the customer's monthly payments until all costs are recovered.

The scope of items funded through an OBR program are focused on weatherization and energy-efficient equipment upgrades. Avista is also looking at opportunities through an OBR program to fund customers' renewable energy projects and other clean energy-related products and services.

Program Implementation

Once the program is established, the key to delivering on the objectives of this program are Avista's trade allies, who would help market and deliver the program. In addition, multi-channel marketing efforts help drive customers to the program. As with any program, success comes from clear communication to both trade allies and customers.

Program Eligibility

All residential and small business customers may be eligible for OBR. Historically, eligibility for OBR programs has also included the requirement that the customer is currently using an Avista fuel for heating.

Avista Program Manager

Leona Haley

Key Avista Support Staff

All program implementation staff, Tom Lienhard, Bryce Eschenbacher, Colette Bottinelli, and Avista's customer service, finance, and billing teams

AVISTA-SPECIFIC METHODOLOGIES AND ANALYTICAL PRACTICES



AVISTA-SPECIFIC METHODOLOGIES AND ANALYTICAL PRACTICES

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

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

- ◆ the funding associated with regional programs (NEEA)
- ◆ the cost to perform CPA studies
- ◆ costs related to EM&V

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

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

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

1) During the late summer of 2016, Avista presented to the advisory group a proposal to use a real Weighted Average Cost of Capital (WACC) instead of a nominal figure. This suggestion received positive feedback; a real discount rate was therefore used. For 2021, the company is using separate discount rates for residential and nonresidential. The nonresidential rate will continue at the WACC while the residential discount rate is set at a rate equal to the daily treasury bill rate at 07.09.19.

COMPANY INITIATIVES, STUDIES, AND OTHER ITEMS



COMPANY INITIATIVES, STUDIES, AND OTHER ITEMS

iEnergy DSM Enterprise Software Integration

Avista is continuing its integration of the iEnergy software platform for its energy-efficiency programs. One component of iEnergy, the DSM central module, will be used internally to process and track energy-efficiency projects as well as provide analytics and dashboards. In 2019, Avista completed the integration for its commercial/industrial programs and will be implementing the residential and low-income segments into the enterprise software during 2021.

In addition, the trade ally module will be used to improve communications with regional vendors and installers. This program is a purpose-built data-management, analytics, and customer-engagement platform that assists utilities in managing their business processes. It includes an end-to-end management module that tracks and reports energy-efficiency savings and expenses along with providing timely reporting for both internal and external stakeholders.

Non-Energy Impacts

For 2021, Avista's energy-efficiency team has made additional efforts toward identifying and including NEIs into its residential and commercial/industrial portfolios. NEIs are additional benefits that participants gain from installing energy-efficiency measures. The benefit of an NEI is in addition to energy savings, and can include other real and tangible impacts to resources, quality of life, health, and other economic factors. Increased comfort, improved air quality, water quality, water savings, and other improvements are common examples of NEIs. The acceptability of each type of NEI varies between jurisdictions or region; the widespread identification of NEIs has been a challenge for utilities in general, however.

While basic conservation efforts consider the effect energy-efficiency measures have on the utilities system by way of deferring capital investments, NEIs provide an opportunity to assign value that is received by the customer. As such, NEI values are included in the TRC cost-effectiveness test as a benefit to the customer. Note that since the utility doesn't receive a direct system benefit, NEIs are excluded from the UCT.

A uniformed approach to valuing NEIs has historically proven to be difficult. As new benefits are identified, the quantification of those benefits is not always possible. Moreover, acceptance of specific NEIs varies between regions where there are differing levels of the prevalence of issues mitigated by the measures installed.

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

- a. During this biennium, Avista must demonstrate progress toward identifying, researching, and developing a plan to properly value non-energy impacts that have not previously been quantified. The non-energy impacts considered must include the costs and risks of both long- and short-term public health benefits, environmental benefits, energy security, and other applicable non-energy impacts. These impacts and risks must be included in the 2022-23 *BCP*.
- b. Avista must identify the discrete NEIs and the monetized value used in cost-effectiveness testing for each electric conservation program. This must be provided in a detailed format with a summary page and subsequent supporting spreadsheets, in native format with formulas intact, providing further detail for each program and line item shown in the summary sheet in annual plans and reports.
- c. To the extent practicable, Avista must begin to identify the distribution of energy and non-energy benefits in annual plans and reports. This reporting must use currently quantified NEIs, as well as values and estimates of additional impacts as they become available.

Avista's response to these requests is two-fold. First, the company has made additional efforts to identify existing NEIs applicable to its programs. The result of that work is the quantification of NEIs for the 2021 *ACP*. Second, Avista has committed to a joint engagement to identify new NEIs in the Washington jurisdiction.

For the interim period of 2021, Avista has incorporated NEIs based on two main studies that attempt to quantify impacts. For residential customers, "The Testimony by Lisa Skumatz (of SERA) to the New York Public Service Commission: Non Energy Benefits: Values and Treatment in Cost-Effectiveness Testing – Single and Multifamily Whole-Home Energy Efficiency Programs" provided data for identifying NEIs as a multiplier to customer bill savings. Dr. Skumatz, who at the time had more than 35 years of experience in energy-efficiency, provided testimony on behalf of E4TheFuture and provided estimation of the NEIs on specific technologies. The NEI values include benefits received by customers including, but not limited to:

1. avoidance of low-income subsidies
2. economic factors
3. water/wastewater infrastructure
4. water and other bills
5. equipment operations
6. comfort and noise
7. health and safety

Dr. Skumatz's study also factored in the NEIs received by customers by the technology installed. Table 36 identifies the technology type along with the non-energy benefits multiplier on energy savings.

TABLE 36: NON-ENERGY IMPACTS RECOMMENDED NEB VALUES AS MULTIPLIERS ON BILL SAVINGS

Measure	NEB Multiplier on Energy Savings	Measure	NEB Multiplier on Bill Savings
Air Sealing	47%	Insulation	116%
Appliances	29-65% *	Service to Heating or Cooling System	4%
Cooling Systems	27%	Low-Flow Showerhead	1%
Duct Sealing	4%	AC System Sizing	4%
Heating & Cooling System	24%	Programmable Thermostats	12%
Heating & Hot Water System	7%	Window	6%
Heating System	231%	Weatherization	114%
Hot Water System	8%		

*Estimates of appliance non-energy benefits vary by appliance from 29% for refrigerators to 65% for dishwashers.

Adapted from *NMR Massachusetts Cross-cutting Study*; the allocations on a savings basis are based on Massachusetts value for savings measures.

Dr. Skumatz noted that these multipliers are applied to bill savings and can be applied to both electric and natural gas measures.

For commercial/industrial NEIs, Avista referred to the 2012 *Massachusetts Program Administrators – Final Report – Commercial and Industrial Non-Energy Impacts Study* to value NEIs for 2021. The following tables from that report provide NEIs on an NEI-per-kWh basis for electric (Table 37) and NEI per therm for natural gas (Table 38) measures and identifies those impacts.

TABLE 37: SUMMARY OF AVERAGE ANNUAL NEI ESTIMATES – ELECTRIC

Electric Measures	N	Average Annual NEI per Measure*	NEI/kWh	90% CI Low	90% CI High	Stat Sig
Prescriptive						
HVAC	27	\$ 7,687	\$ 0.0966	\$ 0.0544	\$ 0.1389	Yes
Lighting	163	\$ 1,636	\$ 0.0274	\$ 0.0176	\$ 0.0372	Yes
Motors and Drives	50	\$ 541	\$ 0.0043	\$ (0.0005)	\$ 0.0091	No
Refrigeration	30	\$ 5	\$ 0.0013	\$ (0.0002)	\$ 0.0028	No
Other	32	\$ 28	\$ 0.0039	\$ (0.0002)	\$ 0.0079	No
Total	302	\$ 1,439	\$ 0.0274	\$ 0.0188	\$ 0.0360	Yes
Custom						
CHP/Cogen	6	\$ (12,949)	\$ (0.0147)	\$ (0.0247)	\$ (0.0047)	Yes
HVAC	20	\$ 5,584	\$ 0.0240	\$ 0.0003	\$ 0.0477	Yes
Lighting	89	\$ 5,686	\$ 0.0594	\$ 0.0318	\$ 0.0871	Yes
Motors and Drives	42	\$ 1,433	\$ 0.0152	\$ (0.0005)	\$ 0.0309	No
Refrigeration	90	\$ 1,611	\$ 0.0474	\$ 0.0244	\$ 0.0705	Yes
Other	29	\$ 15,937	\$ 0.0562	\$ 0.0038	\$ 0.1087	Yes
Total	276	\$ 4,454	\$ 0.0368	\$ 0.0231	\$ 0.0506	Yes

*Equals (NEI/kWh) x (Average Annual kWh)

TABLE 38: SUMMARY OF AVERAGE ANNUAL NEI ESTIMATES – NATURAL GAS

Natural Gas Measures	N	Average Annual NEI per Measure*	NEI/Therm	90% CI Low	905 CI High	Stat Sig
Prescriptive						
Building Envelope	2	\$ 1,551	\$ 3.6151	\$ 2.6418	\$ 4.5885	Yes
HVAC	50	\$ 755	\$ 1.3464	\$ 0.5433	\$ 2.1495	Yes
Water Heater	47	\$ 129	\$ 0.2604	\$ (0.0012)	\$ 0.5221	No
Total	99	\$ 439	\$ 0.8344	\$ 0.3634	\$ 1.3053	Yes
Custom						
Building Envelope	46	\$ 922	\$ 0.4774	\$ 0.1258	\$ 0.8290	Yes
HVAC	41	\$ 2,798	\$ 0.2291	\$ 0.1522	\$ 0.3060	Yes
Water Heater	23	\$ 803	\$ 0.1824	\$ (0.4953)	\$ 0.8601	No
Other	2	\$ 1,905	\$ 0.5253	\$ (5.6577)	\$ 6.7083	No
Total	112	\$ 1,940	\$ 0.2473	\$ 0.1490	\$ 0.3455	Yes

*Equals (NEI/Therm) x (Average Annual Therms)

To integrate the commercial/industrial values into Avista’s portfolio, Avista included NEIs for HVAC, motors and drives, and building envelope programs at the stated NEI/kWh and NEI/therm values.

While these NEIs provide a more realistic picture of the benefits received by customers, it does come with some limitations. Most of the information provided by these studies is aggregated and includes several impact types. For instance, while residential HVAC has a 231 percent multiplier, the data necessary to disaggregate the various NEI types that make up that value is not readily available. In addition, the NEIs identified may not be generally accepted in the Northwest at their stated impacts. Avista recognizes that as it moves forward with addressing NEIs in the future, the focus should be on NEIs specific to the region and its customers.

Outside of these studies, Avista has also included NEIs sourced from the RTF, which has historically provided savings on a NEI/kWh value. In addition, Avista includes an NEI for low-income programs to provide provisions for customers who have equipment facing impending failure. Avista has also included NEIs from its wood smoke PM2.5 study done jointly with other Washington-based Investor-Owned Utilities (IOUs).

