NW Natural®

Biennial Energy Efficiency Report
2022-2023

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Executive Summary

During the 2022-2023 biennium, NW Natural worked with long standing partners to deliver energy efficiency programs to customers in SW Washington. NW Natural achieved 739,694 therms of savings, exceeding the established conservation target of 620,915 therms. The overachievement was largely due to strong incentive program performance in 2022 and the addition of savings from the Northwest Energy Efficiency Alliance which were not included in the planning process due to the high uncertainty associated with the estimated savings. In 2023, there was a downturn in savings in the residential new construction program due to the new residential building codes. To mitigate the shortfall in residential new construction, bonuses were offered on windows and targeted outreach was conducted to drive more weatherization projects.

In addition to NW Natural's long-standing programs, new opportunities were explored for achieving more savings. Trial activities conducted in the biennium included industrial site audits and the launch of a residential behavioral energy efficiency pilot. While these activities did not yield savings, these efforts provided additional insight to the appetite and potential for an industrial program and laid the groundwork for achieving more savings in the 2024-2025 biennium.

Table 1 - Biennial Savings Summary

Program	2022 Savings (therms)	2023 Savings (therms)	Biennial Savings	Biennial Goal* (therms)	Percent Achieved
Commercial Incentive Program	244,841	183,197	428,038	351,447	122%
Residential Incentive Program	150,873	89,739	240,612	255,905	94%
Low-Income Weatherization	2,581	1,471	4,052	13,563	30%
Market Transformation**	37,345	29,647	66,992	-	N/A
Total	435,640	304,054	739,694	620,915	119%

**Biennial Savings Goals are from NW Natural's 2022-23 Biennial Energy Efficiency Plan*

***2022 NEEA Market Transformation Reportable Savings have been revised since the 2022 Annual Report*

The biennial expenditure for the portfolio was approximately 9% more than originally budgeted. The overspend was driven by increased program activity in 2022, and the addition of pilot programs that had unknown budgets when the biennial plan was filed. Pilot costs were reviewed by the Energy Efficiency Advisory Group prior to proceeding with pilot development. All expenditures for the biennium are shown below in Table 2.

In both 2022 and 2023 the low-income program did not spend the full budget. Due to the low volume of homes, there is greater variance in the program spending. To help address this issue, NW Natural worked with stakeholders to update the program tariff to increase funding levels for both energy efficiency and health and safety measures. The flexible funds went into effect in 2024 and are anticipated to help provide low-income households with more holistic weatherization.

The cost-effectiveness of programs well exceeded the benefit cost ratio threshold of 1.0 in both 2022 and 2023. Table 3 illustrates the combined benefit cost ratios for the programs that were calculated using a weighted average from reportable savings between the program years.

Table 2 - Biennial Expenditures Summary

Program	2022 Expenditures	2023 Expenditures	Biennial Expenditures	Biennial Budget	Biennial Percent Difference
Commercial Incentive Program	$ 1,530,537	$ 1,428,257	$ 2,958,794	$ 2,709,748	9%
Residential Incentive Program	$ 1,784,927	$ 1,544,012	$ 3,328,939	$ 3,182,266	5%
Low-Income Weatherization	$ 73,064	$ 76,396	$ 149,460	$ 302,163	-51%
Market Transformation	$ 88,148	$ 88,148	$ 176,296	$ 176,296	0%
RTF Regional Collaboration	$ 10,600	$ 10,800	$ 21,400	$ 21,400	0%
Industrial Audits	$ 378	$ 16,008	$ 16,386	N/A	N/A
Behavioral Energy Efficiency	$ -	$ 211,916	$ 211,916	N/A	N/A
Conservation Potential Assessment	$ -	$ 122,802	$ 122,802	N/A	N/A
Total	$ 3,487,654	$ 3,498,339	$ 6,985,993	$ 6,391,873	9%

*Table 3 - Combined 2022-2023 Benefit Cost Ratios****

Program	Utility Cost Test Ratio	Total Resource Cost Test Benefit/Cost Ratio
Commercial Programs	3.40	2.12
Residential Programs	2.70	2.00
Total NW Natural Washington Energy Trust Programs*	3.02	2.03
NW Natural Low Income Program (only)	1.81	1.70
Total NW Natural Washington Programs	*3.00*	*2.03*
*Total Washington Portfolio***	*3.29*	*2.24*

**Does not include NEEA or low-income*

***Includes costs associated with NEEA's gas market transformation and pilots*

****Calculated using weighted average of reportable savings between program years*

Background

NW Natural began offering energy efficiency programs to Washington customers on October 1, 2009 under the direction of the Washington Utilities and Transportation Commission. Energy Trust of Oregon was selected to be the implementer of the Washington programs given they were currently serving NW Natural customers in Oregon.

The conclusion of 2023 marks the 14th year that Energy Trust of Oregon has provided energy efficiency services and incentives to residential and commercial customers in Washington on behalf of NW Natural.

Oversight

The Energy Efficiency Advisory Group (EEAG) was created at the direction of the Washington Utilities and Transportation Commission (WUTC) to provide advice and oversight for NW Natural and Energy Trust regarding energy efficiency offerings in Washington. The advisory group is comprised of representatives from NW Natural, Energy Trust, WUTC, Washington Public Counsel, Energy Project, Association of Western Energy Consumers (AWEC), and Northwest Energy Coalition (NWEC).

Quarterly calls are held to review program activity and seek the advisory group's feedback on program or tariff changes. Additional meetings are scheduled on an ad hoc basis to seek guidance on time sensitive matters. Other agenda items may include evaluation framework, cost-effectiveness, planned marketing, code updates, or items brought forward by advisory group members.

Table 4 - Advisory Group Engagement

Meeting Type	Topic	Date
Interim Meeting	Industrial Offering Intro	1/19/2022
2022 Q1 Meeting	Program Updates	3/22/2022
2022 Q2 Meeting	Internal Audit Reduction	5/24/2022
2022 Q3 Meeting	Program Updates	8/16/2022
2022 Q4 Meeting	Program Updates	10/18/2022
Interim Meeting	2023 Budgets + CPA	1/5/2023
2023 Q1 Meeting	Program Updates	3/22/2023
Interim Meeting	BEE Pilot	4/11/2023
2023 Q2 Meeting	CPA Presentation	5/24/2023
2023 Q3 Meeting	Low-Income Changes Proposed	8/16/2023
2023 Q4 Meeting	Program Updates	10/18/2023

All regulatory filings are shared with the advisory group thirty days in advance. Interested persons outside of the advisory group may file written comments regarding biennial energy efficiency plans and reports within thirty days of NW Natural's filing.

Program Funding

The costs incurred for the administration and delivery of energy efficiency programs are recovered through a conservation tariff adjustment filing that NW Natural makes every year. The prior period deferral balance shall capture any variations between the forecasted amounts and the actual expensed amounts.

2022 Summary

In 2022, NW Natural's energy efficiency programs achieved 133% of the annual portfolio savings goal. Both the commercial and residential incentive programs had strong performances, and NEEA was able to

report savings for codes and standards. Savings results, expenditures, and benefit cost ratios are shown in the tables below. For additional information please see the 2022 Annual Energy Efficiency Report[1].

