2023-2024
Washington Home Energy Savings Program
Evaluation, Measurement & Verification Report

Prepared for:

Rocky Mountain Power

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ADM Associates merged with Qualus LLC on June 15, 2025
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Acronyms & Glossary of Terms

The following acronyms and terms are used in this report.

AHRI – Air-Conditioning, Heating, and Refrigeration Institute

Claimed savings – Reported energy savings calculated based on forecasts rather than actual results; used for program and portfolio planning purposes; energy savings included in Pacific Power's annual reports. Used interchangeably with ex-ante savings.

Deemed savings – An estimate of energy savings for an efficiency measure or practice developed from a set of assumptions that reflects an average installation scenario.

Downstream distribution channel – Financial incentives to purchase energy efficient products measures that are offered to customers post purchase by submitting a rebate application. The incentive is paid at the end point, or downstream, in the distribution channel.

EM&V – Evaluation, measurement, and verification

Evaluated savings – Savings estimates that are based on program results rather than forecasts. Used interchangeably with ex-post savings.

Ex-ante savings – Energy savings calculated based on forecasts rather than actual results; used for program and portfolio planning purposes; energy savings included in Pacific Power's annual reports. Used interchangeably with claimed savings.

Ex-post savings – Savings estimates that are based on verified program results rather than forecasts. Used interchangeably with evaluated savings.

HVAC – Heating, ventilation, and air conditioning

kWh – Kilowatt hours

ML – Measure Library

Realization rate – The ratio of evaluated savings to claimed savings (ex-post savings divided by ex-ante savings).

RTF – Regional Technical Forum

Upstream distribution channel – financial incentives are offered through discounts on energy efficient products or services at retail stores. Pacific Power pays incentives to retailers, distributors, or manufacturers who pass incentives on to customers. The incentive is paid at the beginning, or upstream, point in the distribution channel.

UES – Unit energy savings

1 Introduction and Purpose of Study

ADM Associates, Inc. (ADM) is under contract with PacifiCorp to perform evaluation, measurement, and verification (EM&V) services to determine the energy savings (kWh) that resulted from Pacific Power's 2023-2024 Home Energy Savings Program in Washington. This report documents ADM's findings. The purpose of this report is to present ADM's impact evaluation of the energy savings (kWh) that resulted from the program and ADM's process evaluation that considers program operations.

1.1 Description of Programs

The program provides financial incentives (discounts, rebates, and free products) to Pacific Power residential customers to install energy efficient products. The program leverages relationships with manufacturers, distributors, and retailers to ensure effective program implementation and optimize participation. Products included in the program are reported in Table 1-1.

Table 1-1: Quantities Delivered through Home Energy Savings Program

Measure Category	2023	2024	Total
Appliances	**71**	**66**	**137**
Clothes Washer	60	48	108
Heat Pump Clothes Dryer	11	18	29
Building Shell[a]	**207**	**143**	**350**
Attic Insulation	127	85	212
Floor Insulation	17	21	38
Roof/Attic Insulation	21	-	21
Wall Insulation	15	10	25
Window Upgrade	27	27	54
Electronics	**4,288**	**267**	**4,555**
Air Purifier	4,288	267	4,555
HVAC	**3,658**	**3,377**	**7,035**
Central Air Conditioner	28	17	45
Duct Sealing and/or Insulation	1,673	1,903	3,576
Heat Pump - Fuel Switching	38	83	121
Heat Pump - Air Source	500	314	814
Heat Pump - Ductless	356	283	639
Smart Thermostat	1,061	777	1,838
Thermostat	2	-	2
Lighting	**27,930**	**6,318**	**34,248**
LED	27,930	6,318	34,248
Water Heating	**35**	**55**	**90**
Heat Pump Water Heater	35	55	90

Measure Category	2023	2024	Total
Whole Home	**10**	**9**	**19**
New Home - Performance Path	6	-	6
New Homes - Energy Star Manufactured	4	9	13
Total	**36,199**	**10,235**	**46,434**

[a] Building Shell measure quantities are reported as number of projects.

Table 1-2 reports the methods by which the program provides incentives to customers for each measure category.

Table 1-2: Incentive Delivery Method

Measure Category	Incentive Delivery
Appliances	Customer post-purchase rebate application
Building Shell	Customer post-purchase rebate application Trade ally rebate application
Electronics	Customer post-purchase rebate application
HVAC	Customer post-purchase rebate application Trade ally rebate application
Lighting	Direct install Upstream retail sales
Water Heating	Post-purchase rebate application
Whole Homes	Builder rebate application

1.2 Evaluation Objectives

The objective of the impact evaluation is to determine energy savings that resulted from the program. The purpose of the process evaluation is to gain an understanding of the program and its challenges. The evaluation was completed through key staff interviews with Pacific Power and implementation contractors complemented with program documentation review.

2 Impact Evaluation

The 2023-2024 Home Energy Savings program results are reported in Table 2-1 through Table 2-3. Analysis methodology for each measure category is included in subsequent sections.