As a response to Avista’s BCP conditions section 10, the energy-efficiency team will be making substantial efforts for identifying new NEIs for its customers. Given the impacts of CETA and providing equitable benefits to customers, the NEI information will be a key consideration for what is offered and how. Customers in highly impacted communities and vulnerable populations are the highest at-risk groups, and the NEI efforts will provide a direct benefit to the development of programs to serve these customers.

For 2021, Avista will perform another joint effort with other Washington-based IOUs to address the NEI requirements in section 10 of the BCP conditions. The IOUs agree that a joint approach is appropriate as it will provide the most comprehensive option for understanding impacts, identifying needs, and providing NEIs that have a tangible and lasting effect.

CONCLUSION AND CONTACT INFORMATION



CONCLUSION AND CONTACT INFORMATION

This 2021 ACP represents program efforts by Avista in order to achieve its expected eligible acquisition savings for the second year of the 2020-21 biennium. For additional supporting information please see the corresponding appendices:

Appendix A: Evaluation, Measurement, and Verification Plan

Appendix B: Summarization of Cost-Effectiveness Methodology

Appendix C: Schedule 190 Washington

Appendix D: Program Summary

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GLOSSARY OF TERMS



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

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

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

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

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

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

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

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

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

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

Annual Fuel Utilization Efficiency (AFUE): A measurement on how efficient an appliance is in converting the energy in its fuel to heat over the course of a typical year.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Conservation Potential Assessment (CPA): An analysis of the amount of conservation available in a defined area. Provides savings amounts associated with energy-efficiency measures to input into the Company's Integrated Resource Planning (IRP) process.

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 based largely on an estimation of costs of providing service over a certain set time period, with an allowed profit margin, divided by a forecasted amount of unit sales over the same time period. If the actual sales turn out to be as forecasted, the utility will recover all of its fixed costs and its set profit margin. If the actual sales exceed the forecast, the utility will earn extra profit.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

external evaluators (AKA third party evaluators): Independent professional efficiency person or entity retained to conduct EM&V activities. Consideration will be made for those who are Certified Measurement and Verification Professionals (CMVPs) through the Association of Energy Engineers (AEE) and the Efficiency Evaluation Organization (EVO).

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

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

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

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

heating degree days: A measure of the amount of heat needed in a building over a fixed period of time, usually a year. Heating degree days per day are calculated by subtracting from a fixed temperature the average temperature over the day. Historically, the fixed temperature has been set at 65 degrees Fahrenheit, the outdoor temperature below which heat was typically needed. As an example, a day with an average temperature of 45 degrees Fahrenheit would have 20 heating degree days, assuming a base of 65 degrees Fahrenheit.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

measure life: See Effective Useful Life (EUL).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Site-Specific (SS): A non-residential program offering individualized calculations for incentives upon any electric or natural gas efficiency measure not incorporated into a prescriptive program.

simple payback: The time required before savings from a particular investment offset costs, calculated by investment cost divided by value of savings (in dollars). For example, an investment costing \$100 and resulting in a savings of \$25 each year would be said to have a simple payback of four years. Simple paybacks do not account for future cost escalation, nor other investment opportunities.

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

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

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

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

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

Unit Energy Savings (UES): Defines the savings value for an energy-efficiency measure.

U-value or U-factor: The measure of a material's ability to conduct heat, numerically equal to 1 divided by the R-value of the material. Used to measure the rate of heat transfer in windows. The lower the U-factor, the better the window insulates.

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

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

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

verification: An assessment that the program or project has been implemented per the program design. For example, the objectives of measure installation verification are to confirm (a) the installation rate, (b) that the installation meets reasonable quality standards, and (c) that the measures are operating correctly and have the potential to generate the predicted savings. Verification activities are generally conducted during on-site surveys of a sample of projects. Project site inspections, participant phone and mail surveys, and/or implementer and consumer documentation review are typical activities associated with verification. Verification may include one-time or multiple activities over the estimated life of the measures. It may include review of commissioning or retro-commissioning documentation. Verification can also include review and confirmation of evaluation methods used, samples drawn, and calculations used to estimate program savings. Project verification may be performed by the implementation team, but program verification is a function of the 3rd party evaluator.

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

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

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

8760: Total number of hours in a year.

APPENDICES AND SUPPLEMENTS



APPENDIX A

2021 Energy Efficiency Evaluation, Measurement, and Verification Annual Plan

I. Background

Avista's 2021 *Energy Efficiency EM&V Annual Plan*, in combination with the *EM&V Framework*, is intended to identify the evaluation, measurement, and verification activities planned to be performed in 2021 in order to adequately inform and assess energy-efficiency programs provided by Avista for its customers in Washington and Idaho. This evaluation effort is not only to verify savings estimates of the 2021 program year, but also to enhance program design and improve the marketing and delivery of future programs. This document also provides the projected 2021 EM&V budget.

II. Overview

Avista's 2021 *EM&V Annual Plan* identifies evaluation activities intended to be performed during 2021 on the 2021 energy-efficiency portfolio. The evaluation of 2021 energy savings acquisition will be consolidated with results from the 2020 evaluation to satisfy biennial reporting requirements associated with Washington's Energy Independence Act (EIA), also known as I-937. The scope of this plan is consistent with prior evaluation plans as presented to Avista's energy-efficiency advisory group. A comprehensive EM&V overview and definitions are included in Avista's *EM&V Framework*, a companion document to this plan.

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

For the 2020-21 period, Cadmus has been retained as the independent third-party evaluator for Avista's commercial/industrial segments and also for the company's multifamily direct install program. Avista is currently in the process of selecting an evaluator for its residential and low-income programs.

Key components of this plan are as follows:

- ◆ Avista continues to pursue a portfolio approach for impact analysis, ensuring a comprehensive annual review of all programs, to the degree necessary, based on the magnitude of savings and uncertainty of the related UES values and magnitude of claimed energy-efficiency acquisition relative to the portfolio.
- ◆ Inherent in the impact analysis for 2019, a locked UES list identifying a significant number of UES values is available to employ through verification rather than fundamental impact analysis; this list of UES is reevaluated, however, as part of the company's normal and recurring savings value analysis. Measures will also be updated to reflect the best science from other sources as well – primarily the RTF.
- ◆ Portfolio impact evaluations will be conducted for all electric and natural gas programs in Washington and Idaho. For programs with a majority of savings or particular aspects of interest, such as a high level of uncertainty, detailed impact evaluations using protocols from the Uniform Methods Project, *The International Performance Measurement and Verification Protocol*, and other industry-standard techniques for determining program-level impacts will be used. Billing analyses will be incorporated as appropriate.

- ◆ Electric energy-efficiency acquisition achieved during 2021 will contribute to the biennial savings acquisition for EIA compliance, which will complete its sixth biennium at the end of 2021.¹
- ◆ A final evaluation of the electric programs deployed during 2020 and 2021 will be initiated prior to the end of 2021 in order to meet the June 1, 2022 filing deadline in Washington.
- ◆ The evaluation will provide energy-efficiency acquisition results with 90 percent precision and a 10 percent confidence interval. Discrete measures may be represented by reduced precision and wider confidence, such as 80 percent with a 20 percent confidence interval, but must support the required portfolio criteria of 90 percent/10 percent.
- ◆ This planning document will not be construed as pre-approval by the Washington or the Idaho utilities commissions.
- ◆ Evaluation resources will be identified through the development of the 2021 evaluation work plan in conjunction with the independent third-party evaluator. Primary segments will include:
 - **Residential:** The impact analysis will consider the portfolio of measures provided to residential customers during the program year. Evaluation efforts will be focused on measures that contribute significant portfolio savings and allow consolidation and grouping of similar measures to facilitate the evaluation.
 - **Low-Income:** For the impact analysis, billing analysis on the census of measures – including conversions – will be conducted. In addition, a comparison group, possibly consisting of Low-Income Home Energy Assistance Program (LIHEAP) or Low-Income Rate Assistance Program (LIRAP) participants, may be incorporated into the analysis if possible.
 - **Commercial/Industrial:** Interviews of Avista staff and third-party implementers will be conducted, along with the creation of customer surveys, tracking databases, marketing materials, and quality assurance documents.
- ◆ Consideration will be made to recognize that most of Avista's current portfolio of electric energy-efficiency offerings has been in place since 1995 and natural gas programs since 2001.
- ◆ A process evaluation report will be delivered as part of the 2021 energy-efficiency ACR, which addresses program considerations for that program year.

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

III. External EM&V Budget for Evaluations

For 2020-21, the total budget for external evaluation is estimated to be \$999,464 on a total system basis. The following table identifies evaluation activities and allocations anticipated for 2020-21. The Washington and Idaho expenses include evaluation activities for both electric and natural gas fuel types.

Individual Evaluations	Evaluation Type	Contractor	Budget (System)	WA Expense	ID Expense
2020-21 Electric and Natural Gas Portfolio – Commercial/Industrial	Impact	Cadmus	\$ 629,464	\$ 329,211	\$ 300,253
2020-21 Electric and Natural Gas Portfolio – Residential	Impact	TBD	\$ 250,000	\$ 175,000	\$ 75,000
Electric and Natural Gas DSM Operations (or components of)	Process	Cadmus	\$ 120,000	\$ 84,000	\$ 36,000
Total Budget for Individual Evaluations			\$ 999,464	\$ 588,211	\$ 411,253

IV. Overall 2021 EM&V Budget

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

Activity	Budget (WA/ID system)	Total Budget	WA Expense	ID Expense
Individual Evaluations Previously Specified	\$ 999,464	\$ 999,464	\$ 588,211	\$ 411,253
Regional Technical Forum Dues	\$ 105,000	\$ 105,000	\$ 73,500	\$ 31,500
Total	\$ 1,104,464	\$ 1,104,464	\$ 661,711	\$ 442,753
Expected Total DSM Budget	\$ 27,246,448		\$ 19,319,429	\$ 7,927,019
EM&V as a % of Total DSM Budget*	4.1%		3.4%	5.6%

* While EM&V expenditures will be directly assigned where appropriate, this illustrates the anticipated allocation of estimated EM&V expenditures.

V. EM&V External Evaluation Contract

Avista will continue its engagement with Cadmus for measurement and verification activities associated with the energy-efficiency portfolio as executed by Avista during 2020 and 2021. While in the past a single vendor had been selected to evaluate all activities, for 2020-21 Avista has modified its approach to employ separate vendors in evaluating its commercial/industrial and residential programs. After the 2020-21 biennium is complete, Avista will submit an RFP for its 2022-23 EM&V engagement.

VI. Summary of Individual Evaluations

Following is a summary of each of the external evaluation activities anticipated to occur in 2021. All savings estimates, calculations, assumptions, and recommendations will be the work product of the independent evaluator in conjunction with the respective portfolio impact, process, or market evaluation component. The final evaluation plans will also be included in this plan as an appendix as they become available.

