CADMUS

2019 Washington Annual Conservation Report

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Prepared for:

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Acronym List

Acronym	Definition
DLC	Design Lights Consortium
DSM	Demand-side management
ESG	Energy Smart Grocer
HID	High-intensity discharge
MFDI program	Multifamily Direct Install program
NEEA	Northwest Energy Efficiency Alliance
PSC	Prescriptive
PY	Program year
TRC	Total Resource Cost
UTC	Utility Cost Test
WPM	Wood pole management

Executive Summary

Avista's program year (PY) 2019 *Annual Conservation Report* summarizes the annual energy efficiency achievements for its Washington electric and natural gas customers. These programs are intended to deliver cost-effective, least-cost resources. Funding is provided through Avista's Schedules 91 and 191, also known as the tariff rider, which is a non-bypassable system benefit charge applied to all electric and natural gas retail sales.

PY 2019 is the second year of the fifth Biennial Conservation Plan for Washington's Energy Independence Act (Initiative 937 or I-937). Avista's annual target is 49,158 MWh, as reported in the *2019 Electric Annual Conservation Plan*. In PY 2019, the electric energy efficiency portfolio achieved 41,741 MWh and the natural gas portfolio delivered 504,113 therms in first-year annual savings.[1] Based on the target established by the *2019 Electric Annual Conservation Plan*, Avista achieved 85% of the Washington target, and acquired 69% of the PY 2019 target of 726,128 therms from the *2019 Natural Gas Annual Conservation Plan*. Table 1 shows PY 2019 savings acquired by sector and fuel.

Table 1. PY 2019 Acquired Savings by Fuel and Sector

Sector	Evaluated Savings (kWh)	Evaluated Savings (therms)
Nonresidential	25,433,281	85,567
Residential	15,907,932	397,602
Low-Income	399,536	20,943
I-937 Total	**41,740,749**	**504,113**
Fuel Efficiency program	5,751,109	N/A
Portfolio Total	**47,491,857**	**504,113**

Note: Totals may not sum due to rounding.

The PY 2019 evaluated savings resulted from local energy efficiency programs managed by the utility or third-party contractors. Avista also funds the regional market transformation effort through the Northwest Energy Efficiency Alliance (NEEA); however, reported electric energy savings, cost-effectiveness, and other related information are specific to local programs unless otherwise noted. The electric and natural gas savings are gross savings based on all program participants.

Although the intent of this report is to look back on performance during the previous year, successes and lessons from this process are applied to the business planning process to inform and improve program design, including program modification or termination where necessary. Avista remains committed to delivering responsible and cost-effective energy efficiency programs to its customers.

Washington Portfolio Cost-Effectiveness

Avista judges the effectiveness of the energy efficiency portfolio based on a number of metrics. Two of the most commonly applied benefit/cost tests are the Total Resource Cost test (TRC), encompassing the

[1] All savings reported in this Executive Summary exclude savings from Avista's Fuel Efficiency programs, which are reported separately in the *Program Information* and *Evaluation, Measurement, and Verification* sections.

entire utility ratepayer population, and the Utility Cost Test (UCT), which is from the perspective of the utility. Benefit/cost ratios in excess of 1.00 indicate that the benefits exceed the costs.

Table 2 provides a summary of benefit/cost ratios for the Washington state portfolio by sector and fuel type. Table 3 and Table 4 show the cost-effectiveness of the combined electric (TRC=1.44) and natural gas (UCT=1.08) portfolios. Note that these tables are inclusive of Low-Income programs. The portfolio cost-effectivness without Low-Income programs is a TRC ratio of 1.46 for the electric program and a UCT ratio of 1.69 for the natural gas program.

Table 2. PY 2019 Washington Cost-Effectiveness Summary

Benefit/Cost Test	Residential		Low-Income		Nonresidential	
	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas
TRC	1.38	0.57	0.44	0.24	1.55	0.50
UCT	1.57	1.85	0.39	0.15	2.46	1.11

Table 3. PY 2019 Washington Electric Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$39,107,564	$27,237,479	1.44
UCT	$35,552,331	$19,371,855	1.84

Note: Electric portfolio cost-effectiveness results include the Multifamily Direct Install (MFDI) and Low-Income programs.

Table 4. PY 2019 Washington Natural Gas Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$4,624,618	$8,817,901	0.52
UCT	$4,204,198	$3,890,728	1.08

Note: Natural gas portfolio cost-effectiveness results include the MFDI and Low-Income programs.

Tariff Rider Balances

As of the start of PY 2019, the Washington electric and natural gas (aggregate) tariff rider balances were underfunded by $12.5 million. During PY 2019, Avista collected $26.2 million in tariff rider revenue to fund energy efficiency while expending $21.5 million to operate energy efficiency programs.

During PY 2019, Avista revised its electric demand-side management (DSM) tariff rate to address transition of the Fuel Efficiency program to a funding mechanism through natural gas. This rate revision resulted in lower collections through Tariff Schedule 91. Avista will continue to monitor its tariff rider balances to determine if further modifications are necessary.[2]

Table 5 summarizes the PY 2019 tariff rider activity by fuel type.

[2] On April 30, 2020, Avista filed for an exemption from WAC 480-109-130, the Company's annual requirement to file revisions to its Schedule 91 rate adjustment.

Table 5. PY 2019 Tariff Rider Activity

	Electric	Natural Gas
Beginning Balance (Underfunded)	($11,894,825)	($645,002)
Energy Efficiency Funding	$21,297,866	$4,930,822
Net Funding of Operations	**$9,403,041**	**$4,285,820**
Energy Efficiency Expenditures	$16,289,405	$5,194,368
Ending Balances (Underfunded)	**($6,886,364)**	**($908,548)**

Third-Party Evaluation

The measurement of portfolio energy savings has been independently verified through external third-party evaluators prior to being claimed as portfolio acquisition or being incorporated into the cost-effectiveness calculations. Avista retained Cadmus as its external evaluator to independently measure and verify PY 2018 and PY 2019 electric and natural gas portfolio results.

PY 2019 Program Highlights, Challenges, and Changes

Avista practices active management and continuous process improvement when delivering energy efficiency programs. Avista retained Cadmus to provide impact and process evaluations for the PY 2018 and PY 2019 electric and natural gas programs. As in past reporting periods, Avista has continued to use a portfolio-wide approach for evaluation to provide a comprehensive benchmark to compare against future years. Through Cadmus' ongoing evaluation activities and through internal active management, Avista recognizes program successes and challenges throughout the biennium and practices continuous process improvement to strive for the delivery of successful and cost-effective energy efficiency programs. Avista's PY 2019 program had several highlights as well as some challenges:

- ***Expansion of offerings for small- and medium-sized customers:*** Avista launched the Business Partner pilot program in July 2019, specifically to reach a larger percentage of small- and medium-sized business customers, reminding them about the availability of basic scoping energy audits, budget billing plans, and energy efficiency rebate programs. Avista expanded the business support team to reach more commercial customers with energy needs.
- ***Nonresidential lighting programs:*** The Prescriptive Lighting program continues to be one of the largest programs in Avista's portfolio of energy efficiency offerings. Although savings achieved throughout PY 2019 were substantial, the level of overall throughput was less than in previous years. The T12/T8 lamp retrofit measure remains the most popular and achieves the highest kWh savings; however, Avista noted a continued shift toward more Prescriptive Exterior Lighting projects in PY 2018 continued in PY 2019.
- ***Investments made in Avista's energy efficiency program:*** Avista transitioned to using its Nexant iEnergy platform in PY 2019, which serves as an enterprise software tool for managing its commercial energy efficiency portfolio. The new iEnergy database stores and reports the data in different formats and at different aggregation levels than the previous system, causing some challenges in evaluating the PY 2019 Nonresidential program. Because the transition occurred midyear and some applications were entered into both systems, Avista and Cadmus staff had to manually combine and recategorize data from the new database to match up with the format

used for the old database. Cadmus identified several issues with exports from the new database as well as underlying errors with the way some savings were calculated by the new system. Avista has corrected the issues Cadmus identified, and the new iEnergy database has the potential to facilitate more accurate savings estimates, more detailed project tracking, and more thorough evaluations in the future.

- ***Discontinuation of Fuel Efficiency program:*** Avista transitioned the funding of its Fuel Efficiency program from its electric tariff rider (Schedule 91) to its natural gas tariff rider (Schedule 191), per the April 26, 2018 request of the Washington Utilities and Transportation Commission (Order No. 07 in Docket Numbers UE-170485 and UG-170486 [*consolidated*]). Beginning in PY 2020, Avista will discontinue all current Fuel Efficiency program projects funded through its energy efficiency tariff.
- ***Community Energy Efficiency Program partnership:*** From July 2018 to October 2019, Avista partnered with the Community Energy Efficiency Program (CEEP) and community action agencies to identify multifamily properties for potential energy efficiency improvements. These multifamily improvements included an electric ductless heat pump, line voltage control thermostats, weatherization measures, and lighting. A secondary component to the effort was to switch income-qualified homes utilizing an alternative heat source (e.g., oil or wood) to either a more efficient electric source such as a heat pump or, where available, a natural gas furnace. All homes also received weatherization improvements. Avista matched the Community Energy Efficiency Program's $830,000 contribution to share the cost of these improvements. Additional funds were leveraged from other sources for some of these projects; leveraged funds may have included an owner's contribution, the Avista Low Income Weatherization program, the Washington State Matchmaker program, the federal Low-Income Home Energy Assistance Program (LIHEAP), or U.S. Department of Energy. In total, 18 multifamily properties and six single-family homes were treated, reaching 400 customers in four counties, more than one-half of which were income qualified. The partnership resulted in over 850,000 kWh and 3,400 therms of unverified savings.
- ***Residential Home Energy Audit pilot program:*** Leveraging previous home energy audit program experience and aligning with industry best practices, Avista launched a pilot audit program in PY 2019. Eligible participants were residential customers (single-family home up to a four-unit multifamily property) using an Avista fuel as their primary heat source located in Kootenai County, Idaho and Spokane County, Washington. Avista will roll out a home energy audit program companywide in PY 2020 for energy efficiency education, cross program promotion, and limited direct energy efficiency savings.
- ***Statewide Advisory Group:*** In PY 2018, Avista formed the Washington State Independently Owned Utility Energy Efficiency Joint Advisory Group to align various practices in target setting; the group continued meeting throughout PY 2019. Key topics of the Statewide Advisory Group included the inclusion of NEEA savings in conservation targets, areas of cost-effectiveness improvements, and utility performance incentives.

Continuing the integrated resource planning and conservation potential assessment processes, Avista reviews existing and potential programs as part of its energy efficiency business planning process. In PY 2019, through adaptive management, Avista modified its programs to reflect updated savings and cost information that affected incentive levels. In PY 2019, Avista began implementing the Grocer program directly; currently, it allows only prescriptive measures.

Non Energy Benefits

For the 2019 Program year, Avista utilized data from the Regional Technical Forum (RTF) to quantify non-energy benefits (NEBs) for measures with established RTF NEB values across multiple sectors of the Company's effieincy portfolio. Throughout this report, where data is available, NEBs are quantified in measure summary charts at the program level.

Residential

Avista quantified non-energy benefits for several residential measures including residential insulation, high efficiency windows, air source heat pumps, and ductless heat pumps. The resources from the RTF provide NEBs related to wood fuel credits, increased comfort in the customer's home and reductions in PM 2.5 emissions.

See Appendix E for a quantification of these NEB amounts by measure. While these NEBs were applied to electric weatherization measures, the NEB were not applied to the natural gas counterpart, since the RTF values apply to electric only. In 2020, Avista will reevaluate the use of NEBs to ensure that both natural gas and electric are allocated NEB values where appropriate.

Non-Residential

For Non-Residential programs, Avista did not include NEB for the purposes of calculating cost-effectivness, however, several Food Services measures, including electric steamers and pre-rinse sprayers, have wastewater treatment costs savigs that are identified as an NEB. These savings are based on the 2015 Water and Wastewater Rate Survey. For 2020, Avista will expand its efforts towards identifying non-energy benefits including those pertaining to non-residential measures.

Low Income

Avista defines two major non-energy benefits uniquely applicable to the low income program. These are:

End-use non-energy benefit: CAPs fund the entire cost of the installation of the measure in a customer home, not just the incremental cost of the higher efficiency value. To maintain consistency with how the utility is invoiced and with programmatic budgets, the Company includes the full invoiced cost within the TRC test. However, the energy efficiency value of the measure corresponds only to the incremental cost of the efficiency measure. Thus, Avista values the cost associated with the baseline end-use as a non-energy benefit being provided to the customer.

Health and human safety non-energy benefit: The 15% health and human safety allowance permitted under the Company's funding contracts with the CAP is assumed to create, on a dollar-for-dollar basis, a

quantifiable non-energy benefit. It is assumed that the CAP would only make these investments in an individually reviewed home if the benefits were equal, or in excess of, the cost. Therefore, Avista recognizes a non-energy benefit for health and human safety expenses that is equal to the amount expended.

Other non-energy benefits associated with individual measures are quantified and included within the Low Income portfolio analysis in a similar manner to any other measure within the Avista Energy Efficiency portfolio. NEBs for the Low Income sector are quantified in Table 24 in this report.

Process Evaluation Summary

Cadmus conducted PY 2019 process evaluation activities for all Avista programs except Nonresidential Grocer, Residential ENERGY STAR® Homes, and the third-party Community Energy Efficiency Program. Table 6 provides a brief summary of the programs included in Avista's PY 2019 DSM portfolio evaluation.

Table 6. PY 2019 Evaluated Program Descriptions

Program	Measure(s)	Implementer	Program Summary
Nonresidential			
Site Specific	Custom measure(s)	Avista	Customers design energy efficiency projects with documented energy savings and a minimum 10-year measure life for a technical review and possible rebates.
Prescriptive	Lighting, HVAC, variable frequency drives, food service equipment, shell	Avista	Customers identify potential energy efficiency projects, submit paperwork, and receive prescriptive rebates for projects.
Fleet Heat	Smart block heating system	Avista	Electric customers receive a smart block heating system to install on vehicles. The device controls the water temperature in the block and the air temperature outside the block. HOTSTART can provide installation help.
Green Motor Rewind	Repair or rewind of motors	Green Motors Practices Group	Electric customers who receive a green motor rewind at a participating service receive a rebate for 15 horsepower to 5,000 horsepower industrial motors.
AirGuardian Compressed Air	Compressed air leak reduction device	4Sight Energy Group	Following a compressed air audit, electric customers receive direct installation of a compressed air leak reduction device.
Multifamily			
MFDI	Lighting, water saving, water heater insulation, VendingMisers	SBW Consulting	Direct installation of energy-saving measures, on-site audits to identify opportunities and interest in existing Avista programs, and follow up visits to install supplemental lighting measures.
Multifamily Market Transformation	Natural gas space and water heating	Avista	New multifamily development receives incentives to install natural gas space and water heating.

Program	Measure(s)	Implementer	Program Summary
Residential			
HVAC	Space and water heating, smart thermostats	Avista	Customers identify potential energy efficiency projects, submit paperwork, and receive prescriptive rebates for projects.
Shell (Weatherization)	Standard and storm windows		
Fuel Efficiency	Natural gas space and water heating		
Residential Low-Income			
Low-Income	Weatherization products and services	N/A	Weatherization managers from community action agencies that deliver energy efficiency programs to low-income communities. Qualified homes can be in Washington or Idaho and receive 100% reimbursement for the work costs.
Residential Third-Party Implementer			
Simple Steps, Smart Savings	LEDs, LED fixtures, showerheads, clothes washers	CLEAResult	Midstream program markdowns are offered for certain products in retail stores; CLEAResult receives monthly sales data and provides program support through retailer visits.

Nonresidential Site Specific

Avista did not make any material changes to its Site Specific program in PY 2019. Potential projects must have a simple payback of 15-years or less to qualify for incentives. During PY 2019, Avista modified its Schedule 90 and Schedule 190 tariff, realigning the 15-year simple payback criteria effective 1/1/2020. For PY 2020, the program now offers an incentive for any qualifying electric or natural gas energy-saving improvements with a simple payback less than the life of the equipment installed. The program manager did not report problems or issues in implementing the Site Specific program, noting that the program continues to work well for customers as they become more aware of energy efficiency. All survey respondents (n=19) said they were *very satisfied* (95%) or *somewhat satisfied* (5%) with this program.