Table 2-1: Total Program Energy Savings 2023-2024

Measure Category	Qty	Claimed Savings (kWh)	Evaluated Savings (kWh)	Realization Rate	% of Program Savings
HVAC	7,035	8,102,337	8,053,097	99%	86%
Electronics	4,555	610,209	610,413	100%	7%
Lighting	34,248	330,492	330,492	100%	4%
Building Shell[a]	316,263	187,129	185,741	99%	2%
Water Heating	90	135,119	132,135	98%	1.4%
Whole Home	19	46,389	46,389	100%	0.5%
Appliances	137	29,722	29,722	100%	0.3%
Total	**362,347**	**9,441,397**	**9,387,988**	**99%**	**100%**

[a]Building Shell measure quantities are reported in square feet.
Totals may not equal sum of categories because of rounding.

Table 2-2: Total Program Energy Savings 2023

Measure Category	Qty	Claimed Savings (kWh)	Evaluated Savings (kWh)	Realization Rate	% of Program Savings
HVAC	3,658	3,888,930	3,866,246	99%	78%
Electronics	4,288	581,996	582,192	100%	12%
Lighting	27,930	273,320	273,320	100%	6%
Building Shell[a]	173,244	126,570	125,904	99%	3%
Water Heating	35	51,928	50,682	98%	1%
Whole Home	10	26,661	26,661	100%	1%
Appliances	71	13,934	13,934	100%	0%
Total	**209,236**	**4,963,339**	**4,938,939**	**100%**	**100%**

[a]Building Shell measure quantities are reported in square feet.
Totals may not equal sum of categories because of rounding.

Table 2-3: Total Program Energy Savings 2024

Measure Category	Qty	Claimed Savings (kWh)	Evaluated Savings (kWh)	Realization Rate	% of Program Savings
HVAC	3,377	4,213,407	4,186,850	99%	94%
Water Heating	55	83,191	81,454	98%	2%
Building Shell[a]	143,019	60,559	59,837	99%	1%
Lighting	6,318	57,171	57,171	100%	1%
Electronics	267	28,213	28,220	100%	1%
Whole Home	9	19,728	19,728	100%	0%
Appliances	66	15,788	15,788	100%	0%
Total	**153,111**	**4,478,058**	**4,449,049**	**99%**	**100%**

[a]Building Shell measure quantities are reported in square feet.
Totals may not equal sum of categories because of rounding.

2.1 Impact Evaluation Approach

ADM completed the following steps to evaluate the program.

- Reviewed and reconciled program tracking data to the claimed energy savings reported in the 2023 and 2024 Washington Annual Report on Conservation Acquisition.
- Verified that claimed savings in program tracking data matched ex-ante savings as documented in the Measure Library (ML). That is, ADM checked that the correct savings are claimed for each measure.
- Achieved a sampling precision of better than ±10 percent with 90 percent statistical confidence (“90/10 precision”) for evaluated savings estimates for the two-year evaluation cycle.
- Determined realization rates using sample analysis for measure types that contributed more than 1.0 percent of program savings (groups identified as Measure Sub Type in the program tracking data).
- Provided comprehensive documentation and transparency for all evaluation tasks.
- Provided ongoing technical reviews and guidance throughout the evaluation cycle.

ADM’s evaluation of Unit Energy Savings (UES) for each measure referenced savings values in the ML and associated reference files. ML reference files document savings values from sources such as the Regional Technical Forum (RTF) Library of Measures that is maintained by Northwest Power and Conservation Council, past Pacific Power program evaluation reports, and briefs prepared by program implementation partners.

For the following measure categories, ADM reviewed program data to verify that the correct measure was claimed for the documented project conditions:

- HVAC
- Air purifiers
- Lighting
- Window upgrades
- Water Heating

For example, the savings for many measures are determined by the home heating and cooling systems. In these cases, ADM reviewed the home heating system documented in the program tracking data or the supplemental data provided by the program implementer.

When measures specify a threshold efficiency rating for an incentivized product, ADM verified product specifications using product model numbers or Air-Conditioning, Heating, and Refrigeration Institute (AHRI) certificate numbers. When ADM found that documented product specifications or baseline conditions did not match claimed savings at the record level, ADM determined which, if any, measure included in the ML accurately matched the conditions and identified the correct measure and ex-post saving.

Thus, ADM's analysis verified that the evaluated program savings are an accurate reflection of the correct prescribed savings for products incentivized through the program.

2.2 Data Review and Verification

ADM reviewed program tracking data to evaluate the following.

- Did the tracking dataset include duplicate or erroneous data entries?
- Did claimed energy savings match the applicable ML source documents and calculations?
- Did data entries in the program dataset include all necessary fields for savings calculations?
- Did the installed measures meet efficiency requirements documented in the ML reference files?

2.3 Sample Design

ADM achieved a sampling precision of ±8 percent at the 90 percent confidence level – exceeding 90/10 precision requirements – for evaluated savings. The program sampling plan is reported in Table 2-4.