Table 5 - 2022 Program Results

Program Track	2022 Savings Goal (therms)	2022 Actuals (therms)	Percentage of Goal Achieved	2022 Budget	2022 Expenditure	Budget Variance
Commercial Incentive Program	185,649	244,841	132%	$ 1,389,990	$ 1,530,537	10%
Residential Incentive Program	133,073	150,873	113%	$ 1,589,678	$ 1,784,927	12%
Low-Income Weatherization	5,425	2,581	48%	$ 157,624	$ 73,064	-54%
NEEA Market Transformation*	TBD	37,345	N/A	$ 88,148	$ 88,148	0%
RTF Regional Collaboration	N/A	N/A	N/A	$ 10,600	$ 10,600	0%
Pilot & Trial Programs	N/A	N/A	N/A	N/A	$ 378	N/A
Evaluation	N/A	N/A	N/A	N/A	N/A	N/A
Savings Total	324,147	435,640	134%	$ 3,236,040	$ 3,487,654	8%
Biennial Goal (therms)	620,915	**Percentage to Biennial Goal**		70%		

**NEEA Market Transformation Savings have been revised since 2022 Annual Report*

Program Highlights

The top performing measures in the commercial sector in 2022 were refrigeration case doors, custom building controls, custom chillers, boilers, fryers, and custom operations and maintenance projects.

- Refrigeration case doors from 10 projects at grocery stores accounted for 89,857 therms.
- A multi-year project at the Vancouver Innovation Center that was originally set to close in 2021 rolled over into 2022 contributing to the program surpassing savings goals.

The top performing measures in the residential sector were gas furnaces, smart thermostats, EPS™ new construction, and windows. The launch of a new online marketplace was a driving factor in the smart thermostat uptake. Almost twice as many smart thermostats were purchased in 2022 than in 2021.

The strong performance of furnaces and smart thermostats offset the decrease in savings from new construction. Washington's new residential energy code caused a major shift in building practices resulting in less homes being built with gas heat.

[1] https://www.nwnatural.com/-/media/nwnatural/pdfs/210831-nwn-2022-ee-program-arpt-06-15-23.pdf?rev=ff1efdfc87ce43a7a30af3c5bfb5672b&hash=146925192A36742532397E0E69EBA742#:~:text=In%202022%2C%20Energy%20Trust%20achieved,of%20the%20annual%20portfolio%20goal.&text=Gas%20efficiency%20projects%20installed%20in,150%2C873%20in%20the%20residential%20sector.

2023 Annual Report

In 2023, NW Natural exceeded the annual savings goal by achieving 306,399 therms saved across all programs. While the residential incentive program saw a decline in activity, savings from the commercial incentive program and NEEA's market transformation work offset the short fall.

To address adoption barriers, NW Natural and implementation partners are exploring new opportunities to increase activity. Energy Trust is conducting targeted outreach and exploring new ways to reach communities that have not historically had a lot of participation. The Behavioral Energy Efficiency (BEE) Pilot launched in Q4 of 2023, which will not only generate savings but boost incentive program activity through cross-promotion.

Table 6 - 2023 Program Results

Program Track	2023 Savings Goal* (therms)	2023 Actuals (therms)	Percentage of Goal Achieved	2023 Budget*	2023 Expenditure	Budget Variance
Commercial Incentive Program	169,245	183,197	108%	$ 1,696,286	$ 1,428,257	-16%
Residential Incentive Program	112,663	89,740	80%	$ 1,556,820	$ 1,544,012	-1%
Low-Income Weatherization	5,425	1,471	27%	$ 135,318	$ 76,396	-56%
NEEA Market Transformation	N/A	29,647	N/A	$ 88,148	$ 88,148	0%
RTF Regional Collaboration	N/A	N/A	N/A	$ 10,800	$ 10,800	0%
Pilot & Trial Programs	N/A	N/A	N/A	$ 140,596	$ 227,924	62%
Evaluation	N/A	N/A	N/A	$ -	$ -	0%
Conservation Potential Assessment	N/A	N/A	N/A	$ -	$ 122,802	N/A
Total	287,333	306,399	107%	$ 3,627,968	$ 3,521,350	-3%

**2023 Savings and Budget Goals are from the 2023 Annual Energy Efficiency Plan which updated the goals originally filed in the Biennial Plan. Due to the update, the summation of annual goals do not equate to the Biennial Goals.*

Cost Effectiveness

NW Natural is required to maintain portfolio level cost-effectiveness with a demonstrated benefit cost ratio (BCR) greater than 1. Both the utility and total resource cost tests are used to evaluate the cost-effectiveness of programs. In 2023, Energy Trust's incentive programs and the total NW Natural portfolio were well above the cost effective threshold with total resource cost test BCRs of 1.95 and 2.09 respectively.

Table 7 - 2023 Program Benefit Cost Ratios

Program	Utility Cost Test	Total Resource Cost Test
Commercial Programs	3.47	2.28
Residential Programs	2.17	1.61
Total NW Natural Washington Energy Trust Programs*	2.79	1.95
NW Natural Washington Low-Income Program	1.91	1.80
Total NW Natural Programs	2.77	1.95
Total Washington Portfolio**	2.86	2.09

**Does not include NEEA or low-income*

***Includes costs associated with NEEA's gas market transformation*

Energy Trust Incentive Programs

In 2023, Energy Trust achieved 97% of the annual goal for the commercial and residential programs. Gas efficiency projects installed in 2023 by NW Natural's Washington customers saved 272,936 annual therms of natural gas.

Commercial Sector Highlights

The commercial sector achieved 183,197 therms reaching 108% of its annual goal. The top performing measures were custom building controls, boilers, and custom operations and maintenance projects.

The commercial program continued to hear from customers that they faced budget constraints and labor cutbacks, leading to delays for projects that were intended to complete in 2023. Among these were a handful of boiler replacement projects that will shift into 2024.

To help promote uptake the program provided bonuses for several measures including boilers, HVAC equipment, kitchen equipment, and insulation in the fourth quarter.

The program recognized several large projects in 2023 including:

- Vancouver Innovation Center controls installation for 69,132 therms saved.
- Clark College controls upgrade for 44,443 therms saved.
- Upgrades at Vancouver and Evergreen school districts for a combined 43,745 therms saved.
- A Walmart store heat reclaim project for 10,128 therms saved.

In 2023 Strategic Energy Management (SEM) major activities included:

- Adding a new participant to the program and getting them up to speed.
- Transitioning data into the Energy Performance Platform (EEP), then creating and sharing gas models with participants.
- Delivering three "treasure hunt" webinars.
- Performing in-person "treasure hunts," virtual building automation system (BAS) reviews and orienting customers to opportunity registers hosted in the new EPP.

- Supporting participants through one-on-one site visits and meetings.
- Working to align delivery with Clark and Stillwater Energy when possible.
- Identifying a list of potential new enrollees.

Energy Trust engaged with various partners to enhance and expand the program reach.