Nonresidential Prescriptive

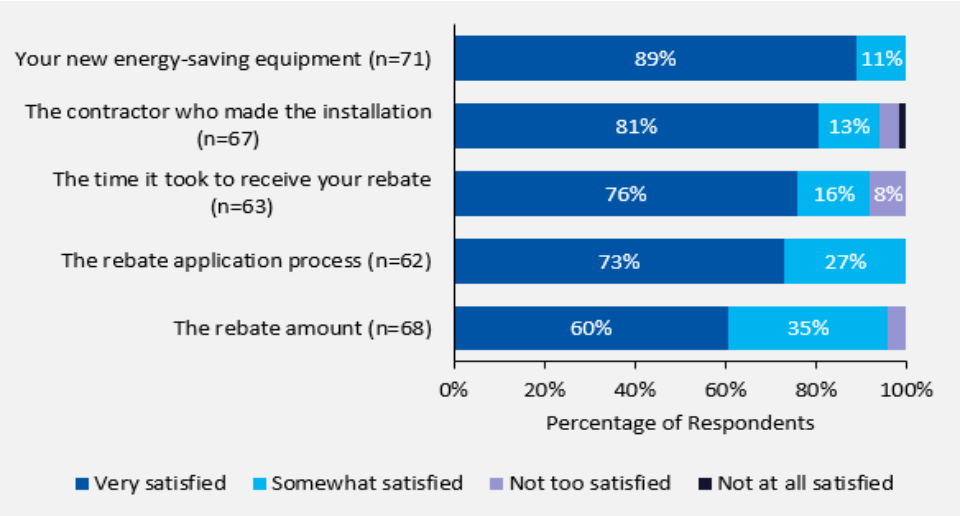
Avista made several changes to the Lighting Rebates program in PY 2019. A large majority of survey respondents (98%; n=83) said they were *very satisfied* (88%) or *somewhat satisfied* (10%) with the Prescriptive program, indicating that the program is running well. Lighting participants were most satisfied with application processing times, rebate amounts, and equipment installed (99% *very satisfied* or *somewhat satisfied* with each component), while non-lighting participants were most satisfied with equipment installed (100% *very satisfied* or *somewhat satisfied*; n=13) and with trade ally communications (100% *very satisfied*; n=7). The two AirGuardian participants and the one Green Motors Rewind participant were *very satisfied* with all program aspects. In PY 2019, Avista also began implementing the Grocer program directly.

Residential

The Residential program delivery was smooth, and except for small changes to the rebate levels outlined in the *2019 Annual Conservation Plan*, the HVAC, Shell, and Fuel Efficiency programs were delivered and performed as expected. Cadmus asked survey respondents to indicate their satisfaction levels with various program elements associated with their rebate, new equipment, and installing contractor as

well as their overall satisfaction with the program and with Avista. Respondents' satisfaction levels ranged from 92% to 100%[3] with the five elements shown in Figure 1. All program participants were either *very satisfied* or *somewhat satisfied* with the program overall and 98% were either *very satisfied* or *somewhat satisfied* with their overall experience with Avista.

Figure 1. PY 2019 Satisfaction with Residential Program Elements



Source: Residential Program Participant Survey Question C1.
"How would you rate your overall experience with..."

Avista adjusted program rebates for the Residential programs shown in Table 7.

Table 7. PY 2019 Residential Prescriptive Program Rebate Changes

Program	Change	PY 2018	PY 2019
ENERGY STAR Homes	Manufactured home	$1,000	$800
HVAC	Natural gas water heater	$200	$60
	Heat pump water heater	$200	$215
	Tankless water heater	$200	$215
Fuel Efficiency	Wall heater/stove	$1,300	Discontinued
	Space and water heater	$2,250	$1,700
	Space heater	$1,500	$1,200
Shell/Weatherization	Storm windows	$1.00 per square foot	$2.00 per square foot
	Windows	$1.50 per square foot	$3.00 per square foot

Source: *2018 Avista Energy Efficiency Standard Operating Procedures Manual* and *2019 Avista Energy Efficiency Standard Operating Procedures Manual*.

[3] The combination of *very satisfied* and *somewhat satisfied* responses.

Multifamily Direct Install

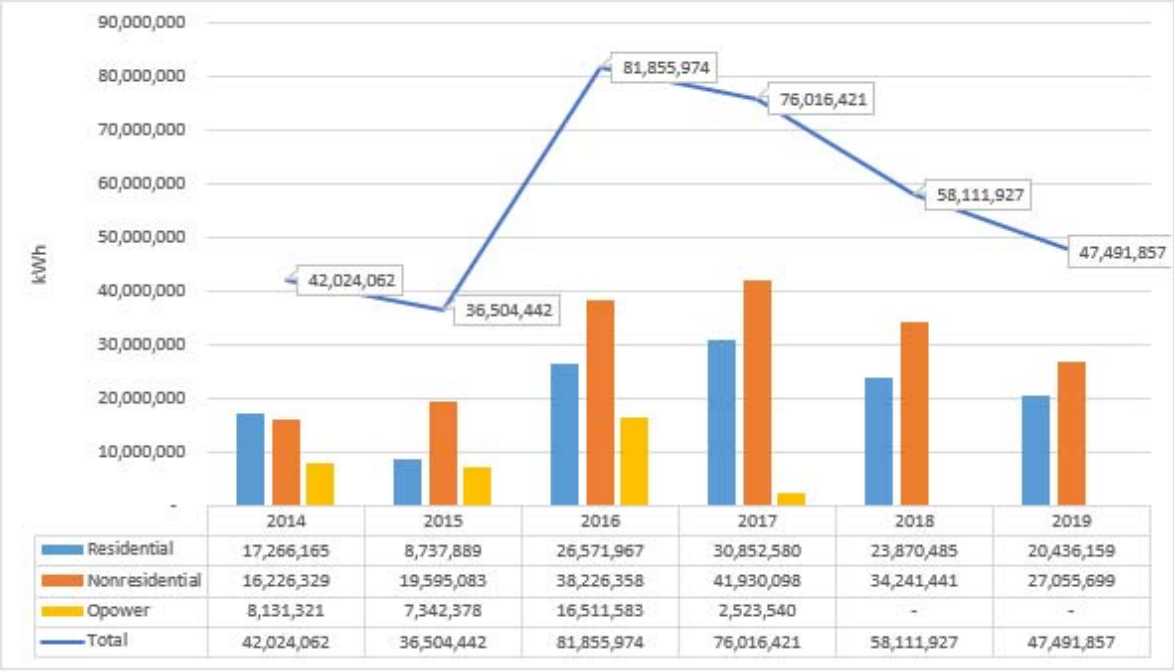
In PY 2019, the MFDI program followed the structure of the PY 2018 pilot, but the implementer integrated the supplemental lighting phase more effectively with the program's direct install portion. The program implementer and Avista reported high satisfaction with direct install measures among tenants and building mangers. All five of the interviewed multifamily property managers who participated in the MFDI program supported this, being *very satisfied* with their program experiences overall. In PY 2019, the program surpassed its goals midway through the year, encouraging the implementer to increase its electricity and natural gas targets for PY 2020.

PY 2019 Portfolio Trends

Avista's electric portfolio decreased in savings in PY 2019 compared to previous years. As noted in PY 2018, much of the change was attributed to the downward trend in both Residential and Nonresidential interior lighting (LEDs) programs because a large portion of savings from these programs was captured over the PY 2016 and PY 2017 biennium.

As shown in Figure 2, Avista's 47,491,857 kWh of energy savings achieved in PY 2019 (including Fuel Efficiency program savings) is lower than its PY 2018 acquisition of 58,111,927 kWh. Savings acquired through the company's Residential program decreased by 14%, from 23,870,485 kWh in PY 2018 to 20,436,159 kWh in PY 2019. Nonresidential programs decreased their conservation acquisition by 21%, from 34,241,441 kWh in PY 2018 to 27,055,699 kWh in PY 2019.

Figure 2. PY 2014 to PY 2019 Washington Electric Energy Savings



	2014	2015	2016	2017	2018	2019
Residential	17,266,165	8,737,889	26,571,967	30,852,580	23,870,485	20,436,159
Nonresidential	16,226,329	19,595,083	38,226,358	41,930,098	34,241,441	27,055,699
Opower	8,131,321	7,342,378	16,511,583	2,523,540	-	-
Total	42,024,062	36,504,442	81,855,974	76,016,421	58,111,927	47,491,857

Low-Income electric energy savings are included in the overall total. For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

Of Avista's overall electric savings portfolio, the Nonresidential Prescriptive and Site Specific programs (excluding Fuel Efficiency) obtained 54% of the savings in PY 2019. These programs, combined with the Residential Lighting program and all Fuel Efficiency programs, achieved 92% of the overall savings for PY 2019. Figure 3 illustrates these components.

Figure 3. PY 2019 Washington Electric Savings Portfolio

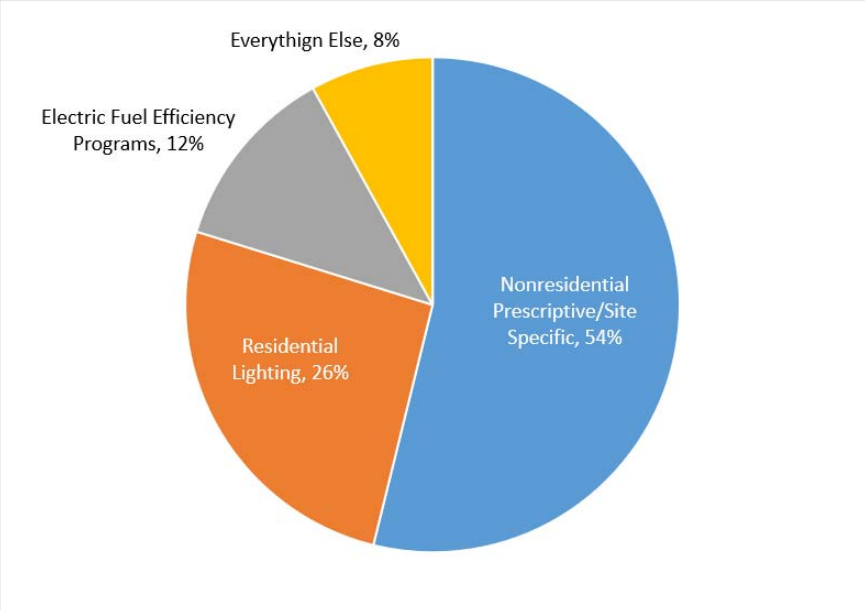
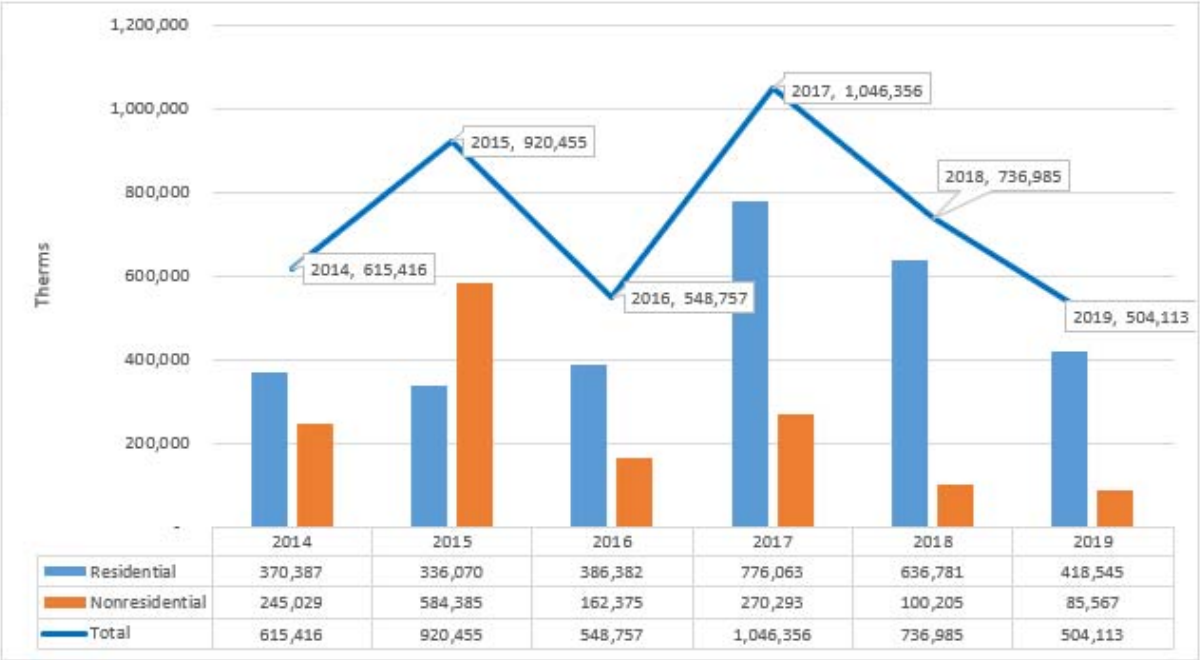


Figure 4 shows that Avista's natural gas portfolio had a decrease in savings in PY 2019 compared to the prior year. Much of the change is attributed to the Nonresidential Prescriptive and Residential HVAC and Water Heater programs, which declined in savings in PY 2019. Avista's 504,113 therms of energy savings from PY 2019 is lower than its PY 2018 acquisition of 736,985 therms. Savings acquired through the company's Residential program decreased by 34%, from 621,381 therms in PY 2018 to 418,545 therms in PY 2019. Nonresidential programs decreased their conservation acquisition by 15%, from 100,205 therms in PY 2018 to 85,567 therms in PY 2019.

Figure 4. PY 2014 to PY 2019 Washington Natural Gas Energy Savings

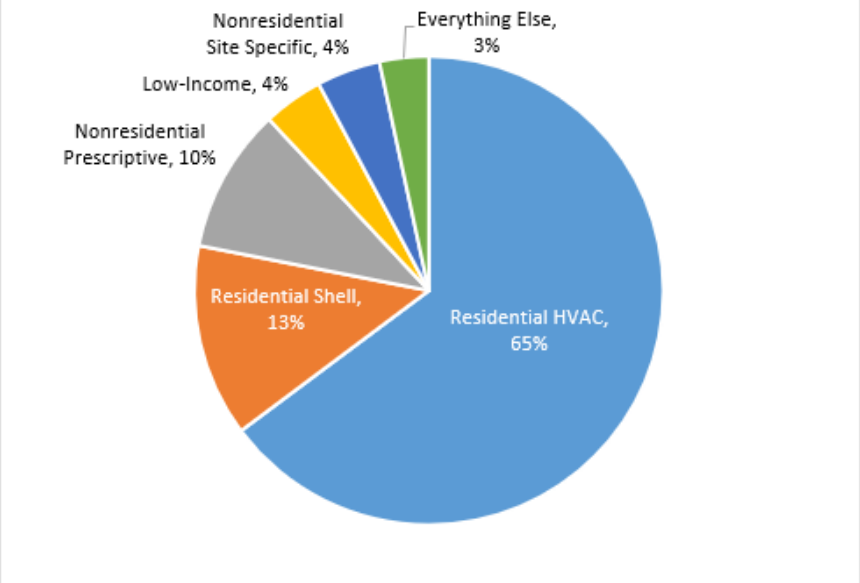


	2014	2015	2016	2017	2018	2019
Residential	370,387	336,070	386,382	776,063	636,781	418,545
Nonresidential	245,029	584,385	162,375	270,293	100,205	85,567
Total	615,416	920,455	548,757	1,046,356	736,985	504,113

Low-Income natural gas savings are included in the overall total. For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

Figure 5 illustrates Avista's natural gas savings portfolio. The Residential HVAC and Shell programs obtained 78% of the overall savings in PY 2019 (65% and 13%, respectively).

Figure 5. PY 2019 Washington Natural Gas Savings Portfolio



Cost-Effectiveness

Table 8 and Table 9 present cost-effectiveness results for Washington PY 2019 portfolios by fuel. The TRC benefit/cost ratios for the electric and natural gas portfolios are 1.44 and 0.52, respectively.

Table 8. Washington Electric Portfolio Cost-Effectiveness

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$39,107,564	$27,237,479	1.44
UCT	$35,552,331	$19,371,855	1.84

Table 9. Washington Natural Gas Portfolio Cost-Effectiveness

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$4,624,618	$8,817,901	0.52
UCT	$4,204,198	$3,890,728	1.08

The following sections contain TRC and UTC cost-effectiveness results for Washington PY 2019 programs by sector. Full cost-effectiveness results are included in *Appendix D*.

Nonresidential Cost-Effectiveness Results

Table 10 and Table 11 show Nonresidential sector cost-effectiveness results by fuel type.

Table 10. PY 2019 Washington Nonresidential Electric Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$19,658,208	$12,659,898	1.55
UCT	$17,871,098	$7,265,762	2.46

Table 11. PY 2019 Washington Nonresidential Natural Gas Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$606,137	$1,222,193	0.50
UCT	$551,033	$497,655	1.11

Residential Cost-Effectiveness Results

Table 12 and Table 13 show Residential sector cost-effectiveness results by fuel type.

Table 12. PY 2019 Washington Residential Electric Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$18,712,659	$13,551,321	1.38
UCT	$17,011,509	$10,834,822	1.57

Table 13. PY 2019 Washington Residential Natural Gas Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$3,703,796	$6,543,459	0.57
UCT	$3,367,087	$1,822,569	1.85

Low-Income Cost-Effectiveness Results

Table 14 and Table 15 show Low-Income sector cost-effectiveness results by fuel type.