Table 2-4: 2023-2024 Home Energy Savings Program Sampling Plan

Measure Type	Qty	Sample Size	Claimed Savings	St Dev	Mean	CV[a,b]	% of Claimed Program Savings	Relative Precision @ 90% CI[c]
Duct Sealing	3,636	40	3,600,825	220	990	0.222	38.1%	±6%
Air Source Heat Pump	814	15	2,327,974	2,010	2,829	0.710	24.7%	±30%
Ductless Heat Pump	639	15	1,170,763	585	1,839	0.318	12.4%	±13%
Fuel Switching	121	5	520,935	316	4,304	0.074	5.5%	±5%
Smart Thermostat	1,838	15	478,454	96	263	0.364	5.1%	±15%
Central Air Conditioner	45	0	3,302	37	74	0.498	0.03%	±100%
Thermostat	2	0	84	-	42	0.200	0.00%	±100%
Air Purifiers	4,555	40	610,209	28	120	0.236	6.5%	±6%
LED - Direct Install	5,193	332	316,490	14	62	0.221	3.4%	±2%
LED - Upstream	29,055	0	14,001	0	1	0.200	0.15%	±100%
Window Upgrade	54	15	96,813	6,954	1,793	3.879	1.0%	±140%
Attic Insulation	212	10	57,364	302	271	1.117	0.6%	±57%
Wall Insulation	25	0	18,392	493	736	0.670	0.2%	±100%
Floor Insulation	38	0	9,559	141	252	0.562	0.1%	±100%
Roof/Attic Insulation	21	0	5,001	77	238	0.322	0.1%	±100%
Heat Pump Water Heater	90	5	135,119	77	1,501	0.051	1.4%	±4%
New Homes - Energy Star Manufactured	13	0	28,552	240	2,196	0.200	0.3%	±100%
New Home - Performance Path	6	0	17,837	675	2,973	0.227	0.2%	±100%
Clothes Washer - Electric DHW & Electric Dryer	108	0	18,468	-	171	0.200	0.2%	±0%
Heat Pump Clothes Dryer	29	0	11,254	106	388	0.273	0.1%	±100%
Total	**46,494**	**225**	**9,441,397**				**100.0%**	**±8%**

[a]Coefficient of variance [b]In order to calculate program level relative precision, ADM used a conservative floor CV value of 0.2 for strata of low-impact measures to reflect the nature of a deemed savings analysis which detects little variation. [c]Confidence interval. Note that a low relative precision (RP) value reflects higher certainty, and a high RP reflects lower certainty. This sampling plan reflects low RPs for high-impact measure types and higher RPs for low-impact measure types that contributed <1% to program savings. The 8% program-level RP exceeds 90/10 precision requirement.

2.4 Determination of Impact Methodology

ADM completed impact analyses for measure categories that contributed 1 percent or more to program savings. Table 2-5 shows the methodology used to calculate evaluated savings for each measure category. The primary source of savings values was the ML along with reference files included in the ML. Impact methodologies are documented in the following sections by measure category.

Table 2-5: Impact Evaluation Methodology by Measure Type

Measure Category	Impact Evaluation Methodologies	Inputs to Evaluated Savings
HVAC	UES Review	• Savings values from ML reference files • Model specifications (from model or AHRI #s) • Program tracking data (for home type) • Supplemental data from implementer (for baseline condition)
Electronics (Air purifiers) Lighting Building Shell Water Heating	UES Review	• Savings values from ML reference files • Model specifications (from model or AHRI #s) • Supplemental data from implementer (for baseline condition, heating and cooling systems, installation locations)
Low-impact measure types: Whole Homes Appliances	Pass Through	• Savings values from ML reference files

2.4.1 Net-to-Gross Ratio

Washington uses a prescribed net-to-gross ratio of 1.0. Therefore, an NTG ratio is not included in impact analyses.

2.5 Heating, Ventilation, and Air Conditioning (HVAC)

Pacific Power offered customers financial incentives to install energy efficient HVAC measures in existing single-family, multifamily, and manufactured dwellings during 2023-2024. HVAC measures included duct sealing and insulation, heat pumps, smart thermostats, and air conditioners.

ADM reviewed product specifications based on model numbers and, in existing homes, reviewed baseline heating and cooling systems provided as supplementary data by the program implementer.

A total of 7,035 HVAC measures were incentivized, resulting in 8,053,097 kWh of evaluated savings with a 99 percent realization rate. The measure category accounted for 86 percent of total evaluated program savings; results are reported in Table 2-6 through Table 2-8.

Table 2-6: HVAC Energy Savings 2023-2024

Measure Type	Qty	Claimed Saving (kWh)	Evaluated Savings (kWh)	Realization Rate
Duct Sealing and/or Insulation	3,576	3,600,825	3,600,844	100%
Heat Pump - Air Source	814	2,327,974	2,290,312	98%
Heat Pump - Ductless	639	1,170,763	1,170,763	100%
Heat Pump - Fuel Switching	121	520,935	509,338	98%
Smart Thermostat	1,838	478,454	478,454	100%
Central Air Conditioner	45	3,302	3,302	100%
Thermostat	2	84	84	100%
Total	**7,035**	**8,102,337**	**8,053,097**	**99%**

Table 2-7: HVAC Energy Savings 2023

Measure Type	Qty	Claimed Saving (kWh)	Evaluated Savings (kWh)	Realization Rate
Duct Sealing and/or Insulation	1,673	1,574,181	1,574,190	100%
Heat Pump - Air Source	500	1,222,273	1,202,924	98%
Heat Pump - Ductless	356	650,306	650,306	100%
Smart Thermostat	1,061	276,618	276,618	100%
Heat Pump - Fuel Switching	38	163,174	159,830	98%
Central Air Conditioner	28	2,294	2,294	100%
Thermostat	2	84	84	100%
Total	**3,658**	**3,888,930**	**3,866,246**	**99%**