2020-21 Electric and Natural Gas Portfolio Impact Evaluation

The electric and natural gas portfolio impact evaluation will be performed by Cadmus (commercial/industrial and multifamily direct install) and a separate evaluator that has yet to be selected. Both independent third-party evaluators are selected through a competitive bidding process. Based on the evaluator's work plan, performance data and supporting information may be derived from primary consumption data collected in the field, site audits, phone surveys, billing analysis, and other methods identified to effectively quantify the performance of the energy-efficiency measure.

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

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

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

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

2021 Portfolio Process Evaluation

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

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

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

Cadmus Evaluation Plan

As part of its contractual requirements, Cadmus provided an overall detailed evaluation plan for 2020-21. That plan will be attached to this EM&V plan.

2022-23 Electric and Natural Gas Portfolio Impact Evaluation

Avista will continue its engagement with Cadmus for the 2020-21 biennium. After that time, the company will begin to solicit bids for the evaluation of the 2022-23 biennium and will work with the advisory group to finalize the selection of the next external evaluator.



Avista Corporation 2020-2021 Evaluation Work Plan

October 15, 2020

Prepared for:

Avista Corporation

1411 East Mission Avenue

Spokane, WA 99252

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Introduction and Goals

Avista Corporation contracted with Cadmus to evaluate its Nonresidential program portfolio for program year (PY) 2020 and PY 2021. For this engagement, the Nonresidential evaluation also includes the Multifamily Direct Install program. Cadmus will also conduct a process evaluation of Avista's entire portfolio, including Nonresidential, Residential, and Low Income programs.

The primary goals for the evaluation are these:

- Independently verify, measure, and document energy savings impacts from each electric and natural gas energy efficiency program or from program categories representing consolidated small-scale program offerings, from January 1, 2020, through December 31, 2021
- Analytically substantiate the measurement of those savings
- Calculate the cost-effectiveness of the portfolio and component programs
- Identify any program improvements
- Identify possible future programs

This evaluation work plan reflects Cadmus' understanding of the programs as described in Avista's 2020 Annual Conservation Plans as well as at the project kickoff. The work plan may change in response to program modifications or at Avista's request during PY 2020 and PY 2021. Cadmus will relay to Avista all modifications to evaluation approaches prior to proceeding.

Presently, this document offers proven methods to conduct full impact and process evaluations for Avista's Nonresidential portfolio and the Multifamily Direct Install program, as well as process evaluations for Avista's Residential and Low-Income portfolio of programs.

The following chapter summarizes the overall evaluation effort and includes an introduction to project staff, overview of the budget, and list of deliverables. Subsequent chapters present the evaluation methodologies for the impact and process evaluations, cost-effectiveness calculations, and Cadmus' quality assurance and quality control (QA/QC) processes.

Evaluation Work Plan Overview

Cadmus’ highly skilled evaluators have considerable knowledge from many years of evaluating Avista’s portfolio of programs and can rely on resources such as Cadmus’ inventory of data monitoring equipment and Portfolio Pro+. The team has experience conducting virtual site visits, even before the limiting effects from Covid-19, and its proactive approach to project management will ensure the evaluation objectives are achieved in the most cost-effective manner. The following sections introduce the evaluation team and present the budget, timeline, and communication activities.

Evaluation Team

Cadmus’ evaluation team is organized as shown in Figure 1 and features key personnel who have previous experience with Avista’s evaluations.

Figure 1. Cadmus Evaluation Team Organizational Chart



Table 1 presents the projected staffing hours by state and includes current Cadmus titles and billing rates.

Table 1. Cadmus Staffing Plan

Staff	FY2021 Title	FY2021 Billing Rate	Projected Hours	
			Washington	Idaho
Jeffrey Cropp	Principal II	\$310	195	132
Jerica Stacey	Associate I	\$180	343	326
Nathan Hinkle	Associate II	\$190	287	203
Kristie Rupper	Associate III	\$205	67	64
Max Blasdel	Analyst	\$125	113	60
Romio Mikhael	Associate III	\$205	63	50
Evan Talan	Sr. Analyst II	\$165	215	174
Brandon Kirlin	Analyst II	\$135	192	181
Ian Nimmo	Engineering Tech III	\$135	73	71
Aaron Huston	Engineering Tech II	\$115	16	12
Nora Twichell	Engineering Tech II	\$115	107	99
Mitt Jones	Sr. Associate II	\$250	12	29
Kean Amidi-Abraham	Research Analyst	\$115	120	108
Brian Hedman	Principal II	\$310	10	10
Maggie Buffum	Associate I	\$180	31	31
Taylor La Prairie	Analyst I	\$125	84	52
Amanda McLeod	Analyst II	\$135	116	76
Alex Chamberlain	Sr. Analyst I	\$155	68	55
Alexander Opirari	Research Analyst	\$115	179	160
Leslie Anderson	Technical Editor	\$125	42	40

Budget

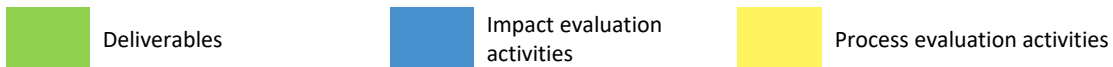
Avista awarded Cadmus \$413,211.25 for the PY 2020-2021 Washington evaluation and \$336,252.50 for the Idaho evaluation. This budget includes \$33,169 in travel and other direct costs for site visits.

Timeline and Reporting

The overall timeline presented in Table 2 broadly depicts progress for each of the work tasks. The work plans for each program cluster include their own specific evaluation timelines. Deliverables associated with work tasks are specified after the table.

Table 2. PY 2020 and PY 2021 Task and Deliverable Schedule

Task	PY 2020		PY 2021				PY 2022	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Kickoff Meeting	Deliverables							
Work Plan		Deliverables						
Project Management	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities
Advisory Group Meetings, as needed		Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities
Verification Surveys		Impact evaluation activities		Impact evaluation activities		Impact evaluation activities	Impact evaluation activities	
On-Site or Virtual M&V and Analysis		Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	Impact evaluation activities	
Cost-Effectiveness Analysis			Impact evaluation activities	Impact evaluation activities			Impact evaluation activities	Impact evaluation activities
Document and Database Review		Process evaluation activities		Process evaluation activities				
Avista and Implementer Interviews		Process evaluation activities		Process evaluation activities				
Participant Surveys and Interviews			Process evaluation activities		Process evaluation activities		Process evaluation activities	
Market Actor Interviews			Process evaluation activities		Process evaluation activities			
Electric Impact Memos				Deliverables				Deliverables
Natural Gas Impact Memos				Deliverables				Deliverables
Process Memo and Report				Deliverables				Deliverables
Cost-Effectiveness Memos				Deliverables				Deliverables



Cadmus will provide the following deliverables by the dates listed:

- April 9, 2021
 - PY 2020 Washington Nonresidential electric impact evaluation memorandum
 - PY 2020 Washington Nonresidential natural gas impact evaluation memorandum
 - PY 2020 Washington Nonresidential electric and natural gas cost-effectiveness analysis
- April 16, 2021
 - PY 2020 Idaho Nonresidential electric impact evaluation memorandum
 - PY 2020 Idaho Nonresidential natural gas impact evaluation memorandums
 - PY 2020 Idaho Nonresidential electric and natural gas cost-effectiveness analysis
 - PY 2020 Washington and Idaho (combined) process evaluation memorandum
- April 8, 2022
 - PY 2020 – 2021 Washington Nonresidential electric impact evaluation memorandum
 - PY 2020 – 2021 Washington Nonresidential natural gas impact evaluation memorandum
 - PY 2020 – 2021 Washington Nonresidential electric and natural gas cost-effectiveness analysis

- April 15, 2022
 - PY 2021 Idaho Nonresidential electric impact evaluation memorandum
 - PY 2021 Idaho Nonresidential natural gas impact evaluation memorandum
 - PY 2021 Idaho Nonresidential electric and natural gas cost-effectiveness analysis
 - PY 2020 – 2021 Washington and Idaho (combined) process evaluation memorandum

Prior to delivery of each memorandum, Cadmus will prepare a comprehensive outline for Avista’s review and approval. The memorandums will describe data collection and process methods, present results of the analysis and summarize findings, draw conclusions, and provide meaningful recommendations. Data collection instruments used for the process evaluation will be included as appendices to the final report. Cadmus will submit all supporting workpapers for the calculations, tables, graphs, and other illustrations contained in the deliverables.

Cadmus will also prepare *ad hoc* reports to document problems, urgent issues, and resolutions as they arise.

Communication

Avista expects multiple communication and reporting activities to be performed as part of this evaluation effort. Cadmus will design its project communications based on the following:

- The Avista DSM Planning and Analytics team serves as the lead contact for all evaluation aspects (impact and process) and, for contract purposes, is the client. Ryan Finesilver of the DSM Planning and Analytics team will serve as the contract manager and primary contact for the Cadmus team.
- The Avista DSM Planning and Analytics team will work with the Cadmus team to facilitate incorporation of Avista’s implementation team’s input into the final product. Avista may encourage the implementation team to actively participate in the evaluations, seeking to deliver the best product possible, consistent with the evaluation’s independent character.
- An Avista DSM Planning and Analytics team member may be present (in person, by phone, or copied on e-mails) during any interactions between the Cadmus team and Avista’s DSM implementation team.

Cadmus will hold biweekly conference calls with the Avista DSM Planning and Analytics team. These calls will provide updates about the project’s status and issues. *Ad hoc* calls may be required to address specific project issues and activities. Cadmus anticipates attending and occasionally facilitating in-person, telephone, or web-based meetings in addition to regular and *ad hoc* project meetings and a final close-out meeting.

Throughout the evaluation process, Cadmus will remain engaged with Avista’s regional stakeholders, participating as requested in DSM Advisory Group and Technical Committee meetings. Cadmus will provide the following support to Avista through these meetings:

- Present evaluation plans

- Present interim or final results on energy savings, realization rates, and cost-effectiveness
- Act as a technical resource to explain details of the evaluation methodologies and the rationale behind the methods employed for Avista
- Explore opportunities for new or expanded techniques to evaluate programs or inform program design

Impact Evaluation

Cadmus will apply the methods described below to develop findings that will determine the impacts of Avista’s Nonresidential programs and guide the development of current and future programs.

Overview of Nonresidential Impact Evaluation Methods

Cadmus’ analyses will use standard engineering approaches such as those defined by the International Performance Measurement and Verification Protocols (IPMVP) and the Uniform Methods Project (UMP). Cadmus will employ the following primary methods:

- Simple verification (desk review, phone, online, remote walk-through, or on-site)
- Energy calculation models
- Metering (IPMVP A and B)
- Whole building billing analysis (IPMVP Option C)
- Simulation modeling (IPMVP Option D)

Table 3 lists the impact evaluation data collection and analysis activities by program. Cadmus will conduct the online, phone, remote, and on-site measurement and verification activities in two waves in both 2020 and 2021 to obtain a reasonable sample from each program year.