Table 14. PY 2019 Washington Low-Income Electric Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$736,697	$1,026,259	0.72
UCT	$669,724	$1,271,272	0.53

Table 15. PY 2019 Washington Low-Income Natural Gas Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$314,685	$1,052,248	0.30
UCT	$286,078	$1,570,504	0.18

Program Information

Since 1978, Avista has been administering energy efficiency programs to reduce electricity and natural gas energy use for its portfolio of customers. Most of these programs have been implemented in-house, but a few have external implementers. In PY 2019, Avista provided approximately 2,198 individual measures across 12 energy efficiency programs. This chapter provides an overview of the various programs in each sector.

Nonresidential Sector

The Nonresidential sector energy efficiency market is delivered through a combination of Prescriptive and Site Specific program paths. Any measure not offered through the Prescriptive program path is automatically eligible for treatment through the Site Specific program path, subject to the criteria for participation in that program. Prescriptive program paths for the Nonresidential sector market are preferred for measures that are relatively small and uniform in their energy efficiency characteristics.

Avista's tariff rider funded more than $3.8 million for energy efficiency incentives in Nonresidential applications in PY 2019. These incentives were applied to 1,180 Nonresidential sector Prescriptive and Site Specific projects. Excluding Fuel Efficiency savings, nonresidential sector programs realized over 25,433 MWh and 85,567 therms in annual first-year energy savings.

Nonresidential Program Changes

Avista launched the Business Partner pilot program in July 2019, specifically to reach and remind a larger percentage of small- and medium-sized customers about the availability of basic scoping energy audits, budget billing plans, and energy efficiency rebate programs. Avista expanded its support team to assist commercial customers with their energy needs.

As shown in Table 16, Avista made several changes to the Lighting Rebates program in PY 2019; the *PY 2019 Avista DSM Standard Operating Procedures Manual*, pages 36 and 37, compares the PY 2018 and PY 2019 Prescriptive Lighting Rebates.

Table 16. PY 2019 Prescriptive Lighting Rebate Changes

	PY 2018	PY 2019	Notes
Fluorescent Tubular Lamps			
T5HO four-foot TLED	$15	$15	Must be Design Lights Consortium (DLC) rated
T8 four-foot TLED	$6.50	$6.50	
U-bend LED	Site Specific	$8	New prescriptive measure; must be DLC rated
T8 eight-foot TLED	Site Specific	$13	
Fluorescent Fixtures			
2, 3, or 4-lamp T12/T8 fixture to LED qualified 2x4 fixture	$26-$35	$40	Removed hourly requirement; must be DLC rated
2-lamp T12/T8 fixture to LED qualified 2x2 fixture	Site Specific	$30	New prescriptive measure; must be DLC rated

	PY 2018	PY 2019	Notes
High-Intensity Discharge (HID) Lighting			
250-watt HID fixture to ≤140-watt LED fixture or lamp	$155	$155	Increased hourly requirements; lamps eligible only upon removing ballasts and other existing electric components; must be used more than 70 hours per week; must be DLC rated
1,000-watt HID fixture to ≤400-watt LED fixture or lamp	$18	$205	
1,000-watt HID fixture to ≤400-watt LED fixture or lamp	$460	$460	
Incandescent Replacement Lamps, MR16, and Can Light Kits			
6-watt to 20-watt LED lamp	$8	$8	Must be ENERGY STAR–rated
50-watt to 60-watt LED lamp	$55	$55	
2-watt to 9-watt MR16 lamp	$10	$10	
12-watt to 20-watt LED fixture retrofit	$20	$20	
Occupancy Sensors			
Occupancy sensors with built-in relays	$40	$40	Must control greater than 170 watts (not wall switch sensors)
Replacement HID Lighting (Pole, Wallpack, or Canopy)			
70-watt to 89-watt HID fixture to ≤25-watt LED fixture, retrofit kit, or lamp	$60	$60	Lamps become eligible upon removal of ballasts and all other existing electric components; must be used at least 4,288 hours per year; must be DLC rated
90-watt to 100-watt HID fixture to ≤30-watt LED fixture, retrofit kit, or lamp	$80	$80	
150-watt HID fixture to ≤50-watt LED fixture, retrofit kit, or lamp	$125	$125	
175-watt HID fixture to ≤100-watt LED fixture, retrofit kit, or lamp	$130	$130	
250-watt HID fixture to ≤140-watt LED fixture, retrofit kit, or lamp	$140	$140	
320-watt HID fixture to ≤160-watt LED fixture, retrofit kit, or lamp	$180	$180	
400-watt HID fixture to ≤175-watt LED fixture, retrofit kit, or lamp	$255	$255	
750-watt HID fixture to ≤300-watt LED fixture, retrofit kit, or lamp	Site Specific	$450	
1,000-watt HID fixture to ≤400-watt LED fixture, retrofit kit, or lamp	$610	$610	
New Construction Fixtures (HID Lighting)			
175-watt code HID fixture to ≤100-watt LED fixture	$130	$130	Must be used at least 4,288 hours each year; must be DLC rated
250-watt code HID fixture to ≤140-watt LED fixture	$140	$140	
320-watt and 400-watt code HID fixture to ≤160-watt LED fixture	$250	$250	
Sign Lighting Retrofit			
T12 to LED sign lighting	$17/sq ft	$17/sq ft	Must be used at least 4,288 hours each year

As shown in Table 17, Avista also made several changes to the Food Service Equipment and Natural Gas HVAC programs in PY 2019.

Table 17. PY 2019 Prescriptive Food Service Equipment and HVAC Rebate Changes

	PY 2018	PY 2019
Food Service Equipment		
Electric Fryer	$300	$175
Electric Steam 3 Pan	$70	$1,300
Electric Steam 4 Pan	$100	$1,700
Electric Steam 5 Pan	$135	$2,200
Electric Steam 6 Pan	$160	$2,600
Electric Steam 10 or more Pan	$180	$3,200
Electric Dishwasher Low Temp	$600	$750
Electric Dishwasher High Temp	$650	$750
Gas Dishwasher Low Temp	$300	$300
Gas Dishwasher High Temp	$350	$300
Gas Rack Oven	$235	$2,000
Hot Food Holding Cart 1/2 Size	$0	$300
Hot Food Holding Cart Full Size	$0	$575
Hot Food Holding Cart Double Size	$0	$1,000
Hot Food Holding Cart <15 cu. Ft.	$165	$0
Pre Rinse Sprayer	$25	$50
Electric Griddle	$88	$250
Gas Griddle	$505	$250
Electric Convection Oven	$225	$220
Ice Machine Under 200 lb/day	$40	$35
Ice Machine 200-399 lb/day	$60	$80
Ice Machine 400-599 lb/day	$80	$115
Ice Machine 600-799/day	$100	$160
Ice Machine 800-999/day	$120	$200
Ice Machine 100-1199/day	$140	$0
Ice Machine 1200-1399/day	$160	$0
Ice Machine 1400-1599/day	$180	$0
Ice Machine 1600 >/day	$200	$0
Commercial On Demand Over Wrapper	$0	$300
Natural Gas HVAC		
90% - 94.9% AFUE NG Single Stage Furnace <225 kBtu/hr	$4.50 per input kBtu	$5.00 per Input kBtu
95% AFUE or greater NG Single Stage Furnace <225 kBtu/hr	$6.00 per input kBtu	$11.00 per Input kBtu
90% - 94.9% AFUE or greater NG Multi Stage Furnace <225 kBtu/hr	$6.00 per input kBtu	$11.00 per Input kBtu
95% AFUE or greater NG Multi Stage Furnace <225 kBtu/hr	$7.50 per input kBtu	$13.00 per Input kBtu
90% AFUE or greater NG Boiler <300 kBtu/hr	$8.00 per input kBtu	$9.00 per Input kBtu

In PY 2019, Avista began implementing the Grocer program directly; currently, it allows only prescriptive measures. Avista also made a process change to the Fleet Heat program: after a customer submits the rebate form (necessary to order the heater cord), Avista places the order and bills the customer for the equipment. Avista then provides the customer with reimbursement for the heater cord once it completes verification.

Nonresidential Prescriptive Path

The Prescriptive program path does not require pre-project contracting, as does the Site Specific program path, and thus lends itself to streamlined administrative and marketing efforts. Incentives are established for the Prescriptive program path by applying the incentive formula contained in Avista's Schedules 90 and 190 (tariff rider) to a prototypical installation. Actual costs and savings are tracked,

reported, and available to the third-party impact evaluator. When applicable, the Prescriptive program path measures use unit energy savings from the Regional Technical Forum.

Nonresidential Site Specific Path

The Site Specific path is the most comprehensive offering of the Nonresidential sector. Avista's Account Executives and Efficiency Engineers help Nonresidential customers identify energy efficiency opportunities, determine potential energy and cost savings, and identify and estimate incentives for participation. Site Specific incentives are capped at 70% of the incremental project cost for all projects with simple paybacks of less than 15 years. All projects must have a measure life of 10 years or more. Site Specific project measures include appliances, compressed air, HVAC, industrial process, motors (nonprescriptive), shell, and lighting, with the majority being HVAC, lighting, and shell.

Multifamily Natural Gas Market Transformation

The Multifamily Natural Gas Market Transformation is a Site Specific program intended to prompt building owners and developers to consider natural gas as the fuel of choice when constructing multifamily housing. The program ended on December 31, 2019; prior to its ending, Avista offered incentives of $3,000 - $3,500 per unit for the conversion to natural gas by installing standard efficiency space and water heaters.

iEnergy DSM Central Software Implementation

Avista started its transition to using its Nexant iEnergy platform in PY 2018 and those efforts continued into PY 2019. iEnergy serves as an enterprise software tool for managing its energy efficiency portfolio. The new iEnergy database stores and reports the data in different formats and at different aggregation levels than the previous system, causing numerous challenges in evaluating the PY 2019 Nonresidential program. Because the transition occurred midyear and some applications were entered into both systems, Avista and Cadmus staff had to manually combine and recategorize data from the new database to match up with the format used for the old database. Cadmus identified several issues with exports from the new database, as well as underlying errors with the way some savings were calculated by the new system. Avista has corrected the issues Cadmus identified, and the new iEnergy database has the potential to facilitate more accurate savings estimates, more detailed project tracking, and more thorough evaluations in the future.

Nonresidential Sector Measure Summary

Table 18 through Table 21 provide details on the electric and natural gas savings for Nonresidential sector Prescriptive and Site Specific path programs.

Table 18. PY 2019 Washington Electric Nonresidential Prescriptive Measures Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Kilowatt-Hour Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
AirGuardian	2	$8,100	33,752	0	$14,021	$0	$0	$1,229
ESG PSC Case Lighting	3	$3,950	35,550	0	$10,325	$0	$2,293	$905
ESG PSC Cases	3	$2,440	13,176	0	$1,468	$0	$4,338	$129
PSC Food Service Equipment	9	$17,656[a]	27,755	0	$14,613	$0	$4,158	$1,281
PSC Green Motors Rewind	7	$3,550	23,818	0	$9,521	$0	$43,437	$835
PSC Insulation	13	$12,548[a]	20,926	0	$28,468	$0	$44,616	$2,495
PSC Lighting Exterior	500	$1,356,896	8,476,922	0	$5,910,547	$0	$1,236,990	$518,080
PSC Lighting Interior	459	$909,493	8,473,136	0	$4,462,417	$0	$867,016	$391,147
PSC Motor Controls HVAC	7	$29,380	230,157	0	$153,239	$0	$60,729	$13,432
Total	**1,003**	**$2,344,012**	**17,335,192**	0	**$10,604,618**	**$0**	**$2,263,578**	**$929,532**

[a] These dual fuel measures have both electric and natural gas incentives.

Note: Column values may not sum exactly to the totals due to rounding.

Table 19. PY 2019 Washington Natural Gas Nonresidential Prescriptive Measures Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Therm Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
PSC Commercial HVAC	29	$53,474	0	18,599	$130,576	$0	$360,973	$71,784
PSC Food Service Equipment	44	$63,800	0	39,045	$208,082	$0	$197,004	$114,393
PSC Insulation	1	$155	0	5,755	$52,900	$0	$103,924	$29,082
Total	**74**	**$117,429**	**$0**	**63,399**	**$391,557**	**$0**	**$661,901**	**$215,259**

Table 20. PY 2019 Washington Electric Nonresidential Site Specific Measures Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms[b]	Avoided Kilowatt-Hour Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
SS HVAC Combined	4	$25,817	129,087[a]	0	$115,210	$0	$47,810	$10,099
SS HVAC Cooling	1	$180,784	903,921	0	$435,929	$0	$199,570	$38,211
SS Industrial Process	3	$166,656	833,282[a]	0	$679,447	$0	$157,626	$59,556
SS Lighting Exterior	16	$239,244	1,283,874	0	$895,183	$0	$363,936	$78,466
SS Lighting Interior	55	$969,485	4,706,736	0	$3,136,582	$0	$1,234,738	$274,932
SS Motor Controls Industrial	1	$9,651	48,257	0	$30,109	$0	$0	$2,639
SS Motors	1	$1,902	9,509	0	$7,254	$0	$8,697	$636
SS Multifamily	13	$1,042,799	1,025,695	0	$905,442	$0	$419,131	$79,365
SS Shell	5	$155,958	780,145	0	$1,061,325	$0	$644,981	$93,029
Total	**99**	**$2,792,297**	**9,720,506**	**0**	**$7,266,481**	**$0**	**$3,076,490**	**$636,933**

[a] The electricity savings for these measures include both energy efficiency and fuel conversion savings.

Table 21. PY 2019 Washington Natural Gas Nonresidential Site Specific Measures Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Therm Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
SS Industrial Process	1	$10,731	0	3,340	$23,128	$0	$16,180	$12,715
SS Shell	1	$5,757	0	1,919	$17,639	$0	$3,558	$9,697
SS HVAC Heating	2	$37,591	0	16,909	$118,709	$0	$42,899	$65,261
Total	**4**	**$54,079**	**0**	**22,168**	**$159,476**	**$0**	**$62,637**	**$87,672**

PY 2019 Nonresidential Trend Analysis

The following subsections outline trends in the Nonresidential sector electric and natural gas savings.

Nonresidential Electric Trends

During PY 2019, total Nonresidential electric savings decreased by 21% from the previous year, from 34,241,441 kWh in PY 2018 to 27,055,699 kWh in PY 2019.[4] The two largest contributors to the overall savings for PY 2019 were Avista's Prescriptive Interior Lighting and Exterior Lighting programs, which obtained 8,473,136 kWh and 8,476,922 kWh, respectively; together, these programs accounted for 63% of the overall Nonresidential savings (31.3% each). Because a significant amount of interior lighting savings was already captured over the PY 2016 to PY 2017 biennium, the PY 2018 and PY 2019 Prescriptive Interior Lighting programs saw a significant decrease from PY 2017 savings (27,263,252 kWh savings or 65% of all Nonresidential savings).

The next two largest contributor to the overall Nonresidential savings was the Site Specific Interior Lighting program, which contributed 4,706,736 kWh in PY 2019, a decrease of 36% from the 7,333,957 kWh in PY 2018. Site Specific Exterior Lighting savings decreased by 62% from PY 2018, from 3,415,911 kWh in PY 2018 to 1,283,874 kWh in PY 2019.

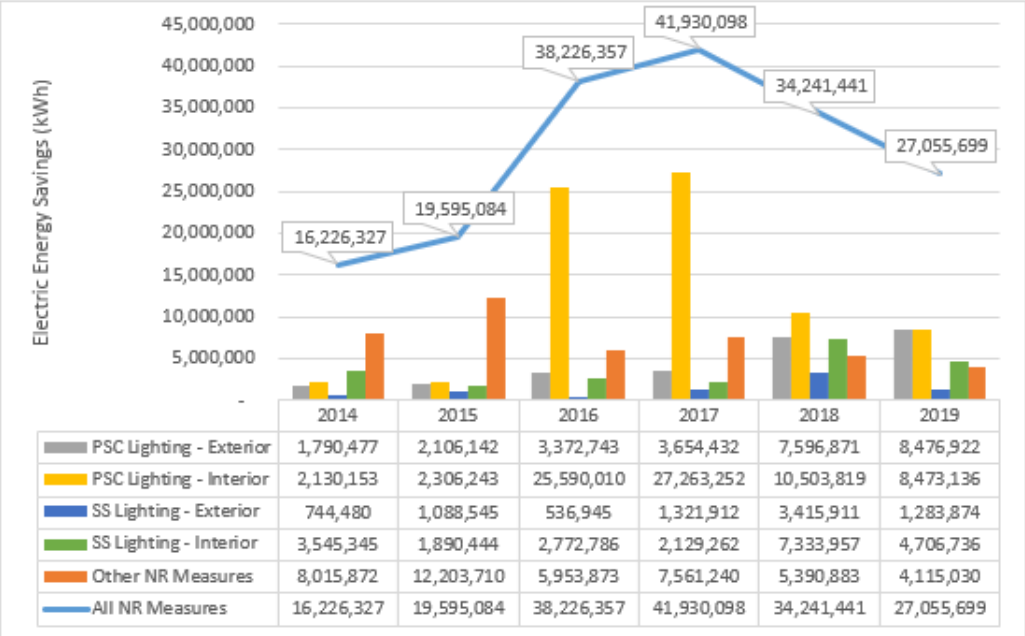
Other Nonresidential measures make up 15% of the overall Nonresidential savings which is consistent with PY 2018. Savings decreased by 24%, from 5,390,610 kWh in PY 2018 to 4,115,030 kWh in PY 2019. The individual programs and measures included in "other NR measure" category for PY 2019 are these:

- EnergySmart Grocer
- Prescriptive Food Service Equipment
- Prescriptive Green Motors Rewind
- Prescriptive Insulation
- Prescriptive Motor Controls HVAC
- Site Specific HVAC Combined
- Site Specific HVAC Cooling
- Site Specific Industrial Process
- Site Specific Motor Controls Industrial
- Site Specific Motors
- Site Specific Shell
- Multifamily Market Transformation

Figure 6 shows savings achieved for PY 2014 to PY 2019.