Table 2-8: HVAC Energy Savings 2024

Measure Type	Qty	Claimed Saving (kWh)	Evaluated Savings (kWh)	Realization Rate
Duct Sealing and/or Insulation	1,903	2,026,645	2,026,654	100%
Heat Pump - Air Source	314	1,105,701	1,087,388	98%
Heat Pump - Ductless	283	520,457	520,457	100%
Heat Pump - Fuel Switching	83	357,761	349,508	98%
Smart Thermostat	777	201,835	201,835	100%
Central Air Conditioner	17	1,008	1,008	100%
Total	**3,377**	**4,213,407**	**4,186,850**	**99%**

2.5.1 Review of Claimed Savings

ADM evaluated the UES values claimed by Pacific Power to verify that claimed savings in each record were supported by the applicable ML documents for the claimed measure. All savings reported in the tracking data matched the values reported in reference files included in the ML for the claimed measures.

2.5.2 Verification of Tracking Data

ADM reviewed product specifications and baseline conditions for a sample of records. ADM found that 2 percent of reviewed records included installed measures that did not meet the efficiency standards indicated in the ML for the claimed measure. ADM identified measures in the ML that matched the installed equipment specifications.

2.5.3 Determination of Evaluated Savings

Evaluated savings equal the UES documented in the ML for the correct measure identified using program data and supplemental data, multiplied by the quantity indicated in the program data. ADM assumed a 100 percent in-service rate.

2.5.4 Discussion of Realization Rates

Corrections to the claimed measures resulted in a 98 percent realization rate for air source and fuel switching heat pumps. The remaining measure types had a 100 percent realization rate. The HVAC measure category has a 99 percent realization rate.

2.6 Electronics (Air Purifiers)

Pacific Power offered customers both upstream and downstream financial incentives to purchase energy efficient air purifiers during 2023-2024 (in the Electronics measure category). ADM reviewed product specifications based on model numbers for a sample of records.

A total of 4,555 air purifiers were incentivized, resulting in 610,413 kWh of evaluated savings with a 100 percent realization rate. The measure category accounted for 7 percent of total evaluated program savings; results are reported in Table 2-9.

Table 2-9: Air Purifiers Energy Savings 2023-2024

Year	Qty	Claimed Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
2023	4,288	581,996	582,192	100%
2024	267	28,213	28,220	100%
Total	**4,555**	**610,209**	**610,413**	**100%**

2.6.1 Review of Claimed Savings

ADM evaluated the UES values claimed by Pacific Power to verify that claimed savings in each record were supported by the applicable ML documents for the claimed measure. All savings reported in the tracking data matched the values reported in reference files included in the ML for the claimed measures.

2.6.2 Verification of Tracking Data

ADM reviewed product specifications for a sample of air purifier records and found that 6 of 42 reviewed records did not match efficiency standards indicated in the ML for the claimed measure. Two records included models that exceeded specification requirements; four included models that did not meet requirements. ADM identified measures in the ML that matched the installed equipment specifications.

2.6.3 Determination of Evaluated Savings

Evaluated savings equal the UES documented in the ML for the correct measure identified using program data and supplemental data, multiplied by the quantity indicated in the program data. ADM assumed a 100 percent in-service rate.

2.6.4 Discussion of Realization Rates

Corrections to the claimed measures that matched product specifications resulted in a 102 percent realization for air purifiers.

2.7 Lighting

The 2023-2024 Home Energy Savings program included an equity lighting offering. Through the program, 5,193 LEDs light bulbs were provided to customers through a direct install program. The implementor reported that all replaced bulbs were incandescent or halogen bulbs installed in high-use areas (living/kitchen/dining rooms) or exterior locations in single family, multifamily and manufactured residential dwellings.

Direct install lighting measures contributed 3.4 percent to overall program savings. An additional 29,055 LED bulbs were sold through retail stores with an upstream discount. Upstream lighting measures contributed 0.1 percent of program savings. Therefore, ADM assumed a 100 percent realization rate for these lighting measures.

Lighting measures resulted in 330,492 kWh of evaluated savings with a 100 percent realization rate. The measure category accounted for 3.5 percent of total evaluated program savings; results are reported in Table 2-10.

Table 2-10: Lighting Savings 2023-2024

Year/ Distribution Channel	Qty	Claimed Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
2023	27,930	273,320	273,320	100%
Upstream	24,148	11,634	11,634	100%
Direct Install	3,782	261,686	261,686	100%
2024	6,318	57,171	57,171	100%
Upstream	4,907	2,367	2,367	100%
Direct Install	1,411	54,804	54,804	100%
Total	**34,248**	**330,492**	**330,492**	**100%**

2.7.1 Review of Claimed Savings

ADM evaluated the UES values claimed by Pacific Power to verify that all claimed savings reported in the tracking data matched ex-ante values reported for the measure in the ML.

2.7.2 Verification of Tracking Data

ADM reviewed product specifications for a sample of lighting records and found that all product specifications, replaced bulb types, and installation locations met the measure requirements documented in the ML.

2.7.3 Determination of Evaluated Savings

Evaluated savings are qual the UES documented for each measure multiplied by the quantity indicated in the program data. ADM did not adjust ex-ante in-service rates.

2.7.4 Discussion of Realization Rates

No corrections were found to be necessary. Therefore, the realization rate was 100 percent.