Table 3. PY 2020–2021 Natural Gas and Electric Impact Evaluation Activities

Sector	Program	Database/ Document Review	Remote Verification/ Site Visit	Metering	Billing Analysis	Simulation Modeling
Multifamily	Multifamily Direct Install	✓				
	Multifamily Market Transformation – Fuel Efficiency (Idaho)	✓	✓			
Nonresidential	Site Specific	✓	✓	✓	✓	✓
	Interior Lighting	✓	✓			
	Exterior Lighting	✓	✓			
	Prescriptive Shell	✓	✓		✓	
	Green Motors	✓	✓			
	Motor Control HVAC (VFD)	✓	✓			
	HVAC	✓	✓		✓	
	Fleet Heat	✓	✓			
	Food Services	✓	✓			
	Compressed Air	✓	✓	✓		
	Grocer	✓	✓			

Simple Verification

Cadmus will verify some prescriptive measures (particularly those with relatively small reported savings) on site, via remote video walkthrough, by phone, by reviewing submitted documentation, or through an on-line questionnaire to confirm that measures are installed in the reported quantity and operating in a manner consistent with deemed-savings assumptions. Cadmus will also verify recorded nameplate efficiency data against manufacturer’s specifications. Cadmus will accept reported savings without further investigation if it can confirm that these details match the assumptions used for unit energy savings in the Regional Technical Forum (RTF) or Avista technical reference manual (TRM). Cadmus will adjust the savings for any inconsistencies based on equipment and operating parameters found at the site.

Engineering Calculation Models

For some Nonresidential Site Specific measures, Avista uses spreadsheets to calculate the estimated energy savings for a variety of measures based on relevant inputs, such as quantity, fixture wattage, square footage, efficiency value, HVAC system details, and location details. For each spreadsheet, Cadmus will review input requirements and outputs to determine if the approach is reasonable. We will discuss any concerns about the approach with Avista’s implementation team and explain why we think a different method may yield more accurate results. Where applicable, we will update calculations using on-site verification data, energy management system (EMS) trend data, spot measurements, and metering data.

Metering Analysis (IPMVP Options A and B)

To estimate the relevant operational parameters needed to inform engineering calculation models, Cadmus may perform data logging for a period of days, weeks, or months. During the site visits, we will confirm relevant information such as installation of the efficient equipment, set points, sequence of operations, operating schedules, and ambient conditions. We will also estimate the baseline energy performance, according to program documentation, on-site conditions, facility interviews, and relevant energy code requirements.

After downloading, we will clean meter data, checking key fields for missing data, correcting bad data, and removing sites with insufficient data. We will flag anomalies and send them to a senior engineer who will determine if the data should be used, corrected, or excluded from the analysis. Next, we will analyze the key variables in the metering data using spreadsheet tools or Python. We will use the resulting information to calculate savings (as input variables in an engineering model) or for comparison to consumption estimates.

Whole Building Analysis (IPMVP Option C)

Cadmus can use monthly billing or interval data to conduct regression analyses for nonresidential retrofit projects, particularly in the Site Specific and HVAC-related prescriptive programs (for example, HVAC and Shell). This analysis method is particularly useful for accurately assessing the energy savings from comprehensive retrofit projects, especially those involving custom HVAC or controls measures.

Using the pre- and post-modeling approach, Cadmus will develop retrofit-savings estimates for the sampled sites, accounting for cooling degree days (CDDs) and heating degree days (HDDs). We will match the participant-consumption data to the nearest weather station by zip code. We will then calculate the building balance-point temperature by correlating monthly energy use with monthly average temperature.

Cadmus will use the balance-point temperature to calculate the CDDs and HDDs then match these to the monthly billing data. We will use the resulting regression estimates to extrapolate average energy savings based on normalized weather conditions. (For this calculation, we will use typical meteorological year [TMY], 15-year normal weather averages from 1991–2005, obtained from the National Oceanic and Atmospheric Administration.)

For each project, Cadmus will model average daily consumption in kilowatt hours (kWh) and/or therms as a function of base load, HDDs and CDDs, and, where appropriate, daily production. For the evaluated sites, we will estimate two demand models—one for the pre-period and one for the post-period. We typically choose this methodology over a single standard-treatment-effects model to account for structural changes in demand that can occur with retrofits, such as changes in occupancy or usage patterns. We will then estimate the annual consumption based these values.

Simulation Model Analysis (IPMVP Option D)

Cadmus may review and verify the savings calculated from simulation models if this methodology is applied on projects. Our simulation approach, which is based on *in situ* observations and measurements, is calibrated to the best available energy-use indices. It entails the use of well-developed, sophisticated building-simulation tools, such as DOE-2, and follows methods described in the U.S. Department of Energy M&V Guideline and ASHRAE Guideline 14.^{1,2}

We will obtain the existing as-built and baseline models, utility billing data, and any available documentation for each simulated measure project in the sample. Step one will be to conduct a side-by-side comparison of the existing baseline and as-built models. Because different versions of the same software (mainly eQuest and EnergyPlus) can return conflicting results, we will open models only in the software-build version in which they were developed.

Our goal for the site visit will be to gather all data necessary to improve and calibrate the model. Using our on-site data collection form and following our facility operator interview guide, we will verify all necessary assumptions and obtain any available EMS data needed to further inform the calibration process.

¹ U.S. Department of Energy. *M&V Guidelines: Measurement and Verification for Performance-Based Contracts (Version 4.0)*. Available online at: http://energy.gov/sites/prod/files/2016/01/f28/mv_guide_4_0.pdf

² ASHRAE. *Measurement of Energy, Demand, and Water Savings*. Atlanta, GA. 2014.

Following the site visit, Cadmus will update the model with the verified values and actual meteorological year (AMY) weather data for the appropriate location and time period then test statistical calibration, comparing model results with utility and metered data. In accordance with ASHRAE Guideline 14, we will target a monthly accuracy within a mean bias error (MBE) of $\pm 5\%$ and a coefficient of variation root mean square error (CVRMSE) of $\pm 15\%$. We will make logical improvements, based on engineering judgment where anomalies are identified. In our analysis, we will account for fluctuations, such as those from initial building commissioning or first-year occupancy changes.

Once the adjusted as-built model has achieved the accuracy requirements, the remaining steps are straightforward. We will replace the AMY data used for calibration purposes with typical meteorological year (TMY) data. To develop the baseline model, we will back out the conservation measures based on incentive documentation, changes between existing models documented during the initial comparison, and any measure stipulations, such as code requirements. Unless instructed otherwise by Avista, we will calculate measure savings in the same order and manner suggested by the existing models and documentation (that is, first measure in, last measure out, and so on). We will determine savings by comparing results from the calibrated typical year as-built and baseline models.

Impact Sampling Plan

Cadmus' approach to developing impact evaluation sampling plans is consistent with the methods described in the UMP. Specifically, we will include these guidelines in our approach:

- **Determine confidence and precision requirements for key metrics.** Our team will use key metrics to support our gross and net energy estimates for each program. For programs with more complex or comprehensive offerings, we typically expect variation between customers to be larger than for programs with fewer variables or more streamlined installations. We will rely on our experience evaluating Avista's programs to estimate the homogeneity or heterogeneity of the population of participants and rely on coefficients of variance calculated from the previous round of evaluation to inform the variability in the expected sample population. When possible, we will design a sample for each program so that we can estimate the overall portfolio energy savings with 90% confidence and $\pm 10\%$ precision for each fuel type within each state.
- **Develop the sample design.** We will apply a sample design that primarily features stratified random sampling. The optimal design depends on the homogeneity or heterogeneity of the population of participants within each program as well as any targeted research we plan to perform (that is, if we are particularly interested in evaluating savings for a particular measure or collection of measures, we will stratify accordingly to ensure ample sample sizes from that population). We may select very large projects with certainty, when their expected savings are expected to differ substantially from the rest of the population. We will select at minimum the number of projects in each program as necessary to calculate confidence and precision within the program, even if participation or savings are low.

- **Calculate sample sizes.** We will calculate sample sizes based on the confidence and precision requirements, expected variation, sample design, and population size for each program. Sample sizes will be sufficient to estimate gross savings for each program and the portfolio as a whole.

For Nonresidential programs and Multifamily Market Transformation, Cadmus proposes a stratified sample design, with strata defined based on fuel type (electric and natural gas) and project savings. For each program and fuel type, we will stratify the sample into large- or small-savings projects and conduct verification on a simple random sample of the projects within each stratum. We will include dual fuel projects in the natural gas stratum for sampling purposes but will include electric savings from dual fuel measures with the electric stratum. We will evaluate the electric savings as a certainty selection for any dual fuel projects selected for random sampling. For the Multifamily Direct Install program, Cadmus will apply a simple random sample to select projects.

We will determine sample sizes for each program and fuel type separately in Washington and Idaho. Data we obtain during site visits will inform our calculation of realization rates used to estimate population savings for each program and fuel type. We will report these results and the corresponding state-specific program savings results.

After receiving program population data from Avista for January to September 2020 we determined sample sizes according to the most recent evaluation results, actual participant and project population sizes, additional stratification variables, and/or alternative sampling approaches (for example, probability proportional to size), with portfolio-level target confidence of 90% and precision of 10%. If possible, we will apply a finite correction to sample sizes to decrease the sample sizes. Table 4 shows the sample design for Washington and Idaho combined.

Table 4. Sample Design for Verification Surveys and Site Visits for Washington and Idaho Combined

Program	Fuel Type	Confidence	Precision	Washington		Idaho	
				Expected Population Size*	Sample Size	Expected Population Size*	Sample Size
Site Specific	Electric	80	20	184	34	64	30
	Natural Gas	80	20	32	6	7	4
Grocer	Electric	90	20	13	2	12	2
Interior Lighting	Electric	90	20	1084	17	516	20
Exterior Lighting	Electric	90	20	1304	17	712	20
Green Motors	Electric	90	20	16	8	16	0
Compressed Air	Electric	90	20	2	1	1	1
Fleet Heat	Electric	90	20	1	1	0	0
Motor Control HVAC (VFD)	Electric	90	20	4	7	3	1
HVAC	Natural Gas	90	20	80	10	80	6
Prescriptive Shell	Electric	90	20	16	3	1	1
	Natural Gas	90	20	16	4	4	2
Food Services	Electric	90	20	28	5	8	2
	Natural Gas	90	20	56	9	52	4
Multifamily Market Transformation	Fuel Efficiency	90	20	N/A	N/A	7	3
Total Nonresidential Site Visits/Verification Surveys				2836	124	1483	96

* Expected population size is extrapolated from 2020 Q1-Q2 participation and 2018-2019 participation. Dual fuel measures are counted as gas for population size and sampling purposes.