[4] Includes Multifamily Market Transformation which is not included in the overall I-937 evaluated savings.

Figure 6. PY 2014 to PY 2019 Washington Electric Nonresidential Savings Trends



	2014	2015	2016	2017	2018	2019
PSC Lighting - Exterior	1,790,477	2,106,142	3,372,743	3,654,432	7,596,871	8,476,922
PSC Lighting - Interior	2,130,153	2,306,243	25,590,010	27,263,252	10,503,819	8,473,136
SS Lighting - Exterior	744,480	1,088,545	536,945	1,321,912	3,415,911	1,283,874
SS Lighting - Interior	3,545,345	1,890,444	2,772,786	2,129,262	7,333,957	4,706,736
Other NR Measures	8,015,872	12,203,710	5,953,873	7,561,240	5,390,883	4,115,030
All NR Measures	16,226,327	19,595,084	38,226,357	41,930,098	34,241,441	27,055,699

For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

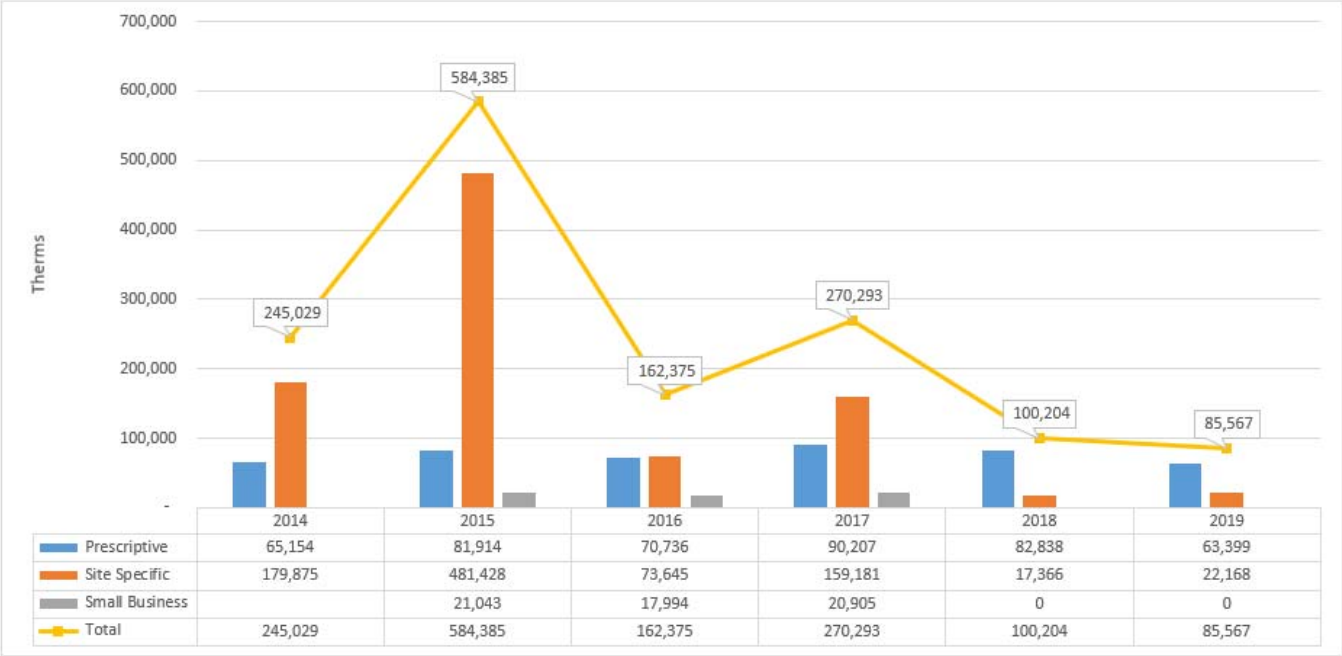
Nonresidential Natural Gas Trends

In PY 2019, the total Nonresidential natural gas savings decreased by 15% from the previous year, from 100,205 therms in PY 2018 to 85,567 therms in PY 2019. The largest contributors to the overall savings for PY 2019 were Avista's Prescriptive programs, which obtained 63,399 therms. The Prescriptive Food Service Equipment program provided the largest savings, with 39,045 therms or 46% of overall Nonresidential savings. Prescriptive HVAC program achieved savings of 18,599 therms followed by Prescriptive Insulation with 5,755 therms (22% and 7% of total Nonresidential savings, respectively).

The Site Specific HVAC Heating program achieved the majority of non-prescriptive savings, with 16,909 therms or 20% of the total Nonresidential savings. Site Specific Industrial Process and Site Specific Shell measures provided the remaining 5% of Nonresidential natural gas savings.

Figure 7 summarizes the savings achieved for the PY 2014 to PY 2019 annual periods.

Figure 7. PY 2014 to PY 2019 Washington Natural Gas Nonresidential Savings Trends



	2014	2015	2016	2017	2018	2019
Prescriptive	65,154	81,914	70,736	90,207	82,838	63,399
Site Specific	179,875	481,428	73,645	159,181	17,366	22,168
Small Business		21,043	17,994	20,905	0	0
Total	245,029	584,385	162,375	270,293	100,204	85,567

For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

Residential Sector

Avista's Residential sector portfolio comprises 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 a variety of additional interventions: upstream buydown of low-cost lighting and water saving measures, select distribution of low-cost lighting and weatherization materials, direct install programs, and a multifaceted, multichannel outreach and customer engagement effort.

Avista provided over $6.4 million in rebates and direct customer benefits to Washington residential customers to offset the cost of implementing these energy efficiency measures. All programs within the Residential sector portfolio contributed 15,908 MWh and 397,602 therms to the annual energy savings.

Residential Program Changes

Program changes made at the beginning of PY 2019 to the Residential sector programs include changing incentive levels. Avista communicates program changes once the *Annual Conservation Plan* is finalized and those changes become effective at the beginning of the year. In addition, Avista makes some program changes throughout the year as necessary, but this practice is less typical.

The sections below describe each Residential sector program offering in the portfolio along with a general description of the program, how it is implemented, and details around eligibility.

Residential ENERGY STAR Homes Program

The ENERGY STAR Homes program takes advantage of the regional and national effort to expand the U.S. Department of Energy and U.S. Environmental Protection Agency's ENERGY STAR label. Prior to PY 2019, Avista offered rebates to both stick-built ENERGY STAR homes and ENERGY STAR/Eco-rated manufactured homes. However, stick-built ENERGY STAR homes with electric heating did not pass the TRC cost--effectiveness test in PY 2018 and were removed from the program offerings.

Any Washington residential electric customer (Schedule 1) with a certified ENERGY STAR/Eco-rated manufactured home that is all electric is eligible for this program. The rebate may not be combined with other Avista individual measure rebate offers.

Residential HVAC Program

Through the HVAC program, Avista encourages residential customers to select a high-efficiency solution when making energy upgrades to their home. Through this prescriptive rebate approach, Avista 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 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 additional 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 natural gas savings for the Residential sector portfolio.

Washington electric customers (Schedule 1) who heat their homes with Avista electricity may be eligible for a rebate to install a variable speed motor on their forced air heating equipment or to convert their electric straight resistance space heating to an air-source heat pump. Any Washington residential natural gas customers (Schedule 101) who heat their homes with natural gas may be eligible for a rebate for installing a high-efficiency natural gas furnace, boiler, or smart thermostat.

Avista reviews energy usage as part of the program eligibility requirements. Customers must demonstrate a heating season electricity usage of 8,000 kWh and less than 340 therms for replacement of electric straight resistance to air-source heat pump or ductless heat pump. High-efficiency natural gas furnaces and boilers must have 90% annual fuel utilization efficiency or greater. Tankless water heaters must have an efficiency of 0.82 energy factor or higher. Ductless heat pumps must be 9.0 heating seasonal performance factor or greater. Heat pump water heaters must have an efficiency of 180% or higher. The supporting documentation required for participation includes but may not be limited to copies of project invoices and Air Conditioning, Heating, and Refrigeration Institute certification.

Residential Shell Program

The Shell program encourages residential customers to improve their home's shell or exterior envelope with upgrades to windows and storm windows. Through this prescriptive rebate approach, Avista 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 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 additional communication methods that encourage program participation.

Washington and Idaho residential electric customers (Schedule 1) who heat their homes with Avista electric are eligible to apply for a program rebate. Washington residential natural gas customers (Schedule 101) who heat their homes with natural gas are also eligible to apply.

Storm windows (interior/exterior) must be new, the same size as the existing window, and not in direct contact with the existing window, and exterior windows' low-e coating must be facing the interior of the home. Glazing material emissivity must be less than 0.22 with a solar transmittance greater than 0.55. Windows must have a U-factor rating of 0.30 or lower.

Avista will review energy usage as part of the program eligibility requirements. Customers in Washington and Idaho with electric heated homes must demonstrate a heating season usage of 8,000 kWh. Customers in Washington with natural gas heated homes must demonstrate a heating season usage of 340 therms.

Residential Fuel Efficiency Program

The Fuel Efficiency program rebate encouraged customers to consider converting their resistive electric space and water heating to natural gas. The direct use of natural gas continued to be the most efficient fuel choice when available, and over time offered the most economic value in the operating costs of the equipment. Since the early 1990s, Avista had offered a conversion rebate. Although natural gas prices have fallen in recent years, the cost of infrastructure continues to rise, both for the utility and for a customer's installation cost for this particular measure. For the PY 2018 and PY 2019 biennium, conversions to natural gas water heaters no longer had a stand-alone rebate. For this biennium, Avista provided a combination rebate for water heater conversions to natural gas furnaces.

Avista paid this prescriptive rebate upon the measure installation and receipt of all relevant documentation. A customer's minimum qualifications included using Avista electricity for electric straight resistance heating or water heating, which was verified by evaluating their energy use. Energy efficiency marketing efforts built considerable awareness of opportunities in the home and drove customers to the website for rebate information. Vendors generated participation 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 were some additional communication methods that encouraged program participation.

Residential electric customers (Schedule 1) who heated their homes or water with Avista electricity may have been eligible for a rebate for converting to natural gas. The home's electric baseboard or furnace heat consumption must have indicated a use of 8,000 kWh or more during the previous heating season (and less than 340 therms).

Avista ended the Fuel Efficiency program in PY 2019. The energy savings from the Fuel Efficiency program do not count toward I-937 targets and will not be included in the overall I-937 savings achieved at the end of the PY 2018 to PY 2019 biennium.

Simple Steps, Smart Savings Program

Simple Step, Smart Savings is a regional program designed to increase the adoption of energy-efficient residential products. To achieve energy savings, Avista encourages residential consumers to purchase and install high-quality LED bulbs, light fixtures, energy-saving showerheads, and ENERGY STAR appliances.

Simple Steps, Smart Savings continues to provide the region's best opportunity to collectively influence both retail stocking practices and consumer purchasing. There continue to be opportunities for efficient lighting improvements in customer residences, as many residences still have inefficient bulbs plugged into residential lighting sockets. Incentives also encourage customers to increase efficiency before burnout of the existing, less-efficient lighting. Energy savings claimed are based on Regional Technical Forum deemed savings.

The key drivers to delivering the program objectives are the incentives that encourage customer interest and the marketing efforts that drive customers to using the program. For the upstream model for lighting and showerheads, Avista uses a manufacturer partnership to buy down the cost of products and allow for greater flexibility in how money is used (such as for markdowns or marketing).

Avista contracted with CLEAResult to provide manufacturer and retail coordination. CLEAResult is responsible for coordinating program marketing efforts, performing outreach to retailers, ensuring that the proper program tracking is in place, and coordinating all implementation aspects of the program. Big-box retailers and select regional and national mass-market chains are the primary recipients of Simple Steps, Smart Savings products and typically offer a variety of these products. These products include LED bulbs (such as general purpose, dimmable, decorative, mini-base, globe, reflectors, outdoor lights, and three-way ENERGY STAR LED fixtures); showerheads with 2.0 gpm and 1.5 gpm ratings; and clothes washers. These products are clearly identified with point-of-purchase tags indicating they are part of the program.

Simple Steps, Smart Savings is available at retail locations with allocations among participating utilities based on an estimated percentage of customers shopping at specific locations.

Multifamily Direct Install Program and Supplemental Lighting

The MFDI program is administered by SBW Consulting, Inc., and is a direct installation and audit program providing customer energy efficiency opportunities through three activities:

- Directly installing appropriate energy-saving measures at each target site
- Conducting a brief on-site audit to identify customer opportunities and interest in existing Avista programs
- Providing contact information so that customers are able to follow up with additional energy efficiency measures under existing programs

Direct install measures include faucet aerators, showerheads, screw-in LEDs, smart power strips, and vending misers in common areas.

This program is only available to customers who receive electric service from Avista and have a five-unit or more multifamily property. This program ran as a pilot for several months before Avista turned it into a program in late PY 2018. Avista also turned a pilot into a program for common area supplemental lighting for properties that had been audited and treated through the direct install program.

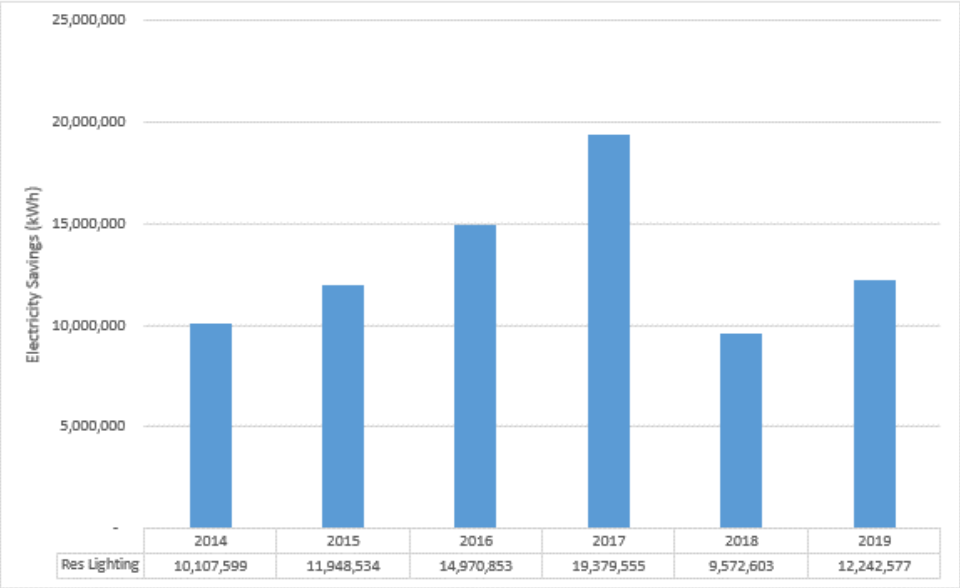
PY 2019 Residential Trend Analysis

The following subsections outline trends in the various Residential sector programs electric and natural gas savings. *Appendix E* provides more detail for PY 2019 first-year program participation, incentives received, and savings achieved for all the Residential sector programs.

Residential Electric Lighting

In PY 2019, the Residential Lighting program obtained 12,242,577 kWh of savings, which represents 26% of the overall savings achieved by Avista's portfolio. Lighting savings increased by 29% over PY 2018 savings because of the addition of savings from Multifamily Direct Install (2,627,255 kWh) and Multifamily Direct Install Supplemental Lighting (1,511,818 kWh) in PY 2019. Savings for Simple Steps, Smart Savings lighting measures decreased 15%, from 9,523,810 in PY 2018 to 8,103,504 in PY 2019, but still provided a majority of lighting program savings. The reduction in savings from Simple Steps, Smart Savings relative to 2018 resulted from a combination of lower unit savings values and 5% fewer installed units (674,512 in PY 2019 compared with 713,024 units in PY 2018). Figure 8 illustrates the trend of Residential lighting between PY 2014 and PY 2019.