2.8 Building Shell

Pacific Power offered customers financial incentives to install energy efficient insulation and replacement windows in existing single-family, multifamily, and manufactured residential dwellings during 2023-2024. Through the program, 262 homes received incentives to install building shell measures to increase the home's energy efficiency.

Building shell measures resulted in 185,741 kWh of evaluated savings with a 99 percent realization rate. The measure category accounted for 2 percent of total evaluated program savings. Results are reported in Table 2-11.

Table 2-11: Building Shell Savings 2023-2024

Year/ Measure Type	Qty[a]	Claimed Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
2023	173,244	126,570	125,904	99%
Insulation	166,754	47,768	47,768	100%
Windows	6,490	78,802	78,135	99%
2024	143,019	60,559	59,837	99%
Insulation	136,380	42,548	42,548	100%
Windows	6,639	18,012	17,290	96%
Total	**316,263**	**187,129**	**185,741**	**99%**

[a]Building shell measure quantities are reported in square feet.

2.8.1 Review of Claimed Savings

ADM evaluated the UES values claimed by Pacific Power to verify that all claimed savings reported in the tracking data matched ex-ante values reported for the measure in the ML.

2.8.2 Verification of Tracking Data

ADM reviewed a sample of records to verify that installed measures met efficiency standards documented in the ML, and that heating and cooling systems met eligibility requirements. Baseline window type was not reviewed.

2.8.3 Determination of Evaluated Savings

Evaluated savings equal the UES documented in the ML for the correct measure identified using program data and supplemental data, multiplied by the quantity indicated in the program data. ADM assumed a 100 percent in-service rate.

2.8.4 Discussion of Realization Rates

Three of 15 sampled records identified the incorrect heating system. The corrected measures had lower UES per square foot. Corrections to the claimed measures that matched product specifications resulted in a 99 percent realization for building shell measures.

2.8.5 ML Documentation for Window Measures

The ML included efficiency requirements errors for some window measures. Additionally, the rebate application form does not include a field to provide baseline window type which is necessary to identify the correct measure and claimed savings.

2.9 Water Heating

Pacific Power offered customers financial incentives to install energy efficient heat pump water heaters during 2023-2024. ADM reviewed product specifications based on model numbers for a sample of records.

A total of 90 heat pump water heaters were incentivized, resulting in 132,135 kWh of evaluated savings with a 98 percent realization rate. The measure category accounted for 1 percent of total evaluated program savings. Results are reported in Table 2-12.

Table 2-12: Heat Pump Water Heater Energy Savings 2023-2024

Year	Qty	Claimed Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
2023	35	51,928	50,682	98%
2024	55	83,191	81,454	98%
Total	**90**	**135,119**	**132,135**	**98%**

2.9.1 Review of Claimed Savings

ADM evaluated the UES values claimed by Pacific Power to verify that claimed savings in each record were supported by the ML for the claimed measure. All savings reported in the tracking data matched the values reported in reference files included in the ML for the claimed measures.

2.9.2 Verification of Tracking Data

ADM reviewed product specifications for a sample of heat pump water heaters and found that 1 of 5 reviewed records did not match efficiency standards indicated in the ML for the claimed measure. ADM identified a measure in the ML that matched the installed equipment specifications.

2.9.3 Determination of Evaluated Savings

Evaluated savings equal the UES documented in the ML for the correct measure identified using program data and supplemental data, multiplied by the quantity indicated in the program data. ADM assumed a 100 percent in-service rate.

2.9.4 Discussion of Realization Rates

Corrections to the claimed measures that matched product specifications resulted in a 98 percent realization for heat pump water heaters.

2.10 Low-impact Measures

The following low-impact measure categories each generated less than 1 percent of total program claimed savings during 2023-2024:

- Whole homes
- Appliances (Clothes Washers and Clothes Dryers)

Because of the small contribution these measures made to program results, ADM assumed the realization rate was 100 percent. Low-impact measure categories accounted for 0.8 percent of total evaluated program savings. Low-impact measure categories savings are reported in Table 2-13.

Table 2-13: 2023-2024 Low-impact Measure Category Program Results

Year	Qty	Claimed Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
2023	81	40,595	40,595	100%
Whole Home	10	26,661	26,661	100%
Appliances	71	13,934	13,934	100%
2024	75	35,516	35,516	100%
Whole Home	9	19,728	19,728	100%
Appliances	66	15,788	15,788	100%
Total	**156**	**76,111**	**76,111**	**100%**

3 Process Evaluation

3.1 Review of Program Materials and Staff Interviews

ADM completed a process analysis of the program which included semi-monthly meetings with Pacific Power's Home Energy Saving program manager and the evaluation manager, and conversations with implementation staff. ADM also reviewed program materials.

3.1.1 Roles and Responsibilities

The Pacific Power program manager is responsible for the Home Energy Savings programs in California, Oregon and Washington including oversight of the regulatory process, assessment of program cost effectiveness, review and approval of marketing campaigns, program participation and procedures, and design and implementation of procedures.

Resource Innovations was the primary implementation partner during 2023-2024. They were responsible for day-to-day program operations, for reviewing measure eligibility, and for maintaining the ML, among other responsibilities.

3.1.2 Program Design and Goals

Pacific Power operates the Home Energy Savings program to communicate the value of energy efficiency, to provide information regarding low-cost, no-cost energy efficiency measures, and to educate customers on the availability of technical assistance, services, and incentives. The overall goal is to engage customers to reduce their energy usage through behavioral changes as well as changes in equipment, appliances, and structures.