Impact Evaluation Activities by Program

Cadmus will conduct the verification activities in four waves—fall 2020, January 2021, summer 2021, and January 2021—using desk reviews, remote or physical site visits, and phone surveys to collect baseline data, operations data, and other information to inform the energy savings analyses. The following sections describe each Avista program and the proposed impact evaluation activities.

Multifamily Direct Install Program

Avista provides free gas and electric direct-install measures to multifamily residences (of five units or more) and common areas in its service territory through the Multifamily Direct Install program. Cadmus will conduct document reviews on the census of projects installed through this program to assess the quality of program tracking data (noting missing, duplicate, and out-of-range values) and will verify that values of key metrics are within expected limits.

We will provide Avista with *ex post* savings values by measure and will also calculate the program’s cost-effectiveness.

Nonresidential Site Specific Program

The Nonresidential Site Specific program provides flexible opportunities to achieve energy savings for measures that do not fit a prescriptive path. In the past, these projects have been for compressed air, custom lighting, process improvement, and complex HVAC measures, among others. Multifamily Market Transformation projects for Idaho are also included in this program.

Cadmus will calculate participants' gross reductions in electricity and natural gas consumption using data collected through desk reviews, remote or on-site visits, customer billing histories (as needed), and engineering models and calculations, for the projects selected by the sample. The number of site visits will depend on actual enrollment and sample-size calculations, based on expected variability and the desired confidence and precision of evaluated savings. During the site visits, we will verify measure installations, collect baseline and equipment data, and identify addressable enrollment or installation issues.

We will analyze gross program impacts using data collected from site visits and from tracking data. We will verify reported *ex ante* savings by recalculating energy savings using Excel spreadsheet analysis tools, site-specific data, and standard engineering analysis methods. Data may include savings calculations, manufacturers' specification sheets, and commissioning reports. We may also conduct regression analyses, as needed, for measures such as comprehensive HVAC controls, whose savings impact cannot readily be evaluated through other means. Information collected during our site visits will determine if the sample projects reasonably address the measure's operating parameters and accurately reflect operating conditions.

Because we will not inspect all participant sites, we need a mechanism to extrapolate the difference between *ex ante* and *ex post* savings to the population. To resolve this, we will apply a correction factor based on the realization rates to *ex ante* savings to calculate evaluated *ex post* gross savings. We will document the reasons and impacts on savings of all adjustments and will review these with Avista's implementation team during a presentation before committing results to the draft reports.

Nonresidential Prescriptive Programs

Avista implements these ten prescriptive programs that provide incentives directly to customers for a variety of measures supported by unit energy savings in the RTF or Avista's TRM:

- Compressed Air
- Fleet Heat
- Food Services
- Green Motors
- Grocer
- HVAC
- Lighting Interior
- Lighting Exterior
- Prescriptive Shell
- Variable Frequency Drives

Cadmus will first work with Avista to prioritize and review prescriptive measures in the TRM to identify those with the most variance based on previous impact evaluation results. These measures may benefit from primary data collection and analysis during the 2020-2021 impact evaluation. This review requires

in-depth knowledge and understanding about the specifics of each measure to ensure that the baseline and savings calculations reflect the best possible *ex ante* values for the region. Cadmus and Avista engineers will coordinate to ensure consistency in inputs and calculations and to ensure that the TRM uses the most up-to-date sources for Avista's engineering calculations. We may recommend measures to examine, as necessary, including references, algorithms, and inputs.

Cadmus will design a sample for verification activities to include all prescriptive programs, with primary emphasis on those that contribute the most savings or represent the highest level of uncertainty. We will apply sampling weights accordingly as part of the correction factor.

We will conduct desk reviews, remote, or on-site inspections during the initial round of impact data collection to confirm that Avista's quality-assurance processes have been maintained. This is particularly relevant for any new programs or programs with updated processes. If we find a high correlation between the *ex ante* and *ex post* results in our initial inspections, we may increase our reliance on less-intrusive data collection methods including desk reviews and phone interviews with participants.

We will review project documents, verify assumptions, adjust reported calculations, and compute *ex post* savings using Excel spreadsheet analysis tools or by approving installation rates for RTF measures with well-defined unit energy savings. We will derive baseline data from virtual/on-site visits, customer interviews, and Avista's program data. We will calculate *ex post* savings using submitted documentation, site visit data, and standard engineering analysis practices. We will also calculate a realization rate based on sampled sites and will apply this rate to the project population to estimate program total *ex post* savings.

In the Prescriptive program, as with the Site Specific program, we will document all reasons and impacts on savings for adjustments and will review these with Avista's implementation team before committing the results to the draft reports.

Remote Verification Strategy

The COVID-19 pandemic has resulted in significant and rapid changes to facility operations and caused uncertainty about future operations. This has complicated impact evaluation and especially affected on-site project verification site visits. Cadmus has developed a virtual and contactless approach that prioritizes customer comfort, preference, privacy concerns and operational policies, and is designed to minimize the burden on the customer throughout the data collection and inspection process.

Our virtual verification process involves using a web-based audio and video connection to simulate in-person customer interactions with a project-specific site contact. To verify savings, our evaluation staff may use a combination of:

- Existing submitted project documentation, including project application files, invoices, specification sheets, calculation models, and Installation Verification reports provided by Avista or available in the iEnergy web software

- Virtual site visit observations, for example a video recording, interview with the site contact, and photos taken during a virtual project tour
- Additional information provided by the site contact, for example additional trend data from the equipment, control system, or meter, more detailed photos or videos of equipment operation, or other documentation requested during the virtual site visit

Cadmus has conducted over 100 virtual site visits for 12 clients throughout the country across a wide variety of project types, and over the next 12 months we expect to have completed over 1,000 virtual site visits across the country. Our process has been designed for the long haul and we plan to keep the virtual/contactless option as a part of our evaluation offerings moving forward. In addition to the safety benefits related to the COVID-19 pandemic, our virtual site visit process saves travel costs, and allows for more flexible scheduling, particularly for geographically remote sites in rural regions of Avista's service territory.

We will review each project selected for verification to ascertain whether it is appropriate for remote verification and what level of remote verification is required to sufficiently verify the measures.

- Desk review: Lower-complexity projects which can be verified through a review of existing complete documentation.
- Desk review with interview: Projects with nearly complete documentation requiring additional photos, invoices, spec sheets, or other simple documentation. Projects with complete documentation where assumptions need to be reviewed or discussed. Interview may be conducted via email, phone call, or web video conference.
- Virtual site visit: Projects that have large savings, higher complexity, or incomplete documentation. Remote verification and interview will be conducted via video walkthrough of the project with a site contact involved in the implementation or operation of the system.
- Physical site visit: Projects that are too complex for remote verification, require on-site data collection or meter installation, projects with a large number of measures or large quantity of equipment, or where safety concerns, participant availability, or time required on site make a virtual site visit impractical or unsafe.

To be eligible for remote verification, a project must meet criteria for participant safety, data security and privacy, suitability of measures to remote verification, and site contact knowledge, availability, and technology limitations. Cadmus will provide a detailed virtual site visit protocol to Avista, and will notify the Avista account executive assigned to each project prior to initiating recruitment for remote or on-site verification. Physical site visits may be postponed until travel to the region is safe and prudent. We will review all in-person site visit plans with Avista prior to scheduling travel and will adhere to all COVID safety procedures provided by Cadmus, Avista, and the participant.

Real-Time Evaluation and Measurement

Cadmus may coordinate with Avista’s implementation team to identify projects with both relatively large expected energy savings and relatively high uncertainty (for example, demand control ventilation and multi-stage compressed air retrofit). In comparison, projects such as large lighting retrofits may not require real-time EM&V because the savings should be relatively certain if the operating hours are well-characterized. Once Avista identifies the most likely projects for real-time EM&V, we will coordinate with implementation engineers and/or contractors to track project installation progress and estimate the completion date.

We will develop a site-specific EM&V plan for each project. Our metering engineer will be prepared to travel to the site to install meters during a timeframe estimated by Avista’s implementation team. After removing the meter, we will follow our standard procedures for analyzing the data. We will summarize our methodology and results for further discussion with Avista before finalizing the energy savings.

EM&V for Advanced Metering Infrastructure (AMI)

Where relevant, and to support Avista’s move toward advanced meter infrastructure (AMI), Cadmus will conduct EM&V for projects with AMI data. To support this type of analysis, we assume that electricity interval consumption data will be available for the pre-treatment, or **baseline**, and treatment, or **reporting**, periods.

The approach to calculating energy savings starts with building a predictive statistical model using baseline data, which includes baseline weather conditions and facility operating conditions as explanatory variables in the model. By applying the baseline model to the explanatory data measured during the reporting period, the model outputs represent the expected energy usage during the reporting period that would have occurred without the influence of the energy-saving measures. Therefore, subtracting the observed energy usage and predicted energy usage at each point in time results in the evaluated energy savings (adjusted for reporting period weather and facility operations).

Our proposed method has several advantages over other approaches:

- The method allows for **flexible modeling** of each facility’s energy consumption. Because we conduct a separate analysis for each facility, it is possible to select a set of variables that are specific to that facility.
- Baseline models are **uncontaminated** by project treatment effects. Because the model is fit with baseline period data, the parameters of the adjusted baseline consumption reflect only baseline period operation.
- The model-building process is **objective**. Because we rely on automated machine-learning to select the model variables, we can identify relevant variables affecting a facility’s consumption from a larger set of candidate variables based on pre-determined criteria, which reduces time and the possibility for idiosyncratic choice by the analyst in building a model.

- The proposed approach is **versatile, scalable, and cost-effective**. Much of the estimation can be automated and applied to a variety of commercial building types and samples with large numbers of facilities.

Our proposed analysis approach has four main steps—data collection and pre-processing, modeling, savings estimation, and reporting— as described in the next sections.

Data Collection and Preprocessing

Cadmus will collect the following data for the evaluation:

- Interval data of facility energy consumption
- Project implementation data including installation dates, project description, and *ex ante* savings estimate
- Building systems data from the facility’s energy management system (if available)
- Interval weather data from nearest weather station

Cadmus will then conduct a quality review of the raw data. This process involves a visual inspection by a domain expert and automated checks for max and min values, consumption per square footage, rates of change, completeness of the data, etc. Once the validity of the data is established, we will define the facility’s baseline and reporting periods from documentation about the project implementation.

Modeling

Cadmus will develop models using these steps:

- **Identify candidate model inputs.** Cadmus will begin by plotting energy usage against all explanatory variables and identify trends. Trends identified from visual inspection will be linear, non-linear, or periodic. These will require evaluation in the context of Cadmus’ understanding of the physical systems involved and experience modeling similar facilities. We will also consider derived variables, such as day of week or degree days, and will assess correlations of these inputs and interactive effects between variables.
- **Select model type.** Cadmus has applied a range of modeling techniques and methods and knows that performance of an algorithm can depend on the dataset it is attempting to fit. Our approach is to select a class of models based on a specific use case and test performance (that is, predictive accuracy, minimization of prediction error, minimal data requirements, etc.) for the various model types within that class. Table 5 summarizes the collection of models we have used.