Figure 8. PY 2014 to PY 2019 Residential Electric Lighting Savings Trends

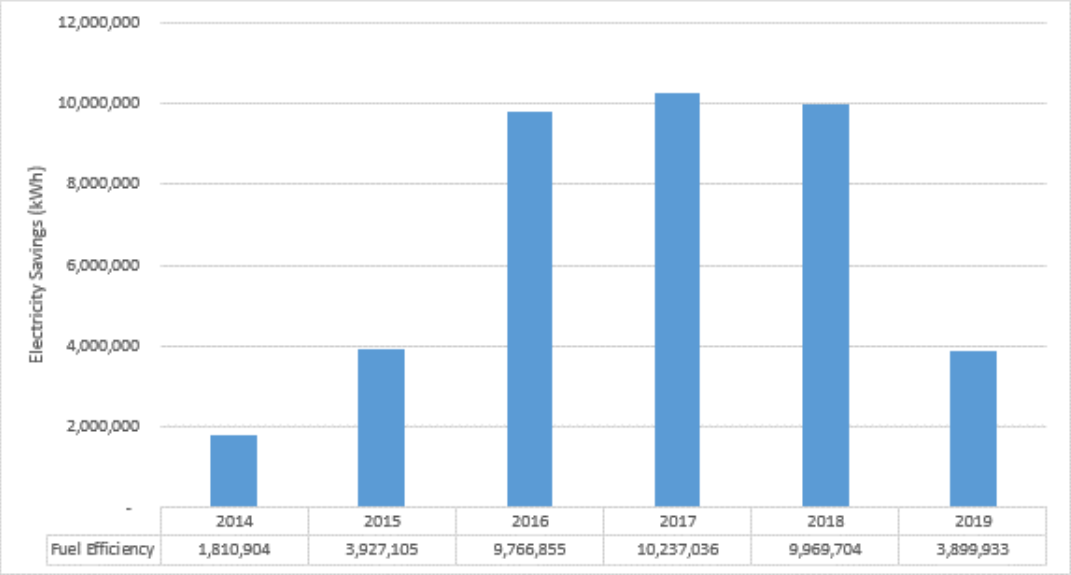


For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

Residential Fuel Efficiency Program

The Fuel Efficiency program obtained 3,899,933 kWh in savings in PY 2019, a decrease of 61% from the 9,969,704 kWh achieved in PY 2018. In total, Avista served 467 customers in PY 2019, with the majority choosing to convert their electric furnace to natural gas. In PY 2018, Avista served 1,137 customers, the majority of which chose to convert both their furnace and water heater (using the "combo measure") to natural gas. PY 2019 savings account for 9% of the overall savings achieved in Avista's portfolio. Figure 9 illustrates the trend in savings for the PY 2014 to PY 2019 period.

Figure 9. PY 2014 to PY 2019 Residential Fuel Efficiency Savings Trends

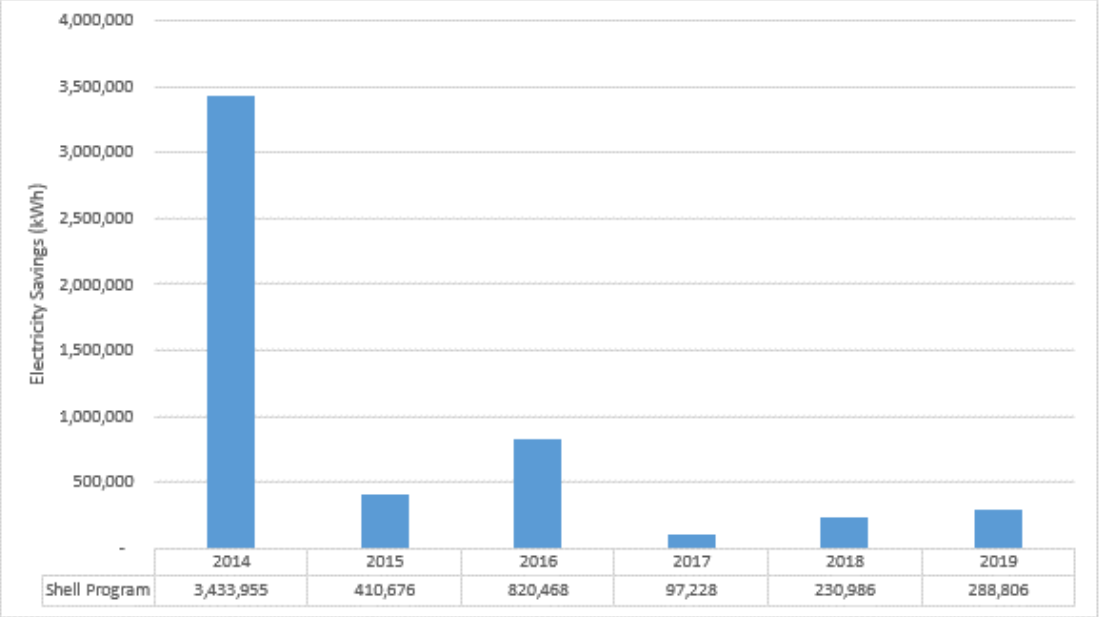


For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

Residential Electric Shell Program

The Residential Electric Shell program obtained savings of 288,806 kWh in PY 2019, a 25% increase in savings over the 230,986 kWh achieved in PY 2018. The savings derived from the Residential Electric Shell program are primarily attributed to single-pane window replacements. Figure 10 illustrates the trend in savings of the Residential Electric Shell program between PY 2014 and PY 2019. Note that the main driver of savings in PY 2014 were a result of the Utility Conservation Services' duct-sealing program.

Figure 10. PY 2014 to PY 2019 Residential Electric Shell Savings Trends

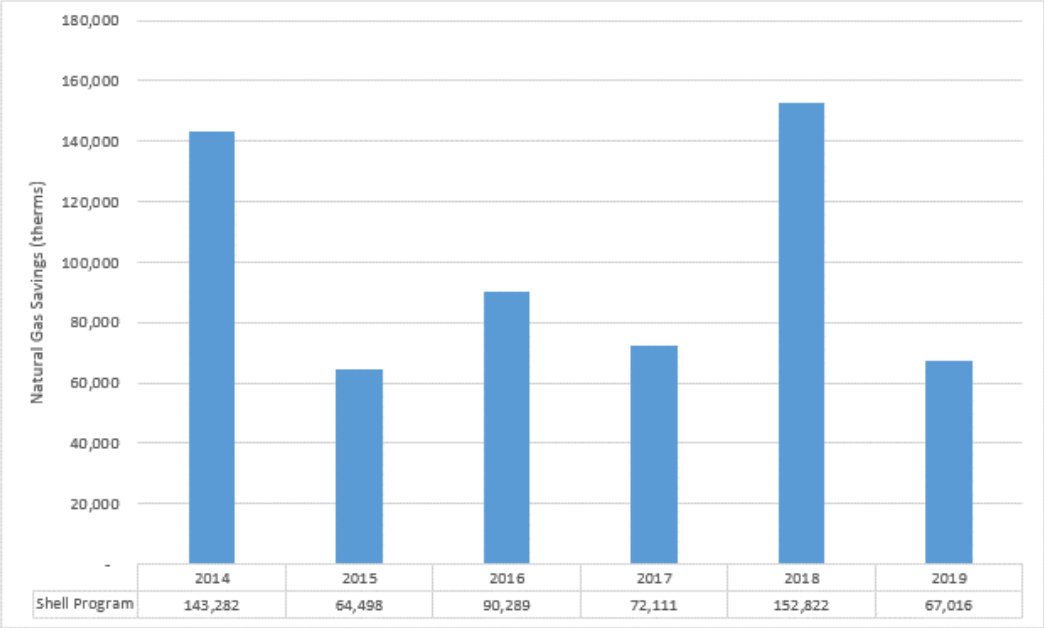


For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

Residential Natural Gas Shell Program

The Residential Natural Gas Shell program obtained savings of 67,016 therms in PY 2019, which represents 13% of the overall savings achieved in Avista's portfolio. The program had a 56% decrease in savings over the 152,822 therms achieved in PY 2018. The savings derived from the program are primarily attributed to single-pane window replacements. Figure 11 illustrates the trend in savings of the Residential Natural Gas Shell program between PY 2014 and PY 2019.

Figure 11. PY 2014 to PY 2019 Washington Residential Natural Gas Shell Program Savings Trends



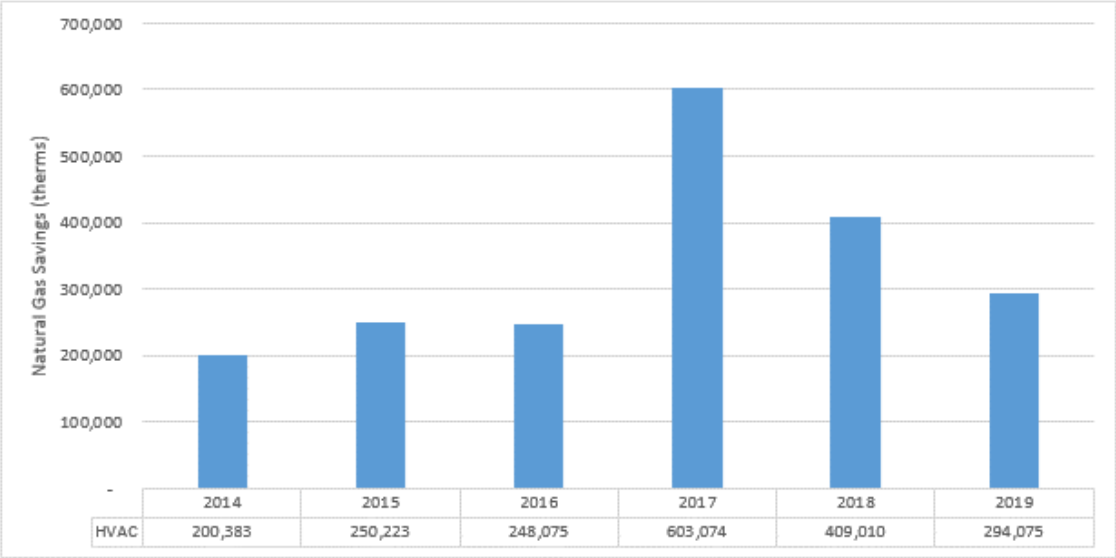
For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

Residential Natural Gas HVAC Program

The Residential Natural Gas HVAC program obtained savings of 294,075 therms in PY 2019, which represents 58% of the overall savings achieved in Avista's portfolio. The program had a 28% decrease in savings over the 409,010 therms achieved in PY 2018. In PY 2018, Avista revised its unit energy savings for residential high-efficiency furnaces, which resulted in a decrease of approximately 35 therms per unit. Avista will continue to monitor the realization rates related to this and all measures so the most accurate unit energy savings can be used.

Figure 12 illustrates the trend in savings of the HVAC program between PY 2014 and PY 2019.

Figure 12. PY 2014 to PY 2019 Washington Residential Natural Gas HVAC Program Savings Trends

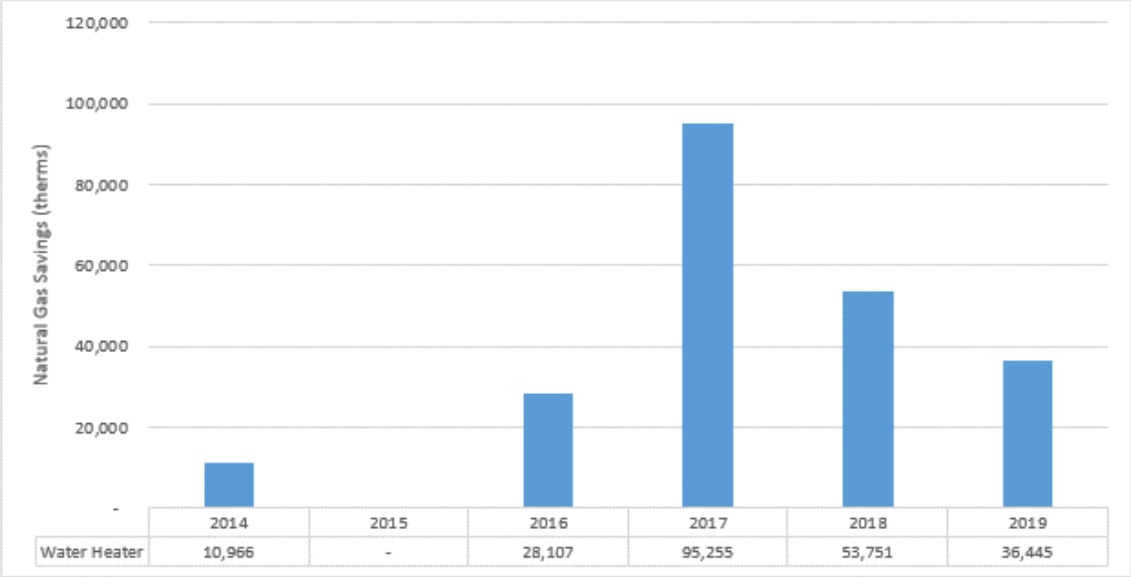


For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

Residential Natural Gas Water Heating Program

The Residential Natural Gas Water Heating program obtained savings of 36,445 therms in PY 2019, which represents 7% of the overall savings achieved in Avista's portfolio. The program had a 32% decrease in savings relative to the 53,751 therms achieved in PY 2018, despite adding 3,712 therms from water heating measures in the Multifamily Direct Install program, which was new for 2019. The reduction in savings relative to PY 2018 results from a drop in G Tankless Water Heater measures, from 686 units with interim verified savings of 47,472 therms in PY 2018 to 400 units and evaluated savings of 31,200 therms in PY 2019. Figure 13 illustrates the trend in savings of the Residential Natural Gas Water Heating program between PY 2014 and PY 2019.

Figure 13. PY 2014 to PY 2019 Washington Residential Natural Gas Water Heating Program Savings Trends



For the purpose of comparing the PY 2014 to PY 2018 trend analysis data, the savings for PY 2014 are unverified gross; PY 2015, PY 2017, and PY 2019 are verified gross; and PY 2016 and PY 2018 are interim verified gross.

Low-Income Sector

Avista relies on five network Community Action Agencies ("Agencies") and one tribal weatherization organization to deliver energy efficiency programs for Low-Income residential customers in its Washington service territory. The Agencies have resources to qualify income and to prioritize and treat customers' homes based on a variety of characteristics. In addition to Avista's annual funding, the Agencies have other monetary resources they can access to weatherize a home or install other energy efficiency measures. The Agencies have either in-house or contract crews who install the eligible program measures.

Low-Income Program Changes

In PY 2019, Avista continued to reimburse the Agencies for 100% of the cost of installing most of the energy efficiency measures defined on the Approved Measure List and deemed cost-effective in Avista's *Annual Conservation Plan*. Measures listed in Washington's *Weatherization Manual* priority list are deemed cost-effective for the Agencies to install and will be 100% funded by Avista regardless of the TRC test result.[5] Measures that do not meet the cost-effectiveness test are listed on the Qualified Rebate List and are offered a partial reimbursement, equal to the avoided cost energy value of the

[5] Washington State Legislature. Filed March 12, 2015, effective April 12, 2015.*Conservation Cost Recovery Adjustment.* "Section 10. Statutory Authority: RCW 80.01.040, 80.04.160, and 19.285.080." WSR 15-07-043 (Docket UE-131723, General Order R-578), § 480-109-130.

improvement. This approach directs the agency toward installing measures that are most cost-effective, from the utility perspective, but that still offer an opportunity to fund other measures if needed. To allow for additional flexibility, the agency may also choose to use its health and safety allocation to fully fund the cost of the measures on the Qualified Rebate List.

Table 22 show's Avista's Approved Measure List. In PY 2019, Avista added ENERGY STAR refrigerators and removed electric-to-natural-gas conversion water heaters

Table 22. PY 2019 Low-Income Program Approved Measure List

Electric Measures	Natural Gas Measures
• Air infiltration • Air source heat pump • Attic insulation • Duct insulation • Duct sealing • Electric to air source heat pump • Electric to natural gas water heater • Electric to ductless heat pump (9.0 heating seasonal performance factor) • ENERGY STAR door • ENERGY STAR refrigerator • ENERGY STAR window • Floor insulation • Heat pump water heater (Tier 1; 0 to 55 gallon) • LED lighting • Wall insulation	• Air infiltration • Attic insulation • Duct insulation • Duct sealing • ENERGY STAR door • ENERGY STAR window • Floor insulation • High-efficiency furnace (90% annual fuel utilization efficiency) • High-efficiency tankless natural gas water heater (0.67 energy factor for storage; 0.82 energy factor for tankless)

The qualified rebate lists include the remaining measures (shown in Table 23) receiving partial reimbursement equal to the value of their avoided cost of energy saved.