Pacific Power incorporated equity measures and objectives into the program during 2023-2024. For example, Pacific Power incorporated a direct install LED lighting offering to the program which replaced incandescent and halogen bulbs in income-eligible homes.

Customers were offered midmarket measures, mostly HVAC equipment, through contractors. Downstream measures offer residential customers post-purchase product rebates; rebate applications are available through the Pacific Power website.

Pacific Power also offered home builders incentives to build more energy efficient homes.

3.1.3 Communication

Pacific Power used earned media, customer communications, paid media, and program-specific media to communicate the value of energy efficiency, provide information regarding low-cost, no-cost energy efficiency measures, and educate customers on the availability of technical assistance, services, and incentives. Pacific Power communicated to its customers through newsletters, bill inserts, email, social media (Facebook and

Twitter), its website, and paid media. Paid media included the following channels: TV, digital streaming services, radio, print, digital media, and social media.

Pacific Power had weekly meetings with implementation staff and frequent ad hoc communication. Weekly meeting topics include program status and performance, long-term strategy, day-to-day tactical decisions, and marketing activities. Pacific Power program staff and implementer staff worked closely with each other and are in nearly daily communication about program operations and performance.

3.1.4 Tracking and Reporting

Pacific Power program savings documentation is comprised of program tracking data, the ML, and additional data is collected and managed by the implementer, though not transferred to Pacific Power. ADM used program tracking data provided by Pacific Power, measure level eligibility requirements documented in ML, and supplemental data provided by Pacific Power's implementation partner to complete this program evaluation. More complete supplementary data was available to ADM than was provided in previous evaluation cycles. High realization rates reflect an increase in accuracy of measures identification over recent past evaluations.

3.1.4.1 Program Tracking Dataset

Pacific Power maintains a program tracking dataset that includes:

- Measure name and version
- Record or application status and relevant dates
- Customer and account information

This data, in conjunction with the following supplemental data provided by the implementer, was used in the evaluation process:

- Product manufacturer, model numbers, efficiency ratings
- Baseline and efficient conditions

ADM found the data provided by Pacific Power and the implementer for this evaluation was more complete and more accurate than data used to identify measures than was provided in past evaluations.

3.1.4.2 Measure Library

Ex-ante measure savings, as well as measure specifications, are documented in Pacific Power's ML. The ML is comprised of records about all program measures and all versions of each measure. Measure specifications are updated as required by changing regulatory and market conditions. The ML file is maintained jointly by Pacific Power and its contracted program implementer. Each measure listed includes specifications

requirements for the measure including reference files that document UES values or savings calculation methodologies.

ML reference files are frequently briefs that summarize relevant measures included in the RTF library of measures maintained by Northwest Power and Conservation Council to verify and evaluate energy efficiency savings. RTF reference files include the basis for unit energy savings values. RTF reference documents are frequently updated.

ADM found six measures (all replacement windows) for which efficiency requirements in the ML did not match the efficiency requirements documented in the reference source documents.

4 Cost-Effectiveness Results

ICF estimated the cost-effectiveness of Pacific Power's evaluated savings for the Home Energy Savings program in Washington based on 2023-2024 costs provided by Pacific Power and the savings results presented in this report. Cost-effectiveness results are provided for the program with and without Non-Energy Impacts (NEIs). The program passes the Utility Cost Test (UCT) and Participant Cost Test (PCT) with and without NEIs.

4.1 Cost Effectiveness Inputs

Program inputs used in the cost effectiveness analysis are included in Table 4-1 through Table 4-3.

Table 4-1: Program Inputs

Parameter	2023	2024
Discount Rate	6.77%	6.77%
Residential Line Loss	7.68%	7.68%
Residential Energy Rate ($/kWh)	$0.11	$0.11
Inflation Rate	2.27%	2.27%

Table 4-2: Program Costs by Year

Year	Program Delivery	Utility Admin	Program Development	Incentives	Total Utility Budget	Gross Customer Costs
2023	$2,796,027	$109,996	$86,149	$3,195,686	$6,187,859	$5,288,270
2024	$3,728,970	$119,177	$124,699	$2,800,363	$6,773,210	$5,513,722
2023-2024	**$6,524,997**	**$229,174**	**$86,149**	**$5,996,050**	**$12,961,069**	**$10,801,992**

Table 4-3: Program Savings by Year

Year	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
2023	4,994,042	99.5%	4,969,165	100%	4,969,165	15
2024	4,478,058	99%	4,449,049	100%	4,449,049	17
2023-2024	9,472,100	99%	9,418,214	100%	9,418,214	16

4.2 Cost-effectiveness Results

Cost-effectiveness results without NEIs are reported in Table 4-4 through Table 4-6.