- Energy Trust staff worked with Clark Public Utilities and NW Natural to improve the customer lead sharing process and make the customer experience easier.
- Energy Trust staff collaborated with Clark River Economic Development Council to introduce Energy Trust incentive programs to new or existing commercial customers looking to expand.
- Energy Trust staff also engaged with the Southwest Washington Contractors Association to connect with more of its members. In 2023, the program was a sponsor and displayed program material at its trade show.

Additionally, Energy Trust conducted an assessment on multifamily affordable housing to better understand opportunities in this sector. The program will work to develop a strategy to serve this sector in 2024.

Residential Sector Highlights

The residential sector achieved 89,740 therms of savings, reaching 80% of the annual program goal. The program continued to see furnaces, smart thermostats, and fireplaces as top performing measures.

Nearly every category of the residential portfolio saw a downturn in savings in 2023 from 2022; the only exception was weatherization measures. Windows outperformed expectations by 7%, wall insulation by 162%, and floor insulation by 99%. This was due to increased window incentives and targeted outreach to insulation contractors throughout 2023.

Despite being top measures, furnaces and smart thermostats did not perform as well as expected. Underperformance of smart thermostats is predominately a result of a decreased incentive starting in quarter one along with reaching a higher level of market saturation. Gas furnaces were down, potentially due to conversions. An increase in installations in single-family rental properties with higher incentives minimized the impact of the furnace shortfall.

EPS new construction savings fell short of goal by 26%. The market delivered fewer homes that were smaller than forecasted resulting in fewer savings per home than expected.

Energy Trust staff continued to work to increase program uptake and reach historically underserved communities. Primary activities conducted in 2023 include:

- High- and low-volume trade allies were identified and provided with in-person training for their managers, salespeople and administrative staff on Energy Trust offers. With low-volume trade allies, especially weatherization contractors, the focus was on awareness of incentives and how to connect their customer with Energy Trust offers.
- A multi-layered marketing campaign utilizing paid social, paid search, direct mail and print advertising was delivered to customers in Skamania and Klickitat counties in the first half of the year. These counties have historically had low participation rates for key incentive offers. The marketing led to measurable growth in multiple measures, especially gas furnace.

- Staff collaborated with the Clark County Rental Association to engage its members, predominately rental property owners and management companies. Energy Trust ran advertisements focused on gas furnaces and smart thermostat bonuses in the association's newsletter and plans to continue to do so on an annual basis.

Trade Ally Network Highlights

By the end of 2023, 416 trade allies served Washington. This number is up from the 390 that delivered measures in 2022. This includes 181 trade allies that are based in Washington.

Energy Trust 2023 Results

The following tables show additional details regarding the measure breakdown and expenditures for the Energy Trust incentive programs.

Table 8 – 2023 Commercial Sites Served

	Q1	Q2	Q3	Q4	Total
Commercial					
Food Service	-	-	-	-	-
HVAC	1	2	4	2	9
Operations & Maintenance	10	3	-	3	16
Process cooling	-	-	-	-	-
Process heating	-	-	-	2	2
Refrigeration	-	-	-	-	-
Study	1	-	-	-	1
Water Heating	-	1	-	1	2
Weatherization	-	-	1	-	1

Table 9 – 2023 Residential Sites Served

	Q1	Q2	Q3	Q4	Total
Residential					
EPS new construction	100	25	8	10	143
New manufactured homes	-	1	-	-	1
HVAC	122	153	134	143	552
HVAC Controls	127	49	32	193	401
Water Heating	5	2	3	12	22
Weatherization	54	64	56	65	239

Table 10 – 2023 Incentive Program Track Budgets and Expenditures

		Annual actual expenditures	Annual budgeted expenditures	Budget variance
Commercial	Commercial	$ 1,347,498	$ 1,487,479	$ -139,982
	Commercial administration	$ 80,759	$ 94,644	$ -13,884
	Commercial Total	**$ 1,428,257**	**$ 1,582,123**	**$ -153,866**
Residential	Residential	$ 1,456,708	$ 1,571,024	$ -114,316
	Residential administration	$ 87,304	$ 99,959	$ -12,655
	Residential Total	**$ 1,544,012**	**$ 1,670,983**	**$ -126,971**
	Total expenditures	**$ 2,972,269**	**$ 3,253,106**	**$ -280,837**

Table 11 – 2023 Incentives Paid

	Annual actual incentives	Annual actual expenditures	Percent incentives/ expenditures
Commercial	$ 557,907	$ 1,428,257	39%
Residential	$ 760,286	$ 1,544,012	49%
Total Incentives	**$ 1,318,194**	**$ 2,972,269**	44%

Table 12 – 2023 Savings by Program Track

		Annual savings therms	Annual goal therms	Percent achieved	Levelized cost/therm
Commercial	Existing Buildings - custom	155,134	88,452	175%	
	Existing Buildings - standard	1,382	43,018	3%	
	New Buildings - custom	-	4,794	-	
	New Buildings - standard	4,610	14,100	33%	
	Strategic Energy Management	22,071	18,881	117%	
	Commercial total	**183,197**	**169,245**	**108%**	**$ 0.95**
Residential	Home retrofit	76,128	92,960	82%	
	Midstream and retail	6,958	11,355	61%	
	New manufactured homes	106	-	N/A	
	Small multifamily	1,672	1,754	95%	
	EPS new construction	4,875	6,594	74%	
	Residential total	**89,740**	**112,663**	**80%**	**$ 1.65**
	Total	**272,936**	**281,908**	**97%**	**$ 1.19**

Table 13 – 2023 Energy Trust Residential Measures

Category	Measure	Measures installed	Total therms saved
EPS new construction		143	4,875
	EPS new construction total	**143**	**4,875**
New manufactured homes		1	106
	New manufactured homes total	**1**	**106**
HVAC	Furnace	538	49,210
	Gas fireplace	959	7,953
	HVAC total	**1,497**	**57,163**
HVAC controls	Thermostat	401	13,288
	Thermostat Optimization	7	2,179
	HVAC controls total	**408**	**15,467**
Water heating	Tank water heater	-	-
	Tankless water heater	22	1,335
	Other total	**22**	**1,335**
Weatherization	Ceiling insulation	28	3,609
	Floor Insulation	11	1,182
	Wall insulation	4	390
	Windows	286	5,613
	Weatherization total	**329**	**10,794**
Grand total		**2,400**	**89,740**

*Table 14 – 2023 Energy Trust Commercial Measures**

Category	Measure	Measures installed	Total therms saved
Foodservice	Fryer	-	-
	Oven	-	-
	Foodservice total	**-**	**-**
HVAC	Boiler	3	3,864
	Building controls	6	138,495
	Variable Air Volumn	1	326
	Demand Control Ventilation	14	1,181
	Gas furnace	1	56
	Radiant heating	-	-
	HVAC total	**25**	**143,923**
Operations & maintenance	Building Operator Certification	-	-
	Custom Operations & Maintenance	30	22,071
	Operations & maintenance total	**30**	**22,071**
Process cooling	Custom chiller	-	-
	Process cooling total	**-**	**-**
Process heating	Custom heat recovery	2	16,313
	Process heating total	**2**	**16,313**
Refrigeration	Refrigeration	-	-
	Refrigeration total	**-**	**-**
Study	Study	1	-
	Study total	**1**	**-**
Water heating	Aerator	-	-
	Tank water heater	2	746
	Tankless water heater	-	-
	Water heating total	**2**	**746**
Weatherization	Ceiling insulation	1	144
	Wall insulation	-	-
	Weatherization total	**1**	**144**
Grand Total		**61**	**183,197**

**The measures installed for tank water heater represents the number of sites not units installed.*

Customer Satisfaction

Energy Trust conducted short web and phone surveys of NW Natural customers in Washington who participated in Energy Trust programs in 2023 to determine their satisfaction with Energy Trust. Results from 165 residential customers indicate a generally high level of customer satisfaction. Most residential customers were satisfied with their overall program experience, but a small proportion were neutral or dissatisfied regarding the turnaround time to receive their incentive and the incentive application form. These numbers are generally consistent with previous program years.