Table 5. Model Classes for Selection

Model Class	Model Type	Use Case
Linear	Single and multiple linear, ridge, Lasso regression	Low temporal resolution usage data, known physical relationships, observed linear trends
Time Series	Autoregressive integrated moving average (ARIMA), error term models, transfer functions	High temporal periodicity and seasonality, predicting future response
Bayesian	Decision trees, random forests, neural networks	Nonlinear relationships, complex systems, large amounts of data

Model validation and testing. Cadmus will create a set of candidate models based on prior experience and understanding of energy-savings projects and will rigorously evaluate these models against the facility-specific data and choose the best model in the energy-savings calculations. As a starting point in selecting the best model, we will apply graphical analysis of the relationship between energy usage and possible explanatory variables. We will then evaluate existing seasonality or temporal changes in selecting model types. In this initial step, we will consider using the model that is the simplest, has the fewest explanatory variables, and can be interpreted based on good engineering judgment.

Cadmus will test model prediction ability using a procedure that minimizes selection bias. This involves randomly splitting the baseline period data into training and testing sets, giving us two datasets of independent variables and measured energy consumption. Models are fit to the training data, applied to the test data, and scored on bias, model fit, and prediction accuracy metrics, such as the mean prediction error, relative root mean-squared error of prediction, mean absolute percentage error of prediction, and the median and other percentiles of prediction errors, r-square, and Akaike information criterion (AIC).

Randomly splitting the data does introduce bias and to fully understand a model we repeat this process for each model many times. These simulations build distributions of test statistics for each model that inform the selection of a final model.

Furthermore, we will identify patterns in the prediction errors by plotting or regressing the errors against variables such as hour of the day and day of the week. Also, we will investigate the evolution of errors over weeks and months to determine if there are prolonged trends that require further investigation.

Cadmus will fit the selected model to the entire set of baseline data. If, in the model validation and testing phase, we find that several models provide relatively good fit and predictions, we will calculate energy savings using several models and provide the results to Avista. For any given model that is chosen during the validation and testing phase, we will calculate the uncertainty in energy savings obtained using the entire dataset.

Cadmus expects that a variety of factors could confound the savings analysis. For example, a facility may undertake energy efficiency projects that are not funded through Avista during the reporting period. If

these other projects are unaccounted for, the estimate of electricity savings could be biased upward. Table 6 lists possible confounding factors and the strategies for addressing them.

Table 6. Potential Confounding Variables

Confounding Variable	Problem	Solution Strategy
Other Energy Efficiency Projects	Unaccounted savings from other energy efficiency projects during the reporting period may bias the savings estimate.	Develop an engineering estimate of savings for the other project(s) and subtract validated savings estimates from Cadmus' regression-based estimate.
Floor Space Additions or Changes in Use of Facility Space	These changes can bias the savings estimates.	Cadmus will review project documentation and available energy management system data to identify significant changes. Cadmus may make engineering-based adjustments to the savings estimates or model energy intensity instead of consumption.

Savings Estimation

After developing a model, estimating savings is straightforward. Cadmus will fit the model to the baseline data and apply it to the conditions present during the reporting period, generating facility consumption at each interval, and subtract these estimates from the actual measured consumption. To calculate “typical year” savings, Cadmus fits a baseline model and a reporting period model, applies each of these models to TMY3 data, and takes the difference in the estimated energy consumption. Savings are provided on a per-site basis in each of these cases.

Cost-Effectiveness Analysis

Cadmus will calculate and report the program's cost-effectiveness using evaluated savings, avoided energy costs, and actual incurred implementation costs. We will use Portfolio Pro+ to provide cost-effectiveness assessments by portfolio, program, fuel type, year, measure, and state level.

We will determine the economic performance of a program from four standard perspectives—a combination of the utility and program participants, the utility, program participants, and all ratepayers (including nonparticipants). Cadmus will evaluate these perspectives using four cost-effectiveness tests—total resource cost (TRC) test, utility cost test (UCT), participant cost test (PCT), and rate impact measure (RIM) test. If requested, we may also look into applying the Resource Valuation Test (RVT).

We will populate a database with Avista's utility data common to all programs (such as discount rates, avoided costs, load shapes, and retail rates) so that we can maintain a consistent approach to cost-effectiveness valuation across all programs and portfolios.

Process Evaluation

The process evaluation approach considers past evaluation findings, insight from the kickoff meeting, and Avista’s 2020 Annual Conservation Plans.

For all programs, our research methods will consider these three fundamental objectives:

- Assess participant and market actor program journey including motivation for participation, barriers to participation, and satisfaction
- Assess Avista and implementer staff experiences including organizational structure, communication, and program processes
- Document areas of success, challenge, and changes to the program

To address these research objectives, we will conduct implementation and customer research. Our implementation research will include a document and database review for each program, in-depth interviews with key Avista and implementation staff and contractor and Community Action Partner (CAP) agencies for relevant programs. Our customer research will include participant surveys and interviews, as well as builder and property manager interviews for relevant programs (Figure 2). We discuss each of these research areas and the associated tasks in more detail below.

Figure 2. Process Evaluation Research Areas and Tasks



Table 7 shows the research areas by program and year in Idaho and Table 8 shows the research areas by program and year in Washington. Cadmus will not complete a process evaluation for Simple Steps Smart Savings because the program will be discontinued soon.

Table 7. PY 2020–2021 Idaho Process Evaluation Activities

Program Name	Implementation Research		Customer Research	
	PY 2020	PY 2021	PY 2020	PY 2021
Residential Programs				
ENERGY STAR Homes	✓			
Shell		✓		✓
HVAC		✓		✓
Water Heat		✓		✓
Fuel Efficiency		✓		✓
Low-Income Programs				
Low-Income		✓		
Multifamily Programs				
Multifamily Direct Install	✓		✓	
Multifamily Market Transformation	✓		✓	
Nonresidential Programs				
Site Specific	✓		✓	
Prescriptive*		✓		✓
Grocer		✓		✓

*Nonresidential Prescriptive: Lighting, HVAC, Shell, Motor Control HVAC (VFD), Food Services, Green Motors, Compressed Air, and Fleet Heat.

Table 8. PY 2020–2021 Washington Process Evaluation Activities

Program Name	Implementation Research		Customer Research	
	PY 2020	PY 2021	PY 2020	PY 2021
Residential Programs				
ENERGY STAR Homes	✓			
Shell		✓	✓	✓
HVAC		✓	✓	✓
Water Heat		✓	✓	✓
Low-Income Programs				
Low-Income		✓		
Community Energy Efficiency Program		✓		
Multifamily Programs				
Multifamily Direct Install	✓		✓	
Nonresidential Programs				
Site Specific	✓		✓	✓
Prescriptive**		✓	✓	✓
Grocer		✓	✓	✓

*Residential prescriptive: space and water heating, smart thermostats, insulation, and windows.

**Prescriptive: Lighting, HVAC, Shell, Motor Control HVAC (VFD), Food Services, Green Motors, Compressed Air, and Fleet Heat.

The next sections describe the task methods for each research area.

Implementation Research

Cadmus will assess program processes and provide timely and actionable recommendations for continuous implementation improvement by reviewing the database and program documentation and conducting interviews with key Avista and third-party implementation staff, such as SBW Consulting, Washington State University Energy Program, 4 Sight Energy Group, the Green Motors Practices Group, contractors in the residential programs, and CAP agencies in the Low-Income program. Our reviews of key program documents and corresponding databases will inform what data we collect to meet the research objectives.

Table 9 lists the implementation research by program.

Table 9. Implementation Research by Program

Program	Implementation Research			
	Document Review	Avista Interviews	Implementer Interviews	Contractor and CAP Agency Interviews
Residential Programs				
ENERGY STAR Homes	✓	✓		
Shell	✓	✓		✓*
HVAC	✓	✓		
Water Heat	✓	✓		
Fuel Efficiency	✓	✓		
Low-Income Programs				
Low-Income	✓	✓		✓
Community Energy Efficiency Program	✓	✓	✓	
Multifamily Programs				
Multifamily Direct Install	✓	✓	✓	
Multifamily Market Transformation	✓	✓		
Nonresidential Programs				
Site Specific	✓	✓		
Prescriptive Lighting	✓	✓		
HVAC	✓	✓		
Prescriptive Shell	✓	✓		
Motor Control HVAC (VFD)	✓	✓		
Food Services	✓	✓		
Green Motors	✓	✓	✓	
Compressed Air	✓	✓	✓	
Fleet Heat	✓	✓		
Grocer	✓	✓		

*Contractor group to be determined after consulting with Avista.

The following sections describe the implementation research tasks. Program-level details are provided in the *Process Evaluation Activities by Program* section of this work plan.

Document and Database Review

Cadmus will review operation manuals, the program website, and the program database to gain a thorough understanding of how the program is implemented. In our database review, we will also assess the quality of program tracking data as it relates to our customer research.

We also will review Avista's most recent process and impact evaluation results to learn how Avista has incorporated earlier recommendations and to identify trends in program performance. We will apply our findings from the program document and database reviews to refine program-specific research objectives and develop data-collection instruments.

Avista Staff and Third-Party Implementer Interviews

Avista and its third-party implementers hold critical insight into program administration and delivery processes. Telephone interviews with these key stakeholders will focus on these topics:

- Program roles and responsibilities
- Program goals and objectives
- Program design and implementation
- Data tracking
- Program participation
- Marketing and outreach
- Program successes
- Market barriers
- Program impact on the market
- Future program changes including redesign

During the interview, we will be conscientious of staff members' time. Because we know they sometimes oversee multiple programs, our interview guides will avoid repetitive questions for programs with similar processes, such as data tracking, and we may cover all programs overseen by one or more staff members in one interview. We will build on our early findings from these program staff interviews to focus interviews with third-party staff about areas of interest.

For Residential and low-income programs in which contractors or agencies play a vital role, we will conduct contractor and CAP agency interviews.

Contractor Interviews

For many customers, contractors are an important source of program awareness and their involvement, cooperation, and understanding can be an indicator of program success. Cadmus proposes to conduct in-depth interviews to gain insights into contractors' motivations, experience, marketing strategies, how contractors identify customers, their standard business practices, knowledge about customer perceptions and experience, perspectives on program processes, the program's influence on business, and the opportunities for improvement.

Cadmus plans to complete up to 10 interviews with residential contractors (five per state). We will probably concentrate Residential contractor interviews on the HVAC program but will consult with Avista staff to determine if this is the best group to target. We will ask Avista program managers and

account executives to identify target contactors and will coordinate communication to program contractors.

CAP Agency Interviews

Cadmus plans to complete up to five interviews with CAP Agency staff. These interviews will be focused on program experience, marketing strategies, knowledge about customer perceptions and experience, and program successes and opportunities for improvement.