Table 4-4: Program Cost-Effectiveness Results (without NEIs) – 2023-2024

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/ Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.17	$17,767,011	$14,394,752	-$3,372,259	0.81
Total Resource Cost Test (TRC) No Adder	$0.17	$17,767,011	$13,086,138	-$4,680,873	0.74
Utility Cost Test (UCT)	$0.13	$12,961,069	$13,086,138	$125,070	1.01
Participant Cost Test (PCT)		$10,801,992	$18,133,646	$7,331,654	1.68
Rate Impact Test (RIM)		$25,098,665	$13,086,138	-$12,012,526	0.52
Lifecycle Revenue Impacts ($/kWh)					$0.00038
Discounted Participant Payback (years)					8.12

Table 4-5: Program Cost-Effectiveness Results (without NEIs) – 2023

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/ Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.16	$8,280,442	$6,557,188	-$1,723,254	0.79
Total Resource Cost Test (TRC) No Adder	$0.16	$8,280,442	$5,961,080	-$2,319,362	0.72
Utility Cost Test (UCT)	$0.12	$6,187,859	$5,961,080	-$226,779	0.96
Participant Cost Test (PCT)		$5,288,270	$9,289,005	$4,000,735	1.76
Rate Impact Test (RIM)		$12,281,178	$5,961,080	-$6,320,097	0.49
Lifecycle Revenue Impacts ($/kWh)					$0.00019
Discounted Participant Payback (years)					7.31

Table 4-6: Program Cost-Effectiveness Results (without NEIs) – 2024

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/ Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.19	$9,486,569	$7,837,564	($1,649,005)	0.83
Total Resource Cost Test (TRC) No Adder	$0.19	$9,486,569	$7,125,058	($2,361,511)	0.75
Utility Cost Test (UCT)	$0.13	$6,773,210	$7,125,058	$351,848	1.05
Participant Cost Test (PCT)		$5,513,722	$8,844,641	$3,330,918	1.60
Rate Impact Test (RIM)		$12,817,487	$7,125,058	($5,692,429)	0.56
Lifecycle Revenue Impacts ($/kWh)					$0.00019
Discounted Participant Payback (years)					9.07

Cost-effectiveness results with NEIs are reported in Table 4-7 through Table 4-9.

Table 4-7: Program Cost-Effectiveness Results (with NEIs) – 2023-2024

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/ Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.17	$17,767,011	$17,066,933	-700,078	0.96
Total Resource Cost Test (TRC) No Adder	$0.17	$17,767,011	$15,758,319	-2,008,692	0.89
Utility Cost Test (UCT)	$0.13	$12,961,069	$13,086,138	125,070	1.01
Participant Cost Test (PCT)		$10,801,992	$20,805,826	10,003,834	1.93
Rate Impact Test (RIM)		$25,098,665	$13,086,138	-12,012,526	0.52
Lifecycle Revenue Impacts ($/kWh)					$0.00038
Discounted Participant Payback (years)					8.12

Table 4-8: Program Cost-Effectiveness Results (with NEIs) – 2023

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/ Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.16	$8,280,442	$7,876,502	-403,940	0.95
Total Resource Cost Test (TRC) No Adder	$0.16	$8,280,442	$7,280,394	-1,000,048	0.88
Utility Cost Test (UCT)	$0.12	$6,187,859	$5,961,080	-226,779	0.96
Participant Cost Test (PCT)		$5,288,270	$10,608,319	5,320,049	2.01
Rate Impact Test (RIM)		$12,281,178	$5,961,080	-6,320,097	0.49
Lifecycle Revenue Impacts ($/kWh)					$0.00019
Discounted Participant Payback (years)					7.31

Table 4-9: Program Cost-Effectiveness Results (with NEIs) – 2024

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/ Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.19	$9,486,569	$9,190,431	($296,138)	0.97
Total Resource Cost Test (TRC) No Adder	$0.19	$9,486,569	$8,477,925	($1,008,644)	0.89
Utility Cost Test (UCT)	$0.13	$6,773,210	$7,125,058	$351,848	1.05
Participant Cost Test (PCT)		$5,513,722	$10,197,507	$4,683,785	1.85
Rate Impact Test (RIM)		$12,817,487	$7,125,058	($5,692,429)	0.56
Lifecycle Revenue Impacts ($/kWh)					$0.00019
Discounted Participant Payback (years)					9.07

5 Conclusions and Recommendations

ADM provides the following conclusions and recommendations from its evaluation of the 2023-2024 Washington Home Energy Savings program.

5.1 Conclusions

ADM draws the following conclusions from its 2023-2024 Washington Home Energy Savings program evaluation.

- Pacific Power's 2023-2024 Home Energy Savings program resulted in evaluated savings of 9,387,988 kWh with a 99 percent realization rate as reported in Table 5-1.

Table 5-1: Total Program Savings 2023-2024

Year	Qty	Claimed Savings (kWh)	Evaluated Savings (kWh)	Realization Rate	% of Program Evaluated Savings
HVAC	7,035	8,102,337	8,053,097	99%	86%
Electronics	4,555	610,209	610,413	100%	7%
Lighting	34,248	330,492	330,492	100%	4%
Building Shell	316,263	187,129	185,741	99%	2%
Water Heating	90	135,119	132,135	98%	1%
Whole Home	19	46,389	46,389	100%	0.5%
Appliances	137	29,722	29,722	100%	0.3%
Total	**362,347**	**9,441,397**	**9,387,988**	**99%**	**100%**

- Figure 5-2 and Figure 5-1 illustrate the growing importance of HVAC measures to overall program savings. During the two-year evaluated period, HVAC contributed 86 percent of program savings results.
- Realization rates trended up reflecting an increase in accuracy in claimed savings (see Figure 5-1).
- Overall program scale has largely rebounded to pre-pandemic energy savings results (see Figure 5-1).