Table 15 – Energy Trust Residential Customer Satisfaction 2023

Residential (n=165)	Dissatisfied	Neutral	Satisfied
Overall experience	5%	1%	93%
Incentive application form	3%	3%	94%
Turnaround time to receive incentive	8%	8%	84%

No commercial customers in Washington who participated in Energy Trust programs in 2023 were surveyed. Only three customers qualified to participate in the survey and none of those chose to participate. Of the 27 commercial projects in 2023, all but three were SEM or New Buildings projects that are not eligible for this survey or were still being processed at the time of the survey.

Washington Low-Income Energy Efficiency

NW Natural partners with Clark County's Department of Community Services to serve Clark County customers and Community Action Council of Lewis, Mason and Thurston Counties (CCLMTC) serving Skamania and Klickitat counties to administer its Washington Low Income Energy Efficiency (WALIEE) program. While offerings and funding are available in Skamania and Klickitat counties, logistics and agency capacity has been a challenge to serving these customers. We will continue to work with the agency to explore how NW Natural can help with some of the challenges encountered. The results below are specific to Clark County's Department of Community Services.

Program year 2023 continued to see changes and challenges in personnel and organizational changes for Clark County, which contributed to capacity issues and falling just short of the 2023 goal. Although increased funding for the program was planned in 2023, the actual increase of $4,000 in flexible funding for H/S/R was approved in early 2024. In recognition that costs for weatherization projects have increased, this $4,000 are meant to be flexible for the company to use as needed per project.

Due to the program's size, any impact on the goal will greatly impact the yearly results, as a result we will see big variances in our actuals vs goals. There were projects completed in 2022, but submissions to NW Natural were made in 2023. These projects were recognized in 2023 and goals and savings are reflected in 2023. Most projects completed in 2023 related to furnace tune-ups and replacements. While these projects did receive full weatherization upgrades, other sources of funding were used to fund these energy efficiency upgrades, and NW Natural funding was utilized for the furnace upgrades only. We understand that our current partners prioritize other sources of funding before complementing their funding sources with NW Natural funds.

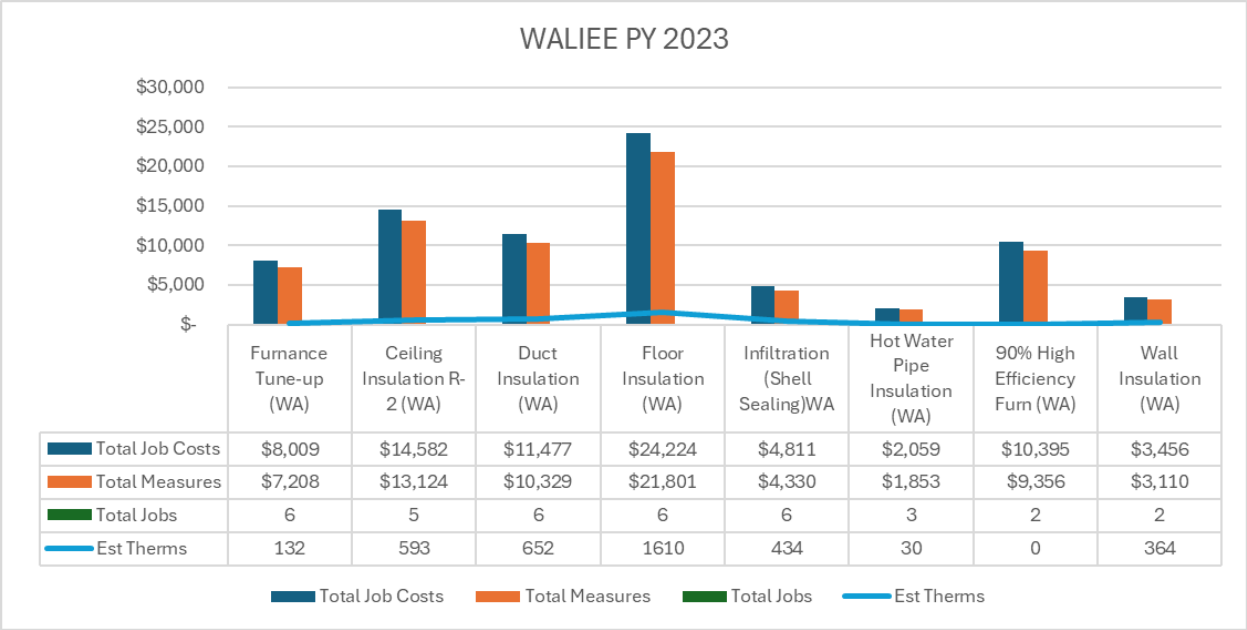
In 2024 the company will be conducting an impact and program evaluation. These evaluations will help address gaps in our program delivery and develop a NW Natural deemed measures list for approved measures that will make the administration and delivery of the programs easier. This deemed measures list will not replace any other systems used by our partners but will act as a complement to the information that our partners provide. Along with this evaluation there will be a customer survey that will provide NW natural an opportunity to hear from customers about the benefits of installed measures in their home post weatherization. This survey will be part of the evaluation but NW Natural hopes to

use this survey to reach customers on an ongoing basis and use it not only to hear from our customers, but as an educational tool to provide customer energy efficiency tips and information on how to access other programs.

NW Natural also aims to establish partnerships with community-based organizations that work outside of the conventional community action agency network to try to reach more customers. By establishing a network of community-based organization partnerships, NW Natural aims to do more outreach in the community to let customers know about this program.

Project Analysis

The figure below provides a breakdown of weatherization occurrences by measure, as well as the associated annual therm savings, total cost per measure, and total cost per project.