Customer Research

As shown in Table 10, Cadmus will conduct online participant surveys, as well as interviews with trade allies where smaller populations exist.

Table 10. Customer Research by Program

Program Category	Customer Research	
	Participant Surveys	Trade Ally Interviews
Residential Programs		
Shell	✓	
HVAC	✓	
Water Heat	✓	
Fuel Efficiency	✓	
Multifamily Programs		
Multifamily Market Transformation (Builders)		✓
Multifamily Direct Install (Property Managers)		✓
Nonresidential Programs		
Site Specific	✓	
Prescriptive*	✓	
Grocer	✓	

*Nonresidential Prescriptive: Lighting, HVAC, Shell, Motor Control HVAC (VFD), Food Services, Green Motors, Compressed Air, and Fleet Heat.

Participant Online Surveys and Interviews

Cadmus will prepare participant survey and interview guides in each of Avista’s programs. Questions will focus on topics that can help Avista understand trends in measure adoption and overall program performance and that gather critical data to inform the impact evaluation.

Our participant survey and interview guides will gather critical insights into participants’ program journey, such as these aspects:

- Program awareness
- How respondents learned about the program
- General program participation
- Program delivery experience
- Overall program satisfaction
- Satisfaction with Avista

- Reasons for participation
- Program benefits
- Current energy-efficient behaviors and purchases
- Suggestions for program improvements

All participant surveys will be online and will involve emailing a link to the survey to participating customers for whom an email address is available.

We typically recommend simple random sampling when the population is sufficiently large but will finalize the sampling plan according to the target sample sizes and expected response rates and after receiving comprehensive participant tracking data. See Table 11 in the *Process Sampling Plans* section for sampling details.

For programs with unique populations (Multifamily Market Transformation and Multifamily Direct Install), we will conduct participating builder and property manager telephone interviews, respectively, to allow for a greater range of topic exploration. We will conduct up to five builders participating in the Multifamily Market Transformation program and up to five property managers in each state for the Multifamily Direct Install program.

Process Sampling Plans

For the participant surveys, Cadmus will calculate sample sizes for each program category and fuel type based on unique participant population sizes, expected variation, and confidence and precision targets. For this work plan, we have described the sample design and estimated sample sizes but will revise them according to actual participant and project population sizes.

In Table 11, we provide the anticipated survey sample sizes for each program category and fuel type, determined based on target 90% confidence and 15% precision for each program category and to far exceed 90% confidence and 10% precision for the portfolio overall with error ratios of 0.5. For programs with limited sample sizes, we will send the survey to a census of participants in the planned year and gather as many survey responses as possible.

We will conduct in-depth interviews with up to five builders participating in the Multifamily Market Transformation program and up to five property managers in each state of the Multifamily Direct Install program.

Table 11. Estimated Participant Survey Sample Design

Program Category	Fuel Type	Idaho and Washington Combined	
		Annual Participant Size*	Survey Target **
HVAC, Shell, Water Heat	Electric	~4,000	30
	Natural Gas	~12,000	40
Fuel Efficiency	Natural Gas	~500	AMAP (estimating between 10 and 20)
Residential Total		~16,500	~90
Site Specific	Both	~400	AMAP (estimating between 10 and 20)
Prescriptive Lighting	Electric	~700	30
HVAC	Natural Gas	~400	AMAP (estimating between 10 and 20)
Prescriptive Shell	Both		
Motor Control HVAC (VFD)	Electric		
Food Services	Both		
Green Motors	Electric		
Compressed Air	Electric		
Fleet Heat	Electric		
Nonresidential Total		~1,500	~70
Portfolio Total		~18,000	~160

* Participant size is the number of residential program participants and nonresidential program projects. These are estimates based on previous years.

**Final survey target will be based on actual unique participants/project by state in each program category in the year survey is scheduled. Due to small population sizes, Cadmus will send email invite to census and gather as many completed surveys as possible.

Process Evaluation Activities by Program

This section describes the process evaluation activities by program. Although many process research activities are similar, such as reviewing program documents and tracking database to assess roles and responsibilities, marketing and outreach, participation trends, and informing subsequent interview and survey questions, the following descriptions note more program-specific focus areas.

Residential HVAC, Shell, and Water Heat Programs

The process evaluation of these programs will include the following data-collection activities:

- **Review program documents and database** to assess program changes and determine if database contains all necessary fields for customer surveys.
- **Interview Avista staff** to assess differences between the implementation of the program in Idaho and Washington, assess the impact of Washington’s Clean Energy Transformation Act on program design and implementation, document program changes and goals, and identify program successes and challenges.

- **Interview participating contractors (n=10)** to assess program understanding, experience, and satisfaction, how contractors identify customers, use of rebates as a sales factor, customer awareness of the program prior to engaging the contractor, standard business practices, influence of the program on business, and qualifying equipment offered.
- **Survey participating customers** to explore their experience, including application processing and influence of the contractor, continued levels of satisfaction, and marketing preferences.

ENERGY STAR Homes Program

The process evaluation of the ENERGY STAR Homes program will include the following data-collection activities:

- **Review program documents** to assess program changes.
- **Interview Avista staff** to document program changes and goals, assess differences between the implementation of the program in Idaho and Washington, identify program successes and challenges, assess regional communication and coordination with NEEA and other partnering utilities, and assess builder and dealer perceived experience and relationship.

Residential Fuel Efficiency Program (Idaho only)

The process evaluation of the Fuel Efficiency program will include the following data-collection activities:

- **Review program documents and database** to assess program changes and determine if database contains all necessary fields for customer surveys.
- **Interview Avista staff** to document program changes and goals and identify program successes and challenges.
- **Survey participating customers** to explore their experience, including application processing and influence of the contractor, continued levels of satisfaction, and marketing preferences.

Low-Income Program

The process evaluation of the Low-Income program will include the following data-collection activities:

- Review program document to assess program changes.
- Interview Avista staff to assess program changes and goals, assess differences between the implementation of the program in Idaho and Washington, identify program successes and challenges, and assess CAP agency and contractor experience and relationship.
- **Interview CAP agencies (up to n=5)** to assess program implementation, document marketing methods, assess experience with contractors, Avista staff, and customers, and identify program successes and challenges.

Community Energy Efficiency Program (Washington Only)

The process evaluation of the Community Energy Efficiency Program will include the following data-collection activities:

- **Review program documents** to document program processes, marketing efforts, and data tracking.

- **Interview Avista and implementer staff** to document program design including goal setting, delivery process, customer eligibility, incentive structure, and data tracking, as well as roles and responsibilities, and areas of success and challenge.

Multifamily Direct Install Program

The process evaluation of the Multifamily Direct Install program will include the following data collection activities:

- Review program documents to assess program changes.
- Interview Avista staff to document program changes and goals, assess differences between the implementation of the program in Idaho and Washington, identify program successes and challenges, and assess trade ally relationship.
- Interview implementer to document program understanding, including coordination of program marketing and outreach, and overall program experience, including satisfaction and suggestions for improvement.
- **Interview participating property managers (up to 5 per state)** to explore customer experience, including program awareness, satisfaction, energy efficiency actions, barriers to energy efficiency programs, and marketing preferences.

Multifamily Market Transformation (Idaho Only)

The process evaluation of the Multifamily Market Transformation program will include the following data collection activities:

- Review program documents to assess program changes.
- Interview Avista staff to document program changes and goals, identify program successes and challenges, and assess trade ally relationship.
- **Interview participating builders (up to 5)** to assess motivation and challenges, explore customer satisfaction and experience, and asses influence of the program on business practices.

Nonresidential Site Specific and Prescriptive Programs

The process evaluation of the Site Specific and Prescriptive programs (Interior and Exterior lighting, HVAC, Shell, Motor Control HVAC [VFD], Food Services, Green Motors, Compressed Air, Fleet Heat, and Grocer) will include the following data-collection activities:

- Review program documents and database to assess program changes and determine if database contains all necessary fields for customer surveys.
- Interview Avista staff to assess differences between the implementation of the program in Idaho and Washington, assess the impact of Washington’s Clean Energy Transformation Act on program design and implementation, document program changes and goals, identify program successes and challenges and to assess contractor relationships.
- **Interview implementers** to document program understanding, roles and responsibilities, experience, satisfaction, and suggestions for improvement.

- Green Motors: Green Motor Program Group
- Compressed Air: 4Sight Energy Group, LLC
- **Survey participating customers** to explore their experience and continued levels of satisfaction, including satisfaction with and influence of the contractor or designer, assess energy-saving behavior and document marketing preferences.

Cadmus QA/QC Procedures

Cadmus will use a variety of QA/QC procedures throughout the evaluation, from the initial data import through prudence review, to ensure our work is accurate and transparent.

Impact Evaluation

Upon receipt of data from Avista, Cadmus will begin the first step in our QA process. We will review each data field to confirm our understanding of the data received and to ensure data are complete and without errors. We will run each data file through a comprehensive review that checks for the fields required for the impact evaluation, looks for possible duplicate records, and compares the number of applications and total electric and gas savings reported in the detailed report for each program category against a separate overview report of savings across all programs. Cadmus will discuss any data questions with Avista in a timely manner to ensure database issues are rectified quickly.

Throughout the evaluation and after analyses are complete, a senior engineer will conduct a thorough and comprehensive QC of inputs, outputs, and calculations.

Process Evaluation

Our team will follow these three practices to manage and implement high-quality data collection for our process evaluation:

- **Data-collection instruments that conform to best practices.** Our team is dedicated to the quality and rigor of primary research. Project managers will review questionnaires to ensure they are consistent with best practices (for example, do not use double-barreled questions and use appropriate scales) and, whenever possible, use consistent questions across programs to enable trend analysis. We will provide all instruments to Avista for review prior to launch and will provide a final copy of the instrument with the final report.
- **Online survey coordinator for streamlined and efficient data collection.** We will designate a single survey coordinator who manages all survey activities to ensure consistent data collection across all research efforts and is our team's primary contact for online programming and survey administration. The coordinator will review each survey instrument, oversee the secure exchange of data with Avista and/or survey vendor, monitor data-collection results on a daily basis, and report progress to Avista and our team.
- **Expert survey oversight and quality assurance.** Cadmus' survey research specialists will supervise every step of survey programming, testing, and data-collection process. We always check programming for errors before fielding the survey to ensure skip patterns work as intended and that responses show the appropriate understanding of the survey questions.

Cost Effectiveness Analysis

Cadmus will meet with Avista staff to ensure the cost-effectiveness analysis is complete, accurate, and transparent. During these meetings, Cadmus will clearly demonstrate how it uses data received from Avista and its implementers in the cost-effectiveness model so Avista can replicate the results. Cadmus

will also provide a replicate model to Avista; this Excel model simulates the cost-effectiveness calculations of Portfolio Pro+ so Avista can easily track inputs, outputs, and results.

Cadmus will have a dedicated cost-effectiveness QC analyst ensure the source documentation aligns with all data used in the analysis, data are not missing and have not been double-counted, and the results provided to Avista are accurate.