Table 23. PY 2019 Low-Income Program Qualified Rebate List

Measure Category	Measure Name	PY 2018 (Per Installation)	PY 2019 (Per Installation)
Electric Measures	Electric to Natural Gas Furnace and Water Heater Conversion	$586.78	$4,723.34
	Electric to Natural Gas Water Heater	N/A	$562.04
Natural Gas Measures	Tankless Natural Gas Water Heater (0.82 energy factor)	N/A	$573.00
	Natural Gas Boiler	N/A	$894.11

PY 2019 Program Details

Individually, each agency's annual contract allows the agency to spend its allotted funds on either natural gas or electric efficiency measures at its discretion and to charge a 15% administration fee toward the cost of each measure. In addition, up to 15% of the agency's annual funding allocation may be used toward health and safety improvements in support of the energy efficiency measures installed in the home. Low-Income program participation and electric and natural gas savings details for PY 2019 are shown in Table 24 and Table 25, respectively.

Table 24. PY 2019 Electric Low-Income Measures Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Kilowatt-Hour Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
E Energy Star Refrigerator	1	$684	39	0	$34	$0	$0	$13
LED Bulbs	230	$1,611	1,984	0	$1,372	$0	$2,460	$506
E To Heat Pump Conversion	2	$12,393	11,731	0	$14,094	$46	$0	$5,193
E INS - Wall	7,010	$17,300	7,857	0	$24,509	$140	$0	$9,031
E Air Infiltration	37,482	$60,342	57,312	0	$68,856	$375	$0	$25,372
E INS - Attic	24,821	$61,507	34,520	0	$107,683	$496	$0	$39,678
E Energy Star Doors	51	$38,154	13,685	0	$36,773	$0	$13,529	$13,550
E Duct Sealing	5	$29	4,275	0	$5,136	$0	$3,013	$1,893
E Ductless Heat Pump	9	$49,762	18,733	0	$16,397	$351	$0	$6,042
E HE Air Heat Pump	2	$15,614	125	0	$150	$0	$0	$55
E Energy Star Windows	1,469	$55,014	14,986	0	$46,749	$279	$0	$17,226
E INS - Floor	32,360	$133,772	27,369	0	$85,376	$324	$0	$31,459
E INS - Duct	304	$1,284	1,010	0	$3,151	$0	$753	$1,161
E To G Furnace Conversion	55	$345,111	192,280	0	$231,011	$0	$0	$85,121
E To G H20 Conversion	23	$72,540	36,478	0	$22,268	$0	$0	$8,205
E LED Giveaway	20,591	$0	205,910	0	$6,165	$0	$0	$15,734.37
Total	**124,415**	**$865,118**	**628,294**	**0**	**$669,724**	**$2,011**	**$19,755**	**$260,238**

Table 25. PY 2019 Natural Gas Low-Income Measures Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Therm Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
G Air Infiltration	105	$251,981	0	1,358	$8,937	$0	$0	$961
G Duct Sealing	13	$16,034	0	189	$1,595	$0	$0	$172
G Energy Star Doors	135	$121,520	0	1,253	$17,882	$0	$15,289	$1,923
G Energy Star Windows	6,829	$306,928	0	2,957	$45,598	$44	$0	$4,904
G HE Boiler	1	$1,028	0	104	$875	$0	$1,827	$94
G HE Furnace	42	$193,830	0	2,894	$24,393	$0	$0	$2,623
G HE WH 50G	4	$12,921	0	20	$115	$0	$0	$12
G INS - Attic	76,546	$185,461	0	7,346	$113,269	$0	$0	$12,182
G INS - Duct	2,267	$9,443	0	65	$1,002	$0	$5,745	$108
G INS - Floor	60,080	$196,043	0	3,018	$46,535	$0	$0	$5,005
G INS - Wall	31,528	$77,931	0	1,606	$24,764	$0	$0	$2,663
G Tankless Water Heater	2	$320	0	133	$1,114	$0	$312	$120
Total	**177,552**	**$1,373,441**	**0**	**20,943**	**$286,078**	**$44**	**$23,173**	**$30,768**

Customer Outreach

PY 2019 energy efficiency outreach strategies incorporated both broad-reaching and targeted communication, as well as attendance at local community events. Energy efficiency was featured throughout the year in Avista's "Connections" monthly newsletter, which was distributed as a bill insert and posted online.

Residential Customer Outreach

Avista's residential customer outreach included the popular "Efficiency Matters" promotion that ran April 15 through June 2, 2019. During the six-week contest, television viewers could watch any KREM newscast for Avista's energy efficiency word-of-the-day and enter it on the KREM website for a chance to win a new Toyota Prius All-Wheel Drive. The television commercials—which featured energy efficiency tips and promoted Avista rebates—delivered over 2.5 million impressions. Campaign tactics also included bill inserts, digital advertising (over 4 million impressions), and social media (more than one million impressions). The final event included live news coverage by KREM-TV.

In fall of PY 2019, Avista ran the "Way to Save" advertising campaign to increase awareness of energy efficiency and drive customer engagement (September 23 through November 17, 2019). Three new television commercials highlighted rebates, energy-saving tips, and lowered emissions due to Avista customers' efforts to save energy. The broadcast advertising schedule delivered over 4.8 million impressions. Avista also utilized digital advertising and social media throughout the campaign to extend reach and reinforce messaging. The digital advertising for the Washington state service territory garnered nearly 18 million impressions and over 65,000 clicks that directed customers to myavista.com. Search engine marketing reached over 166,000 customers who were actively seeking information online. The campaign successfully drove website traffic—visits to Avista's Rebates Overview page increased 716 percent, traffic to the Energy Saving Advice page spiked by 894 percent, and visits to the Washington Rebates page increased by 99 percent.

As temperatures changed, Avista provided summer and winter weather energy efficiency tips to customers and local media outlets. Additionally, Avista produced and distributed a bill insert to highlight energy efficiency achievements for Washington's Energy Independence Act.

The total energy efficiency expenditures related to residential marketing communications were approximately $413,000 for Washington.

Low-Income Customer Outreach

Together with its energy efficiency efforts, Avista's outreach programs provided conservation education and outreach to low-income, senior, and vulnerable customers in PY 2019. Avista made contact with the target populations through workshops, energy fairs, mobile, and general outreach. Each method of outreach included demonstrations and the distribution of low- to no-cost materials focused on energy efficiency; these materials included conservation tips and measures as well as information on energy assistance available through various agencies. The goal for both low-income and senior customer

outreach was to increase awareness of energy assistance programs such as Avista's Low-Income Rate Assistance program (LIRAP), Low-Income Home Energy Assistance program (LIHEAP), and Project Share.

Several activities proved effective for delivering energy efficiency and conservation education and outreach:

- Energy conservation workshops for groups of Avista customers where the primary target audiences were senior and low-income customers.
- Energy fairs where attendees received information about low- to no-cost methods for weatherizing their home through demonstrations and samples.
- Energy fair education on billing assistance and demonstrations of the online account and energy management tools. Community partners were invited, at no cost, to host a booth to provide information about their services for low-income populations and how to access them.
- Mobile outreach conducted through the Avista Energy Resource Van where visitors learned effective tips to manage their energy use, bill payment options, and community assistance resources.
- General outreach provided energy management information and resources at events (such as resource fairs) and through partnerships that reach Avista's target populations. General outreach included bill payment options and assistance resources in senior and low-income publications.

In PY 2019, Avista participated in 139 events including workshops, energy fairs, mobile outreach events, and general outreach partnerships and events reaching nearly 10,400 customers in Washington. Table 26 shows an overview of different activities by type.

Table 26. PY 2019 Washington Low-Income Outreach Event and Bulb Giveaway Summary

Description	Number of Events/Activities	Contacts	LEDs
Energy Fairs	3	3,101	6,202
General Outreach	37	2,289	4,355
Mobile Outreach	55	3,602	7,356
Workshops	44	1,401	2,945
Total	**139**	**10,393**	**20,858**

Similar to PY 2018, Avista found events like energy fairs and workshops to be effective outreach methods for generating program interest; energy assistance generated the majority of interest for the Low-Income program in PY 2019.

Nonresidential Customer Outreach

To complement its residential outreach, Avista continued to build awareness of Nonresidential energy efficiency programs through flyers and electronic newsletters to commercial customers. Avista updated its website and program material to further promote communication and outreach.

Expenditures related to Nonresidential outreach were approximately $14,500 for Washington.

Avista launched the Business Partner program in August 2019. Through December 2019, Avista reached 1,104 small businesses in 10 rural communities, performed 11 audits, and completed an LED direct install of 113 lamps for a total of 15,056 kWh savings. Outreach efforts included mail, email, telephone calls, and customer site visits.

Evaluation, Measurement, and Verification

Avista retained Cadmus to provide impact and process evaluations for the PY 2018 and PY 2019 electric and natural gas programs. As in past reporting periods, Avista has continued to use a portfolio-wide approach for evaluations to provide a comprehensive benchmark to compare against future years.

Impact Evaluation Summary

In PY 2019, Cadmus finalized impact evaluation activities to determine biennial evaluated savings for the PY 2018 and PY 2019 evaluation cycle. More details on the impact evaluations can be found in *Appendix B* and *Appendix C*.

Impact Evaluation Methodology and Activities

Table 27 shows the variety of methods and activities Cadmus completed in conducting the Washington electric and natural gas portfolio evaluations.

Table 27. PY 2019 Program Evaluation Activities

Sector	Program Type	Document/ Database Review	Verification/ Metering Site Visit	Billing Analysis
Nonresidential	Prescriptive (multiple)	✓	✓	--
	Site Specific	✓	✓	✓
Residential	Simple Steps, Smart Savings	✓	--	--
	HVAC	✓	--	✓
	Shell	✓	--	✓
	ENERGY STAR Homes	✓	--	--
	MFDI	✓	--	✓
	Multifamily Direct Install Supplemental Lighting	✓	--	--
Low-Income	Low-Income	✓	--	✓
Fuel Efficiency	Site Specific (Nonresidential)	✓	✓	--
	Residential	✓	--	✓
	Low-Income	✓	--	✓

Nonresidential Impact Evaluation Methodology

As the first step in evaluating biennial savings for the Nonresidential sector, Cadmus explored several documents and data records to gain an understanding of the programs and measures for evaluation:

- Avista's annual business plans, detailing processes and energy savings justifications
- Project documents from external sources (such as customers, program consultants, or implementation contractors)

Based on the initial review, Cadmus checked the distribution of program contributions within the overall portfolio. This review provided us with insight into the sources for unit energy savings claimed for each measure offered in the programs, along with sources for energy-savings algorithms, internal quality assurance, and quality control processes for large Nonresidential sector projects.

Following this review, Cadmus designed a sample strategy for impact evaluation activities. Cadmus performed many evaluation activities in each of four waves:

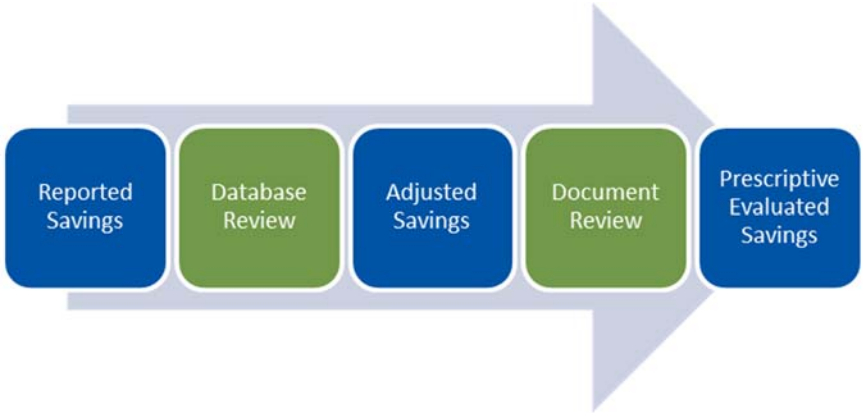
- Selected an evaluation sample and requested project documentation from Avista
- Reviewed project documentation
- Prepared on-site measurement and verification plans
- Performed site visits and collected on-site data (such as trend data, photos, and operating schedules)
- Used site visit findings to calculate biennial evaluated savings by measure
- Applied realization rates to the total reported savings population to determine overall biennial evaluated savings

Residential Impact Evaluation Methodology

To determine the Residential sector's biennial evaluated savings for PY 2018 and PY 2019, Cadmus employed a combination of three impact evaluation methods: database review, document review, and billing analysis.[6]

First, Cadmus calculated adjusted savings for each program based on results of a database review. For the HVAC, Shell, and Fuel Efficiency programs, Cadmus also applied realization rates from the document reviews. For these programs, Cadmus calculated prescriptive evaluated savings by multiplying adjusted savings by the document review realization rate, as shown in Figure 14. With programs without document reviews conducted, adjusted savings were considered prescriptive evaluated savings.

Figure 14. PY 2019 Residential Prescriptive Impact Process



To provide the most rigorous evaluation method, where practical Cadmus analyzed consumption data for all available participants of the HVAC, Shell, Fuel Efficiency, and MFDI (electric impact evaluation

[6] With approval from Avista, Cadmus ceased performing a fourth impact activity—verification surveys—in Q3 PY 2018; this eliminated redundancy between verification surveys and document reviews.

only) programs. Cadmus applied billing analysis results to determine evaluated savings only for measures where savings could be isolated (that is, where a sufficient number of participants could be identified who installed only that measure) and where confidence and precision met specific targets. Program-level realization rates for the HVAC, Shell, and Fuel Efficiency programs incorporate billing analysis results for some measures.

Low-Income Impact Evaluation Methodology

Cadmus designed the Low-Income program impact evaluation to verify reported program participation and energy savings. Evaluation methods included database review and billing analysis. The team used unit energy savings values provided in the Avista technical reference manual to calculate savings for measures reported in the measure tracking database. Cadmus labeled savings calculated during the database review as *adjusted savings*.

For many measures reported in the tracking database, notes indicated that savings were capped at 20% of consumption. When duplicating savings calculations using technical reference manual values, Cadmus used the newly calculated value if it was less than the capped value, and used the capped value where the technical reference manual value indicated greater savings.

Cadmus conducted billing analysis for the Low-Income program using all electricity consumption data available from Avista for PY 2018 and PY 2019 program participants. Because of the relatively small number of Low-Income program participants, Cadmus was unable to isolate measure-level savings for the program (which are necessary for cost-effectiveness calculations). However, the billing analysis did provide reliable savings estimates for the program as a whole.

Fuel Efficiency Impact Evaluation Methodology

Cadmus' impact methodology for Fuel Efficiency program measures followed the same processes as described above for the parent program (Nonresidential Site Specific path), as well as the Residential and Low-Income programs.

Summary of Impact Evaluation Results

Overall, the Washington electric portfolio achieved a 99% realization rate and acquired 41,740,749 kWh in PY 2019 evaluated savings (Table 28). The Washington natural gas portfolio achieved an 85% realization rate and acquired 504,113 therms in annual gross savings (Table 29).

Table 28. PY 2019 Reported and Evaluated Electric Savings

Sector	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Nonresidential	26,503,089	25,433,281	96%
Residential	15,453,277	15,907,932	103%
Low-Income	390,351	399,536	102%
Total	**42,346,717**	**41,740,749**	99%

Table 29. PY 2019 Reported and Evaluated Natural Gas Savings

Sector	Reported Savings (therms)	Evaluated Savings (therms)	Realization Rate
Nonresidential	94,946	85,567	90%
Residential	476,509	397,602	83%
Low-Income	19,958	20,943	105%
Total	**591,413**	**504,113**	85%

Note: Totals may not sum due to rounding.

Cadmus collected the Avista reported savings through database extracts from Avista's Customer Care and Billing (residential), InforCRM (Nonresidential), and iEnergy databases and data provided by third-party implementers.

Summary of Process Evaluation Results

Cadmus conducted process evaluation activities for PY 2019 focused on four fundamental objectives:

- Assess program delivery channel and marketing methods
- Assess participant and market actor program journeys including participation barriers, satisfaction levels, and rebate levels' effectiveness
- Assess Avista and implementer staff experiences including organizational structures, communication levels, and program processes
- Document program successes, challenges, and changes

The PY 2019 evaluation included all Avista programs except the Nonresidential Grocer, Residential ENERGY STAR Homes, and third-party Community Energy Efficiency programs. Cadmus conducted the evaluation by completing a document and database review; interviewing program and implementation staff, community action agencies, and trade allies; and surveying participants.