	Furnance Tune-up (WA)	Ceiling Insulation R-2 (WA)	Duct Insulation (WA)	Floor Insulation (WA)	Infiltration (Shell Sealing)WA	Hot Water Pipe Insulation (WA)	90% High Efficiency Furn (WA)	Wall Insulation (WA)
Total Job Costs	$8,009	$14,582	$11,477	$24,224	$4,811	$2,059	$10,395	$3,456
Total Measures	$7,208	$13,124	$10,329	$21,801	$4,330	$1,853	$9,356	$3,110
Total Jobs	6	5	6	6	6	3	2	2
Est Therms	132	593	652	1610	434	30	0	364

Figure 1 – 2023 Low-Income Measure Occurrence and Savings

Table 16 - Historical Low-Income Program Results

Efficiency Metric	2023	2022	2021	2020	2019	2018	2017
Homes served	10	8	11	3	22	16	13
Average Reimbursement Per Home	$7,639.61	$957.06	$4,996	$4,436	$8,657	$5,739	$5,305
Total Reimbursed	$25,801	$58,251	$54,960	$13,308	$190,457	$91,828	$68,965
Average Estimated Therms Saved Per Home	165	235	324	377	918	474	472
Total Estimated Therms Saved	1471	2581	3,568	1,132	20,170	7,578	6,132
Estimated Cost Per Therm	$20.74	$22.57	$15.40	$11.76	$9.44	$12.12	$11.25

Table 17 - 2023 Low-Income Performance and Goal Metrics

2023 Performance Metric	Goal	Actual
Homes served	15	10
Max reimbursement per home (Actual figure = avg per home)	$7.408.76	$7,639.61
Adjustment Program Max (Actual figure =avg per home)	$5,508	$0
Average estimated therms saved per home[12]	325	235
Total estimated therms saved	8,138	1471
Total expenditure	$100,720	$76,396

Northwest Energy Efficiency Alliance

In 2023, NW Natural continued its participation in the Northwest Energy Efficiency Alliance's (NEEA) Gas Collaborative to support regional market transformation. NEEA's work brings utilities, manufacturers, and energy efficiency organizations together to pool resources and share risks to transform markets toward energy efficiency to the benefit of all consumers in the Northwest.

NEEA's work on their gas portfolio included: product development acceleration of gas-fired heat pump water heater technology, work to increase efficiency of gas rooftop units, and program development for adoption of high-performance windows. Additional information regarding specific activities on the programs can be found in the quarterly on NEEA's website[2]

[2] https://neea.org/resources-reports

Reportable savings for 2023 come from NEEA's previous work on developing codes and standards. Codes represent a permanent market change and hence are critical focus and goal of many NEEA programs. The 2018 Washington State Energy Code (WSEC) is the source of code savings for 2023. Savings are expected to decline in 2024 with increasing restrictions on gas heating that is included in the 2021 WSEC. The product standard savings are from the Commercial Packaged Boilers standard that was published in 2020 and went into effect in 2023 and from the Washington Commercial Cooking equipment standards that were published in 2019 and went into effect in 2021.

Table 18 - 2023 NEEA Savings

NEEA Programs	Gas Program Savings
Residential Codes	25,938
Commercial Codes	2,787
Product Standards	921
Efficient Rooftop Units	-
Total Savings	29,647

Table 19 - 2023 NEEA Expenditures

Program	2023 Budget	2023 Expenditure	Variance
NEEA	$88,148	$88,148	0%

Regional Technical Forum

The Regional Technical Forum (RTF) was created in 1999 to support the Northwest Power and Conservation Council by developing and maintaining a list of energy efficiency measures. The RTF's work is used within NW Natural's programs as a source for reporting accurate peer-reviewed savings.

In 2023, the RTF reviewed 25 existing measures and one standard protocol. Funding provided to the RTF by NW Natural supports the development of gas only and dual fuel measures. The RTF did not review or add any gas specific measures in 2023 but did updates to dual fuel measures, specifically single-family weatherization. A list of active and past measures with supporting analysis can be found on the RTF website[3].

Table 20 – 2023 Regional Technical Forum Expenditures

Program	2023 Budget	2023 Expenditure	Variance
RTF	$10,800	$10,800	0%

Industrial Audits (Pilot)

At the end of 2022, NW Natural contracted with Energy350 to provide energy efficiency audits to industrial customers. This pilot was intended to gauge customer interest for a program and explore the

[3] https://rtf.nwcouncil.org/measures/

savings potential in the sector. Budget for this pilot was listed as "to be determined" in the 2022-2023 Biennial Energy Efficiency Plan and updated in the 2023 Annual Energy Efficiency Plan.

In 2023, Energy350 completed 4 site visits and reports in 2023. Uptake for this offering was relatively low given there were no financial incentives and marketing for this effort was minimal to keep costs of the offering low. Each of the sites that did participate showed several opportunities for energy efficiency upgrades.

NW Natural plans to wrap up this industrial audit offering and work with the EEAG to determine how to move forward with program development in 2024.

Table 21 - 2023 Industrial Audit Expenditures

Program	2023 Budget	2023 Expenditure	Variance
WA Industrial Audits	$ 140,596	$ 16,008	-89%

Behavioral Energy Efficiency (Pilot)

In the 2021 Conservation Potential Assessment, home energy reports were identified as a prominent source of cost-effective savings. NW Natural did not have the program structure to support this type of program at the time and included steps to explore the potential further in the 2022-2023 Biennial Energy Efficiency Plan.

In 2023, NW Natural conducted a Request for Information (RFI) to determine the financial impact of a program and learn about various home energy report platforms. Following the RFI, NW Natural completed a competitive bid process and selected Bidgely as the implementation vendor for a 3-year pilot program. The selection process and program design were presented to the EEAG who voiced support for the offering.

Over the summer months, NW Natural worked with Bidgely to customize messaging and perform user acceptance testing. In October of 2023 the program had a soft launch and was fully up and running by December. Overall, customer responses to the program were very positive.

Budgeted expenses were not included in the Biennial Energy Efficiency Plan due to several unknowns associated with the program. Since the pilot launched at the end of 2023 there are no reportable savings for the year.

Table 22 – 2023 BEE Pilot Expenditures

Category	2023 Expenditure
Contracting	$ 59,688
Bidgely Platform Fee	$ 150,000
Postcard Notification	$ 2,228
Total	$ 211,916

Evaluations

NW Natural programs are evaluated to ensure accuracy of reported savings. Energy Trust works directly with third party evaluators to conduct both process and impact evaluations. A list of evaluations

completed in this biennium are included in the Program Evaluations section. As NW Natural develops more pilot programs there will be increasing evaluation activity to ensure best practices as programs are set up. 2022-2023 marks the first year NW Natural has conducted a portfolio level evaluation.

Portfolio Evaluation

NW Natural contracted with Evergreen Economics to complete the portfolio level evaluation for the 2022-2023 biennium.

The evaluation compared data source files to NW Natural's Biennial Energy Efficiency Report Draft. The evaluation found one instance of double-counting projects and minor reporting discrepancies that were updated and clarified in this final version of the report.

Within the report Evergreen Economics also identified areas where the evaluation may be improved. NW Natural plans to incorporate those suggestions in subsequent evaluations. The full evaluation memo can be found in Appendix 1.[4]

Program Evaluations

The following lists detail Energy Trust's evaluation work over the 2022-2023 program years.