Reporting

The goal of our reporting QA/QC procedures is to ensure information is reported accurately, consistently, and clearly. We will develop a reporting QA/QC document to be shared with Avista and Cadmus staff responsible for reporting prior to drafting reports and memorandums. The document will be used to ensure quality requirements are understood. This document will outline Avista's preferred terminology and will include a checklist for QC verification covering, at a minimum, these quality metrics:

- **Content is complete and as expected.** Cadmus provides meaningful recommendations, methodologies are stated and any changes are documented, etc.
- **Consistent and accurate values.** For example, table values match workbook values, text values match table values, and table totals add correctly.
- **Consistent and accurate formatting.** For example, reference links are tested and accurate and tables do not break across pages where possible.
- **Complete workpapers.** Supporting workpapers are included, complete and free of hardcoded numbers to the extent possible.

We will develop our reporting QA/QC procedures to meet applicable requirements in Cadmus' Idaho Scorecard review.

APPENDIX B

Summarization of Cost-Effectiveness Methodology

Avista takes a standardized¹ approach to the evaluation of the energy-efficiency portfolio to ensure transparency and clarity.

Cost-effectiveness of energy-efficiency programs can be assessed from a variety of perspectives, each of which lead to a specific standardized cost-effectiveness test. The following descriptions outline the costs and measures Avista uses to evaluate the cost-effectiveness of its energy-efficiency portfolio.

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

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

APPENDIX B, TABLE 1: SUMMARIZATION OF STANDARD PRACTICE TEST BENEFITS AND COSTS

	TRC	UCT	PCT	RIM
Benefit Components				
Avoided Cost of Utility Energy	\$	\$		\$
Value of Non-Utility Energy Savings	\$		\$	
Non-Energy Impacts	\$		\$	
Reduced Retail Cost of Energy			\$	
Cost Components				
Customer Incremental Cost	\$		\$	
Utility Incentive Cost		\$	(\$)	\$
Utility Non-Incentive Cost	\$	\$		\$
Imported Funds – Tax Credits, Federal Funding, etc.	(\$)		(\$)	
Reduced Retail Revenues				\$

The following is a summary of some of the approaches by which Avista measures these values and how they are applied within the company's evaluation of cost-effectiveness.

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

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

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

The commodity and capacity benefits are summed for each year and the combined avoided costs are increased to account for avoided line loss rates (6.1 percent).

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

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

- ◆ **Value of Non-Utility Energy:** For forms of energy not provided by the utility, such as propane or wood fuel, and for which there is no *IRP* valuation of the avoided cost, all savings are valued-based on the customer's retail cost of energy.
- ◆ **Non-Energy Impacts:** Impacts of efficiency measures unrelated to energy usage are incorporated into the appropriate standard practice tests to the extent that they can be reasonably quantified and externally represented to a rational, yet critical, audience. Avista is appreciative of the RTF's increased focus on quantifying non-energy impacts. Savings most typically quantified are related to reductions in lighting maintenance, reduced replacement costs (LEDs vs. halogen), and water and sewer cost savings.

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

- ◆ **Reduced Retail Cost of Energy:** For the participant test, it is participating customers' reduced retail cost of energy and not the utility avoided cost of energy that is relevant to that perspective.
- ◆ **Customer Incremental Cost:** This represents the additional cost of an efficient measure or behavior above the baseline alternative. To the maximum extent possible, the determination of customer incremental cost is based on alternatives that are identical in all aspects other than efficiency. When a clear comparison isn't achievable, an individualized adjustment is made to the extent possible.
- ◆ **Utility Incentive Cost:** Direct financial incentives, or the utility cost of physical products or services distributed to individual customers, are transfer payments between participating and non-participating customers. The provision of program delivery services is not a transfer cost and is not incorporated into the definition of the utility incentive cost.
- ◆ **Utility Non-Incentive Cost:** All utility costs that are outside of the previously defined incentive costs. This typically consists of costs associated with the administration of the program such as labor, EM&V, training, outreach, marketing, pilot programs, conservation potential assessments, organizational memberships, etc.
- ◆ **Imported Funds:** Avista considers the value of imported funds (generally tax credits or governmental co-funding of programs) to be a reduction in the customer's incremental cost of the measure for purposes of calculating the TRC test and the participant test. These funds are acquired from entities outside the ratepayer population or the individual participant.

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

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

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

- ◆ **Sub-Measure:** A sub-measure is a component of a measure that cannot be coherently offered without aggregating it with other sub-measures. For example, an efficient three-pan fryer couldn't be offered as part of a sensible customer-facing program if the program did not also include two-pan and four-pan fryers. Avista may offer sub-measures that fail cost-effectiveness criteria if the overall measure is cost-effective. This is the only area where Avista permits the bundling of technologies for the purpose of testing offerings against the cost-effectiveness screen. There are relatively few sub-measures meeting the criteria specified above within the portfolio.
- ◆ **Measure:** Measures are standalone energy-efficiency options, and are generally expected to pass cost-effectiveness requirements barring justifiable exceptions. Those exceptions include, but are not necessarily limited to, measures with market transformation value not incorporated into the assessment of the individual measure, significant non-energy benefits that cannot be quantified with reasonable rigor, and cooperative participation in larger regional programs.
- ◆ **Programs:** Programs consist of one or more related measures. The relation among the measures may be based on technology (e.g. aggregation of efficient lighting technologies) or market segment (e.g. aggregation of efficient food service measures). The aggregation is generally performed to improve the marketability and/or management of the component measures.
- ◆ **Portfolio:** Portfolios are composed of aggregations of programs. The aggregating factor will vary based on the definition of the portfolio. The following portfolios are frequently defined in the course of Avista's energy-efficiency reporting and management:
 - **Customer Segment Portfolio** – An aggregation of programs within a customer segment (e.g. low-income, residential, commercial/industrial).
 - **Fuel Portfolio** – Aggregating electric or natural gas energy-efficiency programs.
 - **Regular vs. Low-Income Portfolios** – Separating income-qualified measures delivered through CAP agencies from the remainder of the portfolio.
 - **Jurisdictional Portfolio** – Aggregating programs within either the Washington or Idaho jurisdiction.
 - **Local or Regional Portfolio** – Aggregating all elements of the local energy-efficiency portfolio vs. the regional market transformation portfolio.
 - **Fuel/Jurisdictional Portfolio** – Aggregating all programs within a given fuel and jurisdiction (Washington electric, Washington natural gas, Idaho electric, or the currently suspended Idaho natural gas portfolio).
- ◆ **Overall Portfolio:** Aggregating all aspects of the Washington and Idaho electric and natural gas energy-efficiency portfolio.

Methodology for Allocation of Energy Efficiency Costs

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

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

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

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

Unit Energy Savings

The quantification of energy savings applicable toward achieving Washington EIA acquisition targets has been an ongoing topic of discussion since the effective date of the requirement. Avista's plan will create an annual locked UES associated with the TRM that will be updated on an annual basis. The savings will primarily be derived from the RTF or previous impact evaluations.

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

Analytical Methodology Applicable to the Low-Income Programs

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

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

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

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

The administrative reimbursement permitted to the CAP agency is considered to be a component of the measure cost. This amount reimburses the CAP agency for back-office costs that would, in a typical trade ally bid, be incorporated into the project invoice. For 2021, the administrative reimbursement is 30 percent for Washington and 15 percent for Idaho.

WN U-29

AVISTA CORPORATION
 dba Avista Utilities

SCHEDULE 190
 NATURAL GAS EFFICIENCY PROGRAMS
 WASHINGTON

1. AVAILABILITY

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

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

(C)

2. ELIGIBLE CUSTOMER SEGMENTS

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

3. MEASURES

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

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

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Issued by Avista Corporation

By Kelly Norwood, Vice President, State and Federal Regulation



AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 190 - continued

4. FUNDING AND NONMONETARY ASSISTANCE

4.1 Funding

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

(C)

(D)

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

(N)

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

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

- 4.1.1 Energy efficiency programs delivered by community action agencies contracted by the Company to serve Low Income or vulnerable customer segments including agency administrative fees and health and human safety measures;
- 4.1.2 Low-cost natural gas efficiency measures with demonstrable energy savings (e.g. rooftop unit service);
- 4.1.3 Programs or services supporting or enhancing local, regional or national natural gas efficiency market transformation efforts.
- 4.1.4 Prescriptive programs are guided by the typical application of that measure in accordance with the previously defined incentive structure. Incentive levels for these programs are based on market conditions at the time of the program design and are not dependent on actual project cost relative to incentive caps. Incentives shall not exceed project costs.

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By

Patrick Ehrbar, Director of Regulatory Affairs

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 190 - continued

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

(D)

4.2 Non-Monetary Assistance

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

- 4.2.1. Educational**, training or informational activities that enhance resource efficiency. This may include technology or customer-segment specific seminars, literature, trade-show booths, advertising or other approaches to increasing the awareness and adoption of resource efficient measures and behaviors.
- 4.2.2. Financial** activities intended to reduce or eliminate the financial barriers to the adoption of resource efficiency measures. This may include programs intended to reduce the payment rate for resource efficiency measures, direct provision of leased or loaned funds or other approaches to financial issues by better than existing market terms and conditions.
- 4.2.3. Product samples** may be provided directly to the customer when resource efficient products may be available to the utility at significantly reduced cost as a result of cooperative buying or similar opportunities.
- 4.2.4. Technical Assistance** may consist of engineering, financial or other analysis provided to the customer by or under the direction of, Avista Corporation staff. This may take the form of design reviews, product demonstrations, third-party bid evaluations, facility audits, measurement and evaluation analysis or other forms of technical assistance that addresses the cost-effectiveness, technical applicability or end-use characteristics of customer alternatives.

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By

Patrick Ehrbar, Director of Regulatory Affairs

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 190 - continued

5. BUDGET & REPORTING

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

(M)

6. GENERAL RULES AND PROVISIONS

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

(D)

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

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By

By Kelly Norwood, Vice President, State and Federal Regulation

APPENDIX D

Natural Gas Program Summary

Program	Therms Savings	Estimated Budget
Low-Income Program		
Low-Income	24,275	\$ 1,763,957
Low-Income Total	24,275	\$ 1,763,957
Residential Programs		
Residential Prescriptive	430,392	\$ 2,543,182
Multifamily Direct Install	–	\$ –
Simple Steps	5,602	\$ 33,444
Residential Total	435,994	\$ 2,576,627
Commercial/Industrial Programs		
HVAC	62,310	\$ 201,478
Prescriptive Shell	26,000	\$ 99,260
Food Services	36,767	\$ 77,482
Site-Specific	200,000	\$ 666,413
Commercial/Industrial Total	325,078	\$ 1,044,632
Total Programs	785,347	\$ 5,385,216
NEEA, CPA, EM&V	–	\$ 611,314
Total Natural Gas Budget	785,347	\$ 5,996,530

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