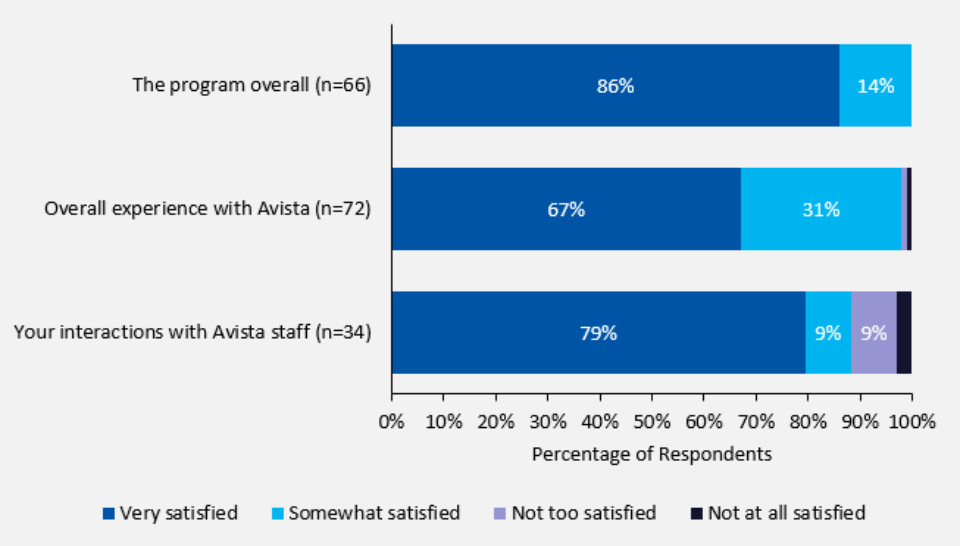
Almost two-thirds of Nonresidential survey respondents have previously participated in an Avista business energy efficiency program. Though participants were highly satisfied with the program, a small number indicated some dissatisfaction. All Site Specific survey respondents (n=19) and 98% of Prescriptive survey respondents (n=83) expressed satisfaction with the program overall. In PY 2019, this satisfaction increased for Prescriptive survey respondents over PY 2018 respondents (98% and 91%, respectively). For the Site Specific program, the top participation challenge was lack of program awareness. Prescriptive survey respondents listed their top challenges as identifying eligible measures and learning about the program. Lighting participants said using the DLC list or the ENERGY STAR–certified products list proved difficult.

The Residential program delivery was smooth, per both Avista and implementer staff, and except for small changes to the rebate levels, the HVAC, Shell, and Fuel Efficiency programs were delivered and performed as expected. Residential survey respondents' satisfaction levels ranged from 88% to 100%[7]

[7] The combination of *very satisfied* and *somewhat satisfied* responses.

with the three elements shown in Figure 15. From PY 2018 to PY 2019, the program overall showed the largest increase in *very satisfied* responses (from 74% to 86%) and interactions with Avista staff showed the largest decrease in *very satisfied* responses (from 87% to 79%).

Figure 15. PY 2019 Satisfaction with Avista and Residential Programs Overall



Source: Residential Program Participant Survey Question C1. "How would you rate your overall experience with..."

Respondents were least often *very satisfied* with the rebate amount. Lower satisfaction with rebates—as customers self-reported via the survey—occurs commonly among prescriptive rebate programs; hence, Cadmus does not find this result unusual. From PY 2018 to PY 2019, however, the rebate amount received the largest increase in *very satisfied* responses (from 42% to 60%). The rebate application process experienced the largest decrease in *very satisfied* responses (from 85% to 73%).

Cadmus also evaluated the MFDI program. According to Avista and implementer staff, the program was delivered smoothly and as expected. Cadmus identified four success areas of the MFDI program through interviews with Avista, the implementer, and participating property managers:

- ***Surpassing savings goals*** midway through PY 2019 allowed for the development of increased goals in PY 2020.
- ***High customer interest,*** generated through positive word-of-mouth and referrals, generated sufficient support for the program overall.
- ***High property manager satisfaction*** levels with direct install measures and the supplemental lighting phase led to high program satisfaction levels and some spillover effects, in which property managers pursued other energy-saving opportunities.
- ***Collaborative relationships*** between Avista and the program implementer allowed the program to run smoothly in PY 2018 and PY 2019.

Generation and Distribution Efficiency

This section describes Avista's Generation and Distribution activities, including the Grid Modernization and LED Streetlight Change-Out programs.

Generation

Avista did not complete any efficiency projects at its generation facilities in PY 2019.

Distribution

During PY 2019, Avista's Grid Modernization program led to a completed upgrade of three Washington feeders with annual savings of 481 MWh. Avista created the Grid Modernization program, which officially started in PY 2013, to provide a thorough examination of its electric distribution circuits to programmatically address the facilities' upgrades and modernization. Avista is focused on selecting and improving the worst performing feeders that have the most opportunity for improvement in the areas of reliability and energy efficiency. This includes the identification, prioritization, selection, and engineering analysis of the distribution circuits. For the Grid Modernization program, Avista performs a comprehensive inventory of each electric feeder on the system to appropriately prioritize and select the candidate feeders for the program. Avista then uses the feeder criteria information to rank the potential benefits for each circuit compared with all the distribution feeders on the system.

Avista initially optimized Grid Modernization at a cycle interval of 60 years, meaning that over 60 years the program would rebuild every feeder in the distribution system. Avista selected this interval since it is related to the average life span of the company's distribution infrastructure as well as to the 20-year interval cycle time for the Wood Pole Management (WPM) program. These two programs are integrated in several important ways. Grid Modernization relies on the inspection data from WPM for its asset condition assessment and targets the timing of feeder rebuilds to optimize the value of wood pole inspections and follow-up already performed. WPM relies on the poles inspected for Grid Modernization as contributing to the total number of poles that WPM inspectors must inspect annually to remain on the 20-year inspection cycle. Further, Grid Modernization integrates activities of other operational programs beyond WPM, including the transformer change-out program, vegetation management program, various budgeted maintenance programs, and segment reconductor and feeder tie program.

Through the Grid Modernization program, Avista aims to accomplish a comprehensive modernization approach from both an energy efficiency and reliability perspective. The program has several targeted criteria: reliability index analysis, peak loading study, load balancing, high loss conductors, feeder reconfiguration or relocation, primary trunk and lateral conductor analysis, feeder tie location and opportunities, voltage quality study, voltage regulator settings, fuse coordination and sizing analysis, distribution line loss assessment, transformer core losses, power factor analysis, power factor correction, distribution automation deployment, open wire secondary analysis, existing pole analysis, underground facilities, and vegetation management. With approximately 350 feeders in its system and a targeted 60-year life cycle, Avista should complete almost six Grid Modernization feeders each year when staffed and funded appropriately. So far, Avista has worked on 22 Grid Modernization feeders

(which are in varying forms of design, construction, or completion). Figure 16 shows the Grid Modernization plan by feeder and identifies the program results and plans that extend through PY 2023.

Figure 16. PY 2019 Grid Modernization Plan by Feeder

Feeder	State	Construction Start Date	Construction End Date	Baseline Report Date	Baseline Report Version	Estimated Annual Pri. Reconductor MWh Savings	Estimated Annual Transformer Loss MWh Savings	Total Estimated Annual MWh Savings[3,4,5]
9CE 12F4	WA	-	2009	Annual MWh Energy Savings were not estimated or documented at this time[1]				
BEA 12F1	WA	2012	2012	Annual MWh Energy Savings were not estimated or documented at this time[2]				
F&C 12F2	WA	2012	2012	Annual MWh Energy Savings were not estimated or documented at this time[2]				
BEA 12F5	WA	2013	2013	Annual MWh Energy Savings were not estimated or documented at this time[2]				
CDA 121	ID	2012	2013	Annual MWh Energy Savings were not estimated or documented at this time[2]				
WIL 12F2	WA	2013	2015	Annual MWh Energy Savings were not estimated or documented at this time[2]				
OTH 502	WA	2015	2015	Annual MWh Energy Savings were not estimated or documented at this time				
M23 621	ID	2014	2015	3/20/2015	Version 4	412.6	163.2	575.8
RAT 231	ID	2014	2015	3/17/2015	Version 3	0.0	148.7	148.7
WAK 12F2	WA	2015	2016	3/3/2015	Version 7	40.3	135.3	175.6
MIL 12F2	WA	2016	2017	3/10/2015	Version 4	21.0	164.8	185.8
SPI 12F1	WA	2015	2019	4/1/2015	Version 2	31.6	83.2	114.8
RAT 233	ID	2016	2019	3/17/2015	Version 5	90.3	381.4	471.7
SPR 761	WA	2017	2019	9/17/2015	Version 3	49.9	55.7	105.6
ORO 1280	ID	2017	2017	10/19/2015	Version 1	3.5	108.2	111.7
TUR 112	WA	2017	2018	5/6/2016	Version 2	140.1	92.7	232.8
PDL 1201	WA	2017	2017	5/27/2016	Version 2	23.5	165.5	189.0
MIS 431	ID	2018	2023	8/22/2006	Version 1	128.8	128.3	257.1
F&C 12F1	WA	2018	2019	11/16/2016	Version 1	1.8	258.5	260.3
HOL 1205	ID	2018	2018	3/30/2017	Version 1	0	65.5	65.5
BEA 12F2	WA	2019	2020	10/13/2017	Version 1	8.8	260.5	269.3
M15 514	ID	2020	2023	4/30/2018	Version 1	0	245.6	245.6
SIP 12F4	WA	2020	2022	12/14/2018	Version 1	10.5	272.8	283.3
ROS 12F5	WA	2021	2021	5/31/2019	Version 1	6.1	145.9	152.1
ROS 12F4	WA	TBD	TBD	TBD	Version 1	TBD	64.1	TBD
ORO 1282	ID	TBD	TBD	TBD	Version 1	TBD	TBD	TBD

LED Streetlight Change-Out

In PY 2019, Avista's LED Streetlight Change-Out program successfully converted 1,852 high-pressure sodium streetlights to LED technology, resulting in an energy savings of 137 MWh in Washington.

Avista manages streetlights for many local and state government entities to provide street, sidewalk, and highway illumination by installing overhead streetlights. The primary driver for converting overhead streetlights from high-pressure sodium to LED is the significant improvement in energy savings, lighting quality, and resource cost savings. Over the five-year program, Avista changed out over 26,000 streetlights by end of PY 2019. Table 30 shows the distribution efficiency savings by program.

Table 30. PY 2019 Distribution Efficiency Savings by Program

Program	Washington Savings (MWh)	Idaho Savings (MWh)	Total Savings (MWh)
Grid Modernization	481	472	952
LED Streetlight Change-Out	137	246	383
Total	**618**	**718**	**1,335**

In PY 2018, Avista made the decision to modify the change-out strategy from a program approach to a "burn-out" only approach. The burn-out only approach dramatically slows the change-out rate;

however, nearly all the streetlights are converted to LED. Replacing burned out streetlights to LEDs is estimated to last past PY 2023, with hundreds being completed each year rather than thousands.

Regional Market Transformation

Avista's local energy efficiency portfolio consists of programs and supporting infrastructure designed to enhance and accelerate the saturation of energy efficiency measures through a combination of financial incentives, technical assistance, program outreach, and education. It is not feasible for Avista to independently have a meaningful impact upon regional or national markets.

Consequently, utilities in the Northwest have cooperated through NEEA to address opportunities that are beyond the ability or reach of individual utilities. Avista has been participating in and providing funding to NEEA since NEEA's founding in 1997.

Table 31 shows the PY 2019 NEEA forecast savings versus actual savings and the associated costs for Washington. Please note that forecast and actual savings include savings from program measures and Codes and Standards measures.

Table 31. PY 2019 Washington Forecast versus Actual Savings and Associated Costs

Fuel Type	NEEA Energy Savings PY 2019 Forecast	PY 2019 NEEA Final Reported Energy Savings	PY 2019 Costs (Avista Financials)	Avista Current Funding Share (Washington and Idaho Combined)
Electric	5,080 MWh (0.58 aMW)	5,548 MWh (0.63 aMW)	$1,492,123	5.77%
Natural Gas	N/A	N/A	$352,410	15.63%

Table 32 shows the NEEA forecast savings versus actual savings for the PY 2018 to PY 2019 biennium.

Table 32. PY 2018 and PY 2019 Northwest Energy Efficiency Alliance Biennium Forecast versus Actual Savings

PY 2018 to PY 2019 Biennium	NEEA Energy Savings Biennium Forecast	NEEA Energy Savings PY 2018 to PY 2019
Total	9,899 MWh (1.13 aMW)	10,778 MWh (1.23 aMW)

Avista Electric Energy Savings Share

All the values provided in this report represent the electric energy savings allocated to the Avista service territory, as a combination of site-based energy savings data (where available) or an allocation of savings based on funding share. When the funding share allocation approach is applied, the funding share for Avista is split 70% Avista Washington and 30% Avista Idaho. The share of total current funding is noted in Table 31 above. The funding share for Avista varies by funding cycle and within cycle if the funding composition changes.

Avista Natural Gas Energy Savings Share

The natural gas PY 2015 through PY 2019 business plan does not forecast energy savings in the short term within this cycle. Avista focused the business plan on developing the portfolio of initiatives that will deliver savings in future years (anticipated in PY 2019 or later).

PY 2019 Costs

NEEA's annual costs do not map directly to Avista's annual energy savings for a given year. Because of NEEA's efforts to transform the market, the energy savings investments are heavy upfront and the return (in the form of energy savings) lags by a few years or more. Approximately 68% of the regional energy savings delivered in PY 2019 was from initiatives for which the investment period was PY 2010 through PY 2014. The current investment period has a forecasted energy stream that extends beyond PY 2019.

NEEA's costs include all costs for operations and value delivery:

- Energy savings initiatives
- Investments in market training and infrastructure
- Stock assessments, evaluations, data collection, and other regional and program research
- Emerging technology research and development
- All administrative costs

Avista's criteria for funding NEEA's electric market transformation portfolio calls for the portfolio to deliver incrementally cost-effective resources beyond what could be acquired through Avista's local portfolio alone. Avista has historically communicated to NEEA the importance of NEEA delivering cost-effective resources to Avista's service territory. Avista believes that NEEA will continue to offer cost-effective electric market transformation in the foreseeable future. Avista will continue to be active in the organizational oversight of NEEA, which will be critical to ensuring that geographic equity, cost-effectiveness, and resource acquisition continue to be primary areas of focus.

Energy Efficiency Expenditures

During PY 2019, Avista incurred over $21.5 million in costs for operating electric and natural gas energy efficiency programs in Washington, with $16.3 million for electric energy efficiency and $5.2 million for natural gas energy efficiency. Of this amount, $1.9 million was contributed to NEEA to fund regional market transformation ventures.

Avista returned 65% of expenditures to ratepayers in the form of incentives or direct benefit to customers through direct install programs. During PY 2019, Avista spent approximately $337,823, or 2%, on evaluation in an effort to continually improve program design, delivery, and cost-effectiveness.

Evaluation, as well as other implementation expenditures, can be directly charged to the appropriate state(s) or segment(s). In cases where the work benefits multiple states or segments, these expenditures are charged to a general category and allocated based on avoided costs for cost-effectiveness purposes.

The expenditures listed in Table 33 and Table 34 represent actual payments incurred in PY 2019 for electric and natural gas fuel types, respectively, and often differ from the *Cost-Effectiveness* section, where all benefits and costs associated with projects completed in PY 2019 are evaluated, in order to provide matching of benefits and expenditures, which results in a more accurate assessment of cost-effectiveness.

Table 33. PY 2019 Washington Electric Energy Efficiency Expenditures

Segment	Incentives and Direct Benefits to Customers	Implementation	Pilots	Evaluation and Community Action Agencies	NEEA	Total
Residential	$4,469,235	$1,133,734	$46,806	$0	$0	**$5,649,775**
Low-Income	$1,200,218	$246,776	$0	$0	$0	**$1,446,993**
Nonresidential	$4,942,916	$449,954	$0	$0	$0	**$5,392,870**
Regional	$0	$0	$0	$0	$1,566,717	**$1,566,717**
General	$0	$1,950,627	$0	$282,424	$0	**$2,233,051**
Total	**$10,612,369**	**$3,781,090**	**$46,806**	**$282,424**	**$1,566,717**	**$16,289,405**

Table 34. PY 2019 Washington Natural Gas Energy Efficiency Expenditures

Segment	Incentives and Direct Benefits to Customers	Implementation	Pilots	Evaluation and Community Action Agencies	NEEA	Total
Residential	$2,239,247	$74,953	$6,385	$0	$0	**$2,320,584**
Low-Income	$1,828,623	$30,768	$0	$0	$0	**$1,859,392**
Nonresidential	$178,244	$129,658	$0	$0	$0	**$307,902**
Regional	$0	$0	$0	$0	$359,942	**$359,942**
General	$0	$291,148	$0	$55,399	$0	**$346,547**
Total	**$4,246,115**	**$526,527**	**$6,385**	**$55,399**	**$359,942**	**$5,194,368**

Tariff Rider Balances

As of the start of PY 2019, the Washington electric and natural gas (aggregate) tariff rider balances were underfunded by $12.5 million. During PY 2019, Avista collected $26.2 million in tariff rider revenue to fund energy efficiency while expending $21.5 million to operate energy efficiency programs.

During PY 2019, Avista revised its electric DSM tariff rate to address transition of the Fuel Efficiency program to a funding mechanism through natural gas. This rate revision resulted in lower collections through Tariff Schedule 91. Avista will continue to monitor its tariff rider balances to determine if further modifications are necessary.

Table 35 illustrates the PY 2019 tariff rider activity by fuel type.