Energy Trust conducted the following evaluations in 2022:

- **In quarter one**, Energy Trust finalized the Analysis of Energy Trust Residential Insulation Impacts 2013-2018. The report can be found online at https://www.energytrust.org/wp-content/uploads/2022/03/Summary-Memo-of-Recurve-Insulation-Impacts-Final.pdf
- **In quarter two**, Energy Trust finalized the 2021 Fast Feedback Annual Report. The report can be found online at https://www.energytrust.org/wp-content/uploads/2022/04/Energy-Trust-2021-Fast-Feedback-End-of-Year-Report-FINAL.pdf
- **In quarter three,** Energy Trust finalized the Process Evaluation of the Residential Program. The report can be found online at https://www.energytrust.org/wp-content/uploads/2022/08/Residential-Process-Evaluation-Final_wSR.pdf
- **In quarter four,** Energy Trust finalized the 2020 Existing Buildings Impact Evaluation. The report can be found online at https://www.energytrust.org/wp-content/uploads/2023/01/EB2020Impact_Final_wSR.pdf

Energy Trust conducted the following evaluations in 2023:

- **In quarter two**, Energy Trust finalized the Impact Evaluation of the New Homes Program 2012-2019: https://www.energytrust.org/wp-content/uploads/2023/04/Energy-Trust-New-Homes-Impact-Evaluation-2012-2019-Final-wSR.pdf
- **In quarter two**, Energy Trust finalized the 2022 Customer Awareness and Participation Study: https://www.energytrust.org/wp-content/uploads/2023/04/Energy-Trust-of-Oregon_CAP-Study-Report-2022_Final-wSR.pdf

[4] The evaluation that Evergreen provided was from an earlier draft of the 2022-2023 Biennial Energy Efficiency Report and some of the table numbers will not match. Please refer to the table titles to match to the final Report.

- **In quarter three**, Energy Trust finalized and posted the 2022-2023 New Buildings Program Process Evaluation: https://www.energytrust.org/wp-content/uploads/2023/07/Process-Evaluation-of-Energy-Trust-2022-2023-New-Buildings-Program-FINAL_wSR.pdf
- **In quarter three**, Energy Trust finalized and posted the Geographically Targeted Energy Efficiency (GeoTEE) Phase Three Process Evaluation: https://www.energytrust.org/wp-content/uploads/2023/07/GeoTEE-Phase-3-Evaluation-Report_REVISED_2023.06.05_Final.pdf
- **In quarter three**, Energy Trust finalized and posted the 2022 Fast Feedback Annual Report: https://www.energytrust.org/wp-content/uploads/2023/07/GeoTEE-Phase-3-Evaluation-Report_REVISED_2023.06.05_Final.pdf
- **In quarter four,** Energy Trust finalized Existing Buildings 2021 Impact Evaluation: https://www.energytrust.org/wp-content/uploads/2023/11/Existing-Buildings-2021-Impact-Evaluation-Final-Report-w-SR.pdf

Internal Audit

NW Natural conducts an internal audit every other year for Energy Trust of Oregon's administration of NW Natural's Washington energy efficiency incentive programs. The assessment ensures program expenses were in accordance with Energy Trust's policy and that incentive details were properly accounted for. There were no exceptions noted during the review.

APPENDIX 1 – WA Portfolio Evaluation

*Please note that the Evaluation that Evergreen provided was from an earlier draft of the 2022-2023 Biennial Energy Efficiency Report and some of the table numbers will not match. Please refer to the table titles to match to the final Report.

MEMORANDUM

Date: June 12, 2024

To: Laney Ralph, NW Natural

From: Kevin Price, Evergreen Economics

Re: NW Natural WA Portfolio Evaluation

This memorandum provides an overview of the approach for the NW Natural Washington State Portfolio Evaluation along with the results of the evaluation audit. The evaluation consists of validating savings claims as well as a review of measure-level savings estimates and program evaluations.

The evaluation team identifies areas for future evaluations to build on what was achievable during this evaluation so that future portfolio evaluations can further validate claimed savings.

Savings Validation

Savings Validation Approach Overview

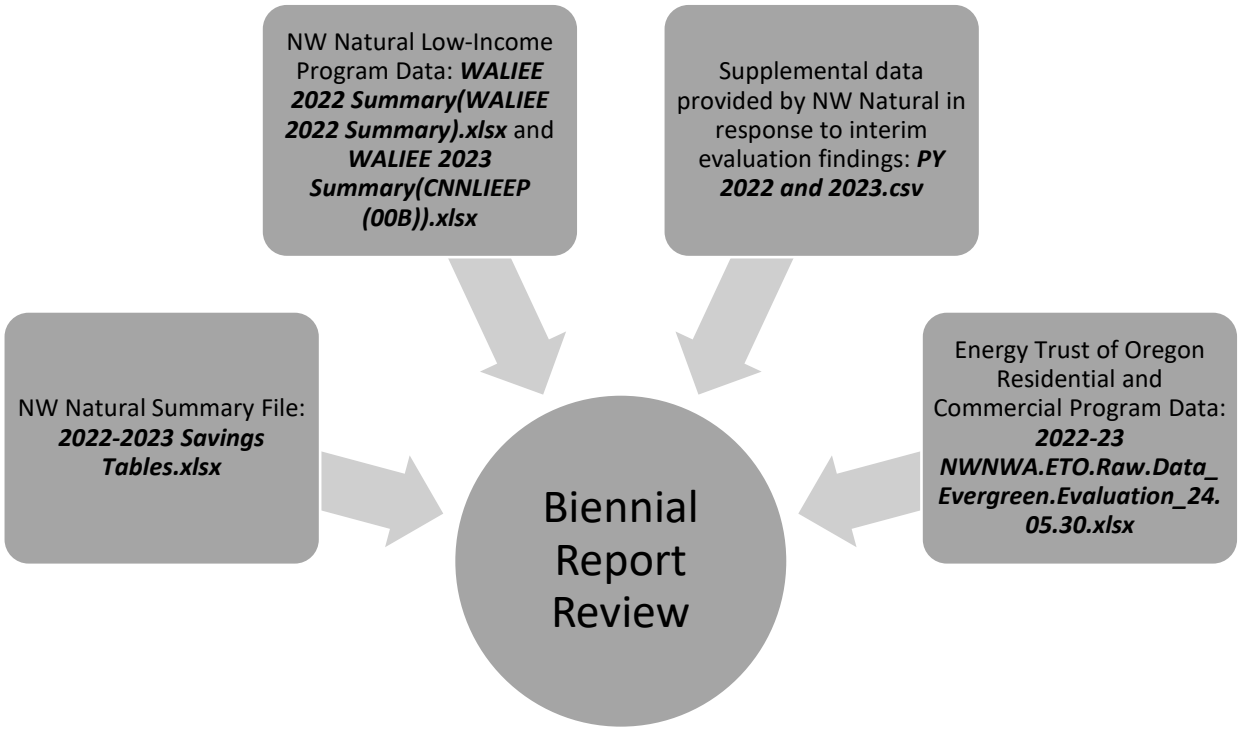
This evaluation included comparing summary and source data files to the 2022-2023 NW Natural Biennial Energy Efficiency Report content.

We started with a comparison of summary data from NW Natural (*2022-2023 Savings Tables.xlsx*) to summary tables in the report, seeking to identify any internal inconsistencies within the report and summary data and between the report and the summary data.

The next step involved comparing 2022 and 2023 low-income program data to the biennial report, and during this step we found double counting of projects across years. As a result, NW Natural sent a supplemental dataset (*PY 2022 and 2023.csv*) to correct for the issue and are planning to update the biennial report accordingly.