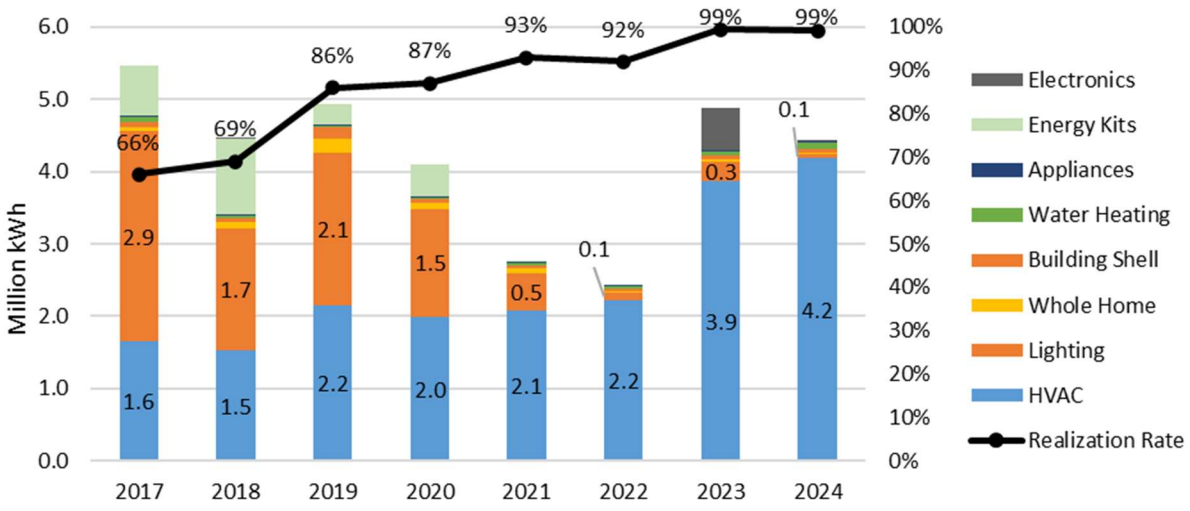

Figure 5-1: Program Savings (kWh) 2017-2024

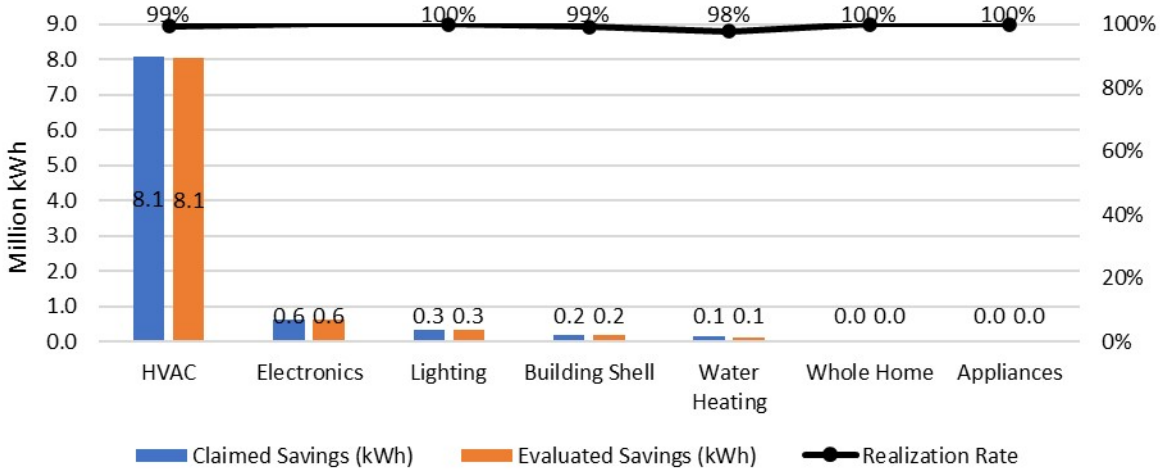

Figure 5-2: 2023-2024 Program Net Savings (kWh) by Measure Category

- The supplementary data provided by Pacific Power's primary implementation partner reflected improved program data management over prior evaluation years, particularly for HVAC measures.

5.2 Recommendations

ADM provides the following recommendations to improve future program implementation.

Update ML to reflect accurate eligibility requirements for all measures. As the comprehensive resource that reflects program ex-ante measure savings and eligibility requirements, the ML should accurately reflect efficiency and eligibility requirements that are documented in source documents.

Complete evaluations annually to improve responsiveness to evaluation results. While evaluations are required minimally on a biannual schedule, more frequent evaluations would increase Pacific Power's ability to respond to findings in a timely manner. When evaluations are conducted on a two-year cycle, significant delay occurs between evaluation of past claimed savings and updates to program implementation and ex-ante values. Annual evaluations would shorten the time between evaluation and ex-ante UES updates.

Update program rebate applications to collect the specific data needed to select the correct measure (and therefore claimed savings). ADM recommends that Pacific Power modify its rebate applications to remove ambiguity about the requested data needed to report correct incentivized measures. For example, replaced window type should be included on rebate forms for replacement windows. ADM recommends a comprehensive review of program data collection tools and practices to ensure that rebate applications accurately collect all data elements needed to correctly identify claimed measures.