Table 35. PY 2019 Tariff Rider Activity

	Electric	Natural Gas
Beginning Balance (Underfunded)	($11,894,825)	($645,002)
Energy Efficiency Funding	$21,297,866	$4,930,822
Net Funding of Operations	**$9,403,041**	**$4,285,820**
Energy Efficiency Expenditures	$16,289,405	$5,194,368
Ending Balances (Underfunded)	**($6,886,364)**	**($908,548)**

WAC 480-109-130 provides that "Utilities must file with the Commission for recovery of all expected conservation cost changes and amortization of deferred balances no later than June 1st of each year with a requested effective date at least sixty days after the filing. If the utility believes that a filing is unnecessary, then it must file a request for exception and supporting documents no later than May 1st of each year demonstrating why a rate change is not necessary" (Washington State Legislature 2015). Avista anticipates filing for a request for exception for both its electric and natural gas tariff riders (Schedule 191) in PY 2020 due to uncertainty with COVID-19 impacts on the energy efficiency program.

Comparison of Actual Expenditures to Annual Conservation Plan Budget

For PY 2019 operations, Avista exceeded its estimated electric energy efficiency expenditures by $1.1 million, or 7%, and exceeded its estimated natural gas expenditures by more than $927,170, or 26%. The biggest driver of the expenditure variance is related to the level of incentives from participation in energy efficiency programs and also to the adoption of the MFDI pilot as a full program. The MFDI program is discussed in more detail in the *Program Information* section.

Although the *Annual Conservation Plan* provides an expectation for operational planning, Avista is required to offer incentives for all energy efficiency measures that qualify under Schedules 90 and 190. Since customer incentives are the largest component of expenditures, customer demand can easily impact the funding level of the tariff riders. Table 36 provides detail on the budget compared to actual energy efficiency expenditures by fuel type.

Table 36. PY 2019 Annual Conservation Plan Budget to Actual Expenditures Comparison

	Electric	Natural Gas
PY 2019 *Annual Conservation Plan*		
Incentives Budget	$8,738,638	$2,624,089
Non-Incentives and Labor	$6,447,138	$961,159
Total Budgeted Expenditures	**$15,185,776**	**$3,585,248**
Actual PY 2019 Expenditures		
Incentives and Direct Benefit to Customer	$10,612,369	$3,564,165
Non-Incentives and Labor	$5,677,037	$948,253
Total Actual Expenditures	**$16,289,405**	**$4,512,418**
Variance	**$1,103,630**	**$927,170**

Notes: Budget values are from the PY 2019 *Annual Conservation Plan*. The PY 2019 actual natural gas incentive and direct benefit to customer amount excludes Fuel Efficiency program incentives of $1,030,120. The total actual incentives including the Fuel Efficiency program is $4,246,115 for PY 2019.

The expenditure variance is mainly attributed to the Nonresidential Exterior Lighting program path, which had an initial estimated incentive expenditure of $1,314,465 and an actual expenditure of $3,351,146 during PY 2019. Avista's Site Specific, Nonresidential Interior Lighting, and MFDI program also substantially contributed to the variance. Table 37 illustrates the programs with the highest impact on the expenditure variance.

Table 37. PY 2019 Programs with Highest Impact on Expenditure Variance

Program	Planned[a]	Actual	Variance	Variance Percentage
Site Specific	$2,233,000	$4,002,744	$1,769,744	79%
Nonresidential Exterior Lighting	$1,314,465	$3,351,146	$2,036,681	155%
Nonresidential Interior Lighting	$2,310,263	$3,943,853	$1,633,590	71%
MFDI	$1,246,714	$2,949,681	$1,702,967	137%

[a] Planned values are estimated incentive costs from the PY 2019 *Annual Conservation Plan* with the exception of the MFDI program, which includes the direct benefit to participants.

Conclusion and Contact Information

This *PY 2019 Washington Annual Conservation Report* represents program efforts by Avista to achieve its expected eligible acquisition savings for the PY 2018 to PY 2019 biennium. For additional supporting information, please see the corresponding appendices:

- Appendix A. Washington Biennial Conservation Report (PY 2018 and PY 2019)
- Appendix B. Washington Biennium (PY 2018 and PY 2019) Electric Impact Evaluation
- Appendix C. Washington Biennium (PY 2018 and PY 2019) Natural Gas Impact Evaluation
- Appendix D. Cost-Effectiveness Results for PY 2019 Washington Programs
- Appendix E. PY 2019 Residential Measure Details
- Appendix F. Biennium Process Evaluation
- Appendix G. Department of Commerce Conservation Report
- Appendix H. BCP Conditions Compliance Record

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Appendix A. Washington Biennial Conservation Report (PY 2018 and PY 2019)

This appendix covers Avista's two-year achievement towards its I-937 conservation target.

Appendix B. Washington Biennium (PY 2018 and PY 2019) Electric Impact Evaluation

This appendix provides the full Cadmus biennium (PY 2018 to PY 2019) impact evaluation report for Avista's electric programs in Washington.

Appendix C. Washington Biennium (PY 2018 and PY 2019) Natural Gas Impact Evaluation

This appendix provides the full Cadmus biennium (PY 2018 and PY 2019) impact evaluation report for Avista's natural gas programs in Washington.

Appendix D. Cost-Effectiveness Results for PY 2019 Washington Programs

This appendix provides the full cost-effectiveness results for Avista's PY 2019 programs. Avista judges the effectiveness of the energy efficiency portfolio based upon a number of metrics. Two of the most commonly applied metrics are the Total Resource Cost test (TRC), a benefit/cost test encompassing the entire utility ratepayer population, and the Utility Cost Test (UCT), a benefit/cost test from the perspective of the utility. The additional metrics included in the tables below are the Participant Cost Test (PCT) and the Ratepayer Impact Measure (RIM).

Benefit/cost ratios in excess of 1.00 indicate that the benefits exceed the costs.

Washington Portfolio Cost-Effectiveness

Table 38 and Table 39 present cost-effectiveness results for Washington PY 2019 programs by fuel. The TRC benefit/cost ratios for the electric and natural gas portfolios are 1.44 and 0.52, respectively.

Table 38. Washington Electric Portfolio Cost-Effectiveness

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$39,107,564	$27,237,479	1.44
UCT	$35,552,331	$19,371,855	1.84
PCT	$68,085,863	$20,994,947	3.24
RIM	$35,552,331	$74,068,273	0.48

Table 39. Washington Natural Gas Portfolio Cost-Effectiveness

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$4,624,618	$8,817,901	0.52
UCT	$4,204,198	$3,890,728	1.08
PCT	$8,474,483	$7,960,082	1.06
RIM	$4,204,198	$9,332,302	0.45

The following sections contain cost-effectiveness results for Washington PY 2019 programs by sector.

Nonresidential Cost-Effectiveness Results

Table 40 and Table 41 show Nonresidential sector cost-effectiveness results by fuel.

Table 40. Washington Nonresidential Electric Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$19,658,208	$12,659,898	1.55
UCT	$17,871,098	$7,265,762	2.46
PCT	$36,618,300	$10,996,267	3.33
RIM	$17,871,098	$38,223,311	0.48

Table 41. Washington Nonresidential Natural Gas Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$606,137	$1,222,193	0.50
UCT	$551,033	$497,655	1.11
PCT	$702,977	$919,262	0.76
RIM	$551,033	$1,005,908	0.55

Residential Cost-Effectiveness Results

Table 42 and Table 43 show residential sector cost-effectiveness results by fuel.

Table 42. Washington Residential Electric Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$18,712,659	$13,551,321	1.38
UCT	$17,011,509	$10,834,822	1.57
PCT	$29,713,299	$9,200,723	3.23
RIM	$17,011,509	$33,869,678	0.58

Table 43. Washington Residential Natural Gas Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$3,703,796	$6,543,459	0.57
UCT	$3,367,087	$1,822,569	1.85
PCT	$5,846,992	$6,019,340	0.97
RIM	$3,367,087	$6,371,111	0.53

Low-Income Cost-Effectiveness Results

Table 44 and Table 45 show Low-Income sector cost-effectiveness results by fuel.

Table 44. Washington Low-Income Electric Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$736,697	$1,026,259	0.72
UCT	$669,724	$1,271,272	0.53
PCT	$1,754,264	$797,958	2.20
RIM	$669,724	$1,975,285	0.39

Table 45. Washington Low-Income Natural Gas Cost-Effectiveness Results

Cost-Effectiveness Test	Benefits	Costs	Benefit/Cost Ratio
TRC	$314,685	$1,052,248	0.30
UCT	$286,078	$1,570,504	0.18
PCT	$1,924,514	$1,021,479	1.88
RIM	$286,078	$1,955,282	0.15

Appendix E. PY 2019 Residential Measure Level Data

This appendix provides more detail for PY 2019 first-year program participation, incentives received, and savings achieved for all the Residential sector programs.

Residential Measure Level Summary Tables

Table 46. PY 2019 Washington Electric Residential HVAC Program Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Kilowatt-Hour Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
E Electric To Air Source Heat Pump	94	$66,511	536,970	0	$575,200	$1,316	$343,254	$165,142
E Electric to Ductless Heat Pump	52	$24,744	118,914	0	$104,086	$2,028	$160,031	$29,883
E Smart Thermostat DIY with Electric Heat	65	$4,065	47,384	0	$30,057	$0	$11,557	$8,629
E Smart Thermostat Paid Install with Electric Heat	62	$5,398	45,197	0	$28,669	$0	$13,140	$8,231
E Variable Speed Motor	1,043	$84,973	1,016,390	0	$1,221,119	$0	$203,777	$350,588
Total	**1,316**	**$185,692**	**1,764,855**	**0**	**$1,959,130**	**$3,344**	**$731,759**	**$562,474**

Table 47. PY 2019 Washington Natural Gas Residential HVAC Program Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Therm Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
G Multifamily Furnace	10	$0	0	1,020	$8,598	$0	$6,820	$1,338.32
G Natural Gas Boiler	41	$14,313	0	4,182	$35,251	$0	$13,649	$5,487.09
G Natural Gas Furnace	2,991	$516,254	0	245,074	$1,711,236	$0	$1,530,428	$266,370.25
G Smart Thermostat DIY with Natural Gas Heat	571	$19,799	0	15,266	$100,459	$0	$117,922	$15,637.45
G Smart Thermostat Paid Install with Natural Gas Heat	1,054	$64,415	0	28,534	$187,769	$0	$250,726	$29,228.11
Total	**4,667**	**$614,780**	**0**	**294,075**	**$2,043,313**	**$0**	**$1,919,546**	**$318,061**

Table 48. PY 2019 Washington Electric Residential Water Heating Program Summary

Measure	Project Count[a]	Incentives	Kilowatt-Hours	Therms	Avoided Kilowatt-Hour Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
Plumbing : Showerhead : Any : 1.50	8	$16	381	0	$173	$0	$0	$50
Plumbing : Showerhead : Any : 2.00	659	$1,354	7,638	0	$3,476	$0	$3,331	$998
Clothes Washers	43	$538	4,669	0	$2,108	$0	$1,828	$605
E Heat Pump Water Heater	161	$33,852	181,697	0	$110,918	$0	$67,444	$31,845
Multifamily Direct Install	18,143	$2,287,130	1,208,464	0	$2,307,706	$0	$68,621	$662,551
Total	**19,014**	**$2,322,890**	**1,402,849**	**0**	**$2,424,380**	**$0**	**$141,224**	**$696,049**

[a] Showerhead project counts are the same for electric and natural gas measures because the savings for each fuel are calculated and apportioned based on the total number of purchased showerheads.

Table 49. PY 2019 Washington Natural Gas Residential Water Heating Program Summary

Measure	Project Count[a]	Incentives	Kilowatt-Hours	Therms	Avoided Therm Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
Plumbing : Showerhead : Any : 1.50	8	$16	0	8	$37	$0	$0	$50
Plumbing : Showerhead : Any : 2.00	659	$1,354	0	167	$747	$0	$3,331	$998
G Tankless Water Heater	405	$32,323	0	31,200	$261,224	$0	$386,852	$0
G 50 Gallon Natural Gas Water Heater	64	$5,303	0	1,338	$7,673	$0	$14,912	$0
Multifamily Direct Install	18,136	$329,129	0	3,732	$21,623	$0	$68,621	$3,366
Total	**19,272**	**$368,126**	**0**	**36,445**	**$291,304**	**$0**	**$473,715**	**$4,414**

[a] Showerhead project counts are the same for electric and natural gas measures because the savings for each fuel are calculated and apportioned based on the total number of purchased showerheads.

Table 50. PY 2019 Washington ENERGY STAR Homes Program Electric Summary

Measure	Project Count	Incentives	Kilowatt -Hours	Therms	Avoided Kilowatt-Hour Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
E Energy Star Home - Manufactured, Furnace	55	$44,917	182,325	0	$203,251	$2,796	$87,135	$58,354
E Energy Star Home - Manufactured, Heat Pump	2	$2,000	6,630	0	$7,391	$102	$2,802	$2,122
E Energy Star Home - Manufactured, Gas & Electric	1	$650	3,315	0	$2,888	$51	$32	$829
Total	**58**	**$47,567**	**192,270**	**0**	**$213,530**	**$2,948**	**$89,969**	**$61,305**

Table 51. PY 2019 Washington ENERGY STAR Homes Program Natural Gas Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Therm Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
G Energy Star Home - Manufactured, Gas & Electric	5	$3,250	16,575	0	$0	$254	$8,755	$0
G Energy Star Home - Manufactured, Natural Gas	1	$650	0	67	$669	$0	$409	$104
Total	**6**	**$3,900**	**16,575**	**67**	**$669**	**$254**	**$9,164**	**$104**

Table 52. PY 2019 Washington Electric Residential Fuel Efficiency Program Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Kilowatt-Hour Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
E Electric To Natural Gas Furnace	263	$426,661	1,931,711	(123,523)	$2,320,813	$8,990	$0	$666,314
E Electric To Natural Gas Furnace & Water Heat	180	$455,133	1,863,655	(98,723)	$2,239,048	$8,581	$752,366	$642,840
E Electric To Natural Gas Wall Heater	14	$3,461	83,733	(5,853)	$100,599	$0	$0	$28,882
E Multifamily Electric to Natural Gas Furnace	10	$3,500	20,833	(2,317)	$25,030	$121	$3,320	$7,186
Total	**467**	**$888,755**	**3,899,933**	**(230,416)**	**$4,685,490**	**$17,692**	**$755,686**	**$1,345,223**

[a] Negative natural gas savings from the Fuel Efficiency program are not accounted for in the total portfolio therm savings.

Table 53. PY 2019 Washington Electric Residential Lighting Program Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Kilowatt-Hour Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
Simple Steps LED	674,512	$502,477	8,103,504	0	$5,870,421	$0	$394,280	$1,685,421
Multifamily Direct Install	112,184	$1,956,426	2,627,255	0	$1,664,201	$0	$0	$477,799
Multifamily Direct Install Supplemental Lighting	3,507	$0	1,511,818	0	$957,642	$0	$0	$274,943
Total	**790,203**	**$2,458,903**	**12,242,577**	**0**	**$8,492,264**	**$0**	**$394,280**	**$2,438,162**

Table 54. PY 2019 Washington Electric Residential Shell Program Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Kilowatt-Hour Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
E Attic Insulation With Electric Heat	34	$14,476	56,551	0	$176,407	$723	$25,385	$50,647
E Floor Insulation With Electric Heat	5	$1,141	2,866	0	$8,941	$33	$3,508	$2,567
E Wall Insulation With Electric Heat	5	$2,206	8,593	0	$26,805	$99	$5,405	$7,696
E Window Replc from Single Pane W Electric Heat	181	$42,395	220,796	0	$688,761	$3,645	$385,769	$197,746
Total	**225**	**$60,218**	**288,806**	**0**	**$900,915**	**$4,499**	**$420,066**	**$258,656**

Table 55. PY 2019 Washington Natural Gas Residential Shell Program Summary

Measure	Project Count	Incentives	Kilowatt-Hours	Therms	Avoided Therm Costs	Non-Energy Benefits	Customer Incremental Cost	Non-Incentive Utility Costs
G Attic Insulation With Natural Gas Heat	201,317	$86,029	0	31,755	$489,652	$0	$344,789	$76,219
G Floor Insulation With Natural Gas Heat	8,088	$1,618	0	510	$7,869	$0	$15,691	$1,225
G Wall Insulation With Natural Gas Heat	39,068	$17,361	0	2,876	$44,344	$0	$68,589	$6,903
G Storm Windows with Natural Gas Heat	660	$865	0	224	$1,884	$0	$5,669	$293
G Window Replc With Natural Gas Heat	93,446	$201,973	0	31,651	$488,051	$0	$1,883,741	$75,970
Total	**342,579**	**$307,846**	**0**	**67,016**	**$1,031,801**	**$0**	**$2,318,479**	**$160,610**

Appendix F. Biennium Process Evaluation

This appendix provides the full Cadmus biennium process evaluation report for Avista's PY 2018 and PY 2019 programs.

Appendix G. Department of Commerce Conservation Report

This appendix includes the Energy Independence Act (I-937) Conservation Report that is submitted to the Department of Commerce.

Appendix H. BCP Compliance Record

This appendix presents Avista's record of compliance with its 2018-2019 Biennial Conservation Plan Conditions.