A final step in this evaluation was to compare Energy Trust of Oregon residential and commercial rebate program tracking data for NW Natural Gas participants (*2022-23 NWNWA.ETO.Raw.Data_Evergreen.Evaluation_24.05.30.xlsx*) to the biennial report.

An overview diagram of the savings validation approach is shown next.



Savings Validation Findings

In this section we provide findings related to summary documentation, low-income program findings, and residential and commercial program findings. In all cases we reviewed the available documentation for internal consistency and consistency with the biennial report.

In most cases, the discrepancies uncovered during this evaluation were minor and do not call into question the overall impact of NW Natural's energy efficiency program savings. In one instance, we did identify double-counting of projects across 2022 and 2023 program years, which NW Natural confirmed as a mistake and is working to remedy. We are confident that an updated biennial report will adjust the impacts accordingly.

Summary Documentation Review Findings

On the first pass of our audit, we compared the information in the *2022-2023 Biennial EE Report Draft.doc* with summary and source data from NW Natural and Energy Trust of Oregon, titled *2022-2023 Saving Tables.xls*. The following discrepancies were uncovered during the audit of these documents (and are summarized in Table 1 of this report):

- *Table 1 - Biennial Savings Summary*
    - 2023 Savings (therms) for Residential Incentive Program. The reported value is off by one therm compared to Table 5 and in the "Residential Sector Highlights" section (89,739 vs 89,740). As a result, the Biennial Savings listed in Table 1 is also off by one therm (306,398 vs 306,399). We note that this is probably a rounding error and has minimal impact.

- **Goals (therms).** The biennial goals reported in Table 1 by program track and overall are inconsistent with the sum of the 2022 and 2023 biennial goals by program track and overall. Shown in the table below, the red text is the calculated biennial goal value when combining the 2022 and 2023 goals. The orange text is the reported biennial goal from Table 1. We advise to adjust this for consistency.

Table 23: Internal Inconsistencies with Reported Goals in Biennial Report

Program Track	**Table 4** Reported 2022 Savings Goal (therms)	**Table 5** Reported 2023 Savings Goal (therms	**Table 4+5** Calculated Biennial Goal (therms)	**Table 1** Reported Biennial Goal (therms)
Commercial Incentive Program	185,649	169,245	**354,894**	**351,447**
Residential Incentive Program	133,073	112,663	**245,736**	**255,905**
Low-Income Weatherization Program	5,425	5,425	**10,850**	**13,563**
Overall	324,147	287,333	**611,480**	**620,915**

- *Table 4 – 2022 Program Results*
  - The content of this table is internally consistent, but the **Biennial Goal (therms)** listed at 620,916. Based on the sum of the 2022 goal (324,147 therms) and the 2023 goal (287,333 therms), we calculate the biennial goal as 611,480 therms.
- *Table 5 – 2023 Program Results*
  - The content of this table is internally consistent.
- *Tables 6 & 7 were not included in this audit.*
- *Table 8 – 2023 Incentive Program Track Budgets and Expenditures*
  - **Annual *Budget* for Commercial and Residential Total** do not match the budgets listed in the excel file titled *2022-2023 Saving Tables.xls* (see tab "2023 Summary" in cells F:3 and F:4). It is unclear which values are correct.
    - The Commercial total budget is listed as $1,582,123 in the biennial report, but in the summary Excel file it is listed as $1,696,286.
    - The Residential total budget is listed as $1,670,983 in the biennial report, but in the summary Excel file it is listed as $1,556,820.
- *Table 9 was not included in this audit.*
- *Table 10 – 2023 Savings by Program Track*
  - **Annual savings therms for Residential Total** listed as 89,740, in excel 89,739. This is the same rounding issue previously described.

Low-Income Program Findings

For the portfolio assessment, NW Natural provided program records and summary information for the low-income program for 2022 and 2023. The information was provided in two Excel files.[5] Upon review of these files, we discovered that five of the projects had been double counted in the results for both years. We provided this information to NW Natural, and they confirmed the finding and provided an updated accounting of 2022 and 2023 program activities.

Subsequently, we received from NW Natural an excel file titled ***PY 2022 and 2023.csv*** which contained a list of 18 total projects. We anticipate that the low-income program summaries for 2022 and 2023 will be revised in a subsequent version of the biennial report to match the content of the updated file provided to the evaluation team.

A summary of the 2022 and 2023 projects from the updated program tracking summary file is provided in Table 2.

Table 24: Revised Low-Income Biennial Summary Information Based on PY 2022 and 2023.csv

Metric	2023	2022
Homes served	10	8
Average Reimbursement Per Home	$ 7,639.61	$ 957.06
Total Reimbursed	$76,396.00	$7,656.48
Average Estimated Therms Saved Per Home*	225	
Total Estimated Therms Saved**	4,052	
Estimated Cost Per Therm***	$20.74	

* The average therms saved per home for 2022 and 2023 combined is 225. This data is not split by fiscal year.

** The "Total Estimated Therms Saved" for the two-year period in the Biennial report is listed as 6,432. However, with the duplicated projects removed the therms saved equals 4,052. The therms saved is not split by fiscal year in the raw data from the file PY 2022 and 2023.csv.

*** The "Estimated Cost Per Therm" for the two-year period in the Biennial report is the total reimbursed ($84,052.75) divided by the therms saved (4,052) which is equal to $20.74

The information in Table 15 in the biennial report (*Table 15 - 2023 Low-Income Performance and Goal Metrics*) must also be repopulated with accurate information after removing the double-counted projects.

Energy Trust of Oregon Residential and Commercial Programs

Energy Trust of Oregon provided the evaluation with program tracking records from 2022 and 2023 for the residential and commercial energy efficiency rebate programs for NW Natural Washington customers.[6] The review of these files largely corroborated claimed savings and identified areas for future portfolio evaluations to work to further validate measure-level savings claims.

[5] *WALIEE 2022 Summary (WALIEE 2022 Summary).xlsx* and *WALIEE 2023 Summary (CNNLIEEP (00B)).xlsx*

[6] *2022-23 NWNWA.ETO.Raw.Data_Evergreen.Evaluation_24.05.30.xlsx*

- *Table 6 – 2023 Commercial Sites Served & Table 7 – 2023 Residential Sites Served*
    - We attempted to validate the sites served counts but were unable to validate the numbers in Table 6 and Table 7 due to the use of "virtual" sites for distributor / midstream rebate program activities.
- *Table 8 – 2023 Incentive Program Track Budgets and Expenditures*
    - The "Annual actual expenditures" cannot be verified with the data provided by Energy Trust of Oregon as they only contain rebate amounts and no administrative or other costs.
    - We did validate that the total expenditures reported in Table 8 matched the summary data provided by NW Natural in *2022-2023 Saving Tables.xls*.
- *Table 9 – 2023 Incentives Paid*
    - The Annual Actual Incentives paid in Table 9 of the biennial report matches the program tracking data provided by Energy Trust for each program.
    - The Annual actual expenditures cannot be verified with the tracking data; however, it was verified that it matched the summary data provided by NW Natural in *2022-2023 Saving Tables.xls*.
- *Table 10 – 2023 Savings by Program Track*
    - The reported annual therms savings match the sum of therms savings from the program tracking data for both residential and commercial programs.
- *Table 11 – 2023 Energy Trust Residential Measures*
    - The evaluation was able to verify that the reported therms in the biennial report were consistent with the reportable therms for all residential measures from the data provided by Energy Trust.
    - Yellow cells in Table 3 show the value we used to validate the quantities reported in Table 11, by measure. Importantly, some measure counts provided in the biennial report are based on the number of installed measures, whereas for other measure counts, it is based on the number of sites (e.g., for insulation, instead of the cubic feet installed, the biennial report shares how many homes received insulation).
    - Orange cells indicate cases where we believe the biennial report is slightly over counting the number of measures installed due to measure reversals (i.e., when a record is determined to be ineligible, Energy Trust accounts for this by creating a new rebate record with negative quantities and savings).
        - We found that the Gas Furnace is count from the program tracking data is two less than the reported amount; however, the reportable therms match the reported therms.
        - We also found that the Windows count should be 284 measures installed instead of 286, while the reportable therms matched.
        - In both cases, the biennial report cites the number of sites improperly (likely by counting the number of rows).

Table 25: Reportable Therms from Energy Trust's Residential Program Data Compared to Biennial Report Table 11

Measure	Sum of "Qty" Variable	Counts of Sites	Reportable Therms	Table 11 Measures / Therms
Ceiling insulation	36,008	28	3,609	28 / 3,609
Floor insulation	15,341	11	1,182	11 / 1,182
Gas fireplace	959	196	7,953	959 / 7,953
Gas furnace	536	538	49,210	538 / 49,210
Tankless water heater	22	22	1,335	22 / 1,335
Thermostat	401	403	13,288	401 / 13,288
Thermostat Optimization	173	7	2,179	7 / 2,179
Wall insulation	4,878	4	390	4 / 390
Windows	28,943	284	5,613	286 / 5,613

- *Table 11 – 2023 Energy Trust Commercial Measures*
  - The evaluation was able to verify that the reported therms in the biennial report were consistent with the reportable therms for all commercial measures from the data provided by Energy Trust.
  - Yellow cells in Table 4 show the value we used to validate the quantities reported in Table 12, by measure. For commercial measures, the "measures installed" value in the biennial report correlates to the number of sites receiving the measure.
  - Orange cells indicate cases where we believe the biennial report is slightly under counting the number of measures installed. We found that the tanked water heater count from the program tracking data is two more than the reported amount from the Biennial Report; however, the therms match. We hypothesized that the discrepancy might have occurred because there were two total project IDs, that only 2 jobs were counted, versus the number of actual water heaters, and asked that Energy Trust clarify. We confirmed with Energy Trust that there were two projects involving four total water heaters, and thus the information in the Biennial Report should be updated.

Table 26: Reportable Therms from Energy Trust's Commercial Program Data Compared to Biennial Report Table 12

Measure	Sum of "Qty" Variable	Counts of Sites	Reportable Therms	Table 12 Measures / Therms
Boiler	4,620	3	3,864	3 / 3,864
Ceiling insulation	1,200	1	144	1 / 144
Custom building controls	6	6	138,495	6 / 138,495
Custom heat recovery	2	2	16,313	2 / 16,313
Custom Operations & Maintenance	16	30	22,071	30 / 22,071
Custom Variable Air Volume	1	1	326	1 / 326
Demand Control Ventilation	64	14	1,181	14 / 1,181
Gas furnace	80	1	56	1 / 56
Tanked water heater	560	4	746	2 / 746

Validating Measure-Level Savings

The evaluation intended to validate measure-level savings estimates.

For the low-income program, information from NW Natural was not granular in terms of the measures provided to customers or the per measure savings assigned to individual projects. As a result, it was not possible to validate project-level savings estimates based on the aggregation of measure-level savings for each project, or that the measure-level savings estimates were properly applied to each project. We advise that more granular information should be made available for subsequent evaluations so that evaluators can review the composition of project-level savings.

Energy Trust provided the evaluation team with "Reportable Therms" estimates for each project, which vary from the program documentation of "Working Therms" for commercial measure savings. Reportable therms are calculated by adjusting working therms based on a "Savings Realization Adjustment Factor" (SRAF), which comes from Energy Trust evaluations. As a result, we are unable to validate the reported therms in the time available for this evaluation, though based on discussion with Energy Trust, we believe that they have accounted for measure level savings properly. For subsequent evaluations, the Energy Trust team understands that the evaluators will want to review how the SRAFs are developed and then review the working therms, SRAF adjustments, and reportable therms for all commercial measures. Residential savings estimates were validated.

Evaluation Review

Energy Trust is responsible for 2022-2023 program year program evaluations and finished four evaluations in 2022 and nine evaluations in 2023.

In 2022, the evaluations included an impacts assessment from insulation measures installed between 2013 and 2018,[7] and it is unclear why this evaluation did not conclude until 2022. The evaluation found that natural gas savings were "roughly double what was expected," which could have led to an increased focus on promoting rebates for insulation in homes heated with natural gas.

The other evaluations conducted in 2022 focused on recent residential program adaptations,[8] providing "fast feedback" from 2021 program participants,[9] and impacts from the 2020 existing buildings program.[10] The cadence of these evaluations would allow for program implementers to adjust programs based on evaluation results in a timely manner.

For 2023, the biennial report provides links to three Energy Trust pilot evaluations, but we found that publishing dates for these documents were in 2011,[11] 2014,[12] and 2016.[13] We believe all three evaluation references should be removed from the biennial report unless further clarification is provided.

One of the impact evaluations released in 2023 covered program years 2012-2019 for Energy Trust's New Homes Program. The evaluation found that per home savings were 21 percent of expected for natural gas. This very low realization rate could have led to an adjustment to program strategy (or the discontinuation of the program, if deemed not cost-effective). However, as countered by Energy Trust in a response memo, the evaluation approach was not able to factor in market-level impacts of the New Homes Program and NEEA initiatives over the study timeframe to determine if the program had *also* transformed the residential new construction market (thus increasing the baseline home performance during the program period). In either case, more timely evaluations would be helpful in identifying *either* poorly performing programs *or* ongoing market-level impacts.

The remaining evaluations in 2023 were timely and provide robust information.

[7] https://www.energytrust.org/wp-content/uploads/2022/03/Summary-Memo-of-Recurve-Insulation-Impacts-Final.pdf
[8] https://www.energytrust.org/wp-content/uploads/2022/08/Residential-Process-Evaluation-Final_wSR.pdf
[9] https://www.energytrust.org/wp-content/uploads/2022/04/Energy-Trust-2021-Fast-Feedback-End-of-Year-Report-FINAL.pdf
[10] https://www.energytrust.org/wp-content/uploads/2023/01/EB2020Impact_Final_wSR.pdf
[11] https://www.energytrust.org/wp-content/uploads/2023/02/SCEP-Memo-Final-10-21-11.pdf
[12] https://www.energytrust.org/wp-content/uploads/2023/02/SEM-Report-2-Final-12-02-14_wSR.pdf
[13] https://www.energytrust.org/wp-content/uploads/2023/03/Evaluation-MPower-Pilot.pdf