Cost-effectiveness and Evaluation Advisory Committee Meeting

DATE: April 30-May 1, 2025

TIME: 9:00AM – 12:00PM – Day 1
8:30AM – 12:30PM – Day 2

LOCATION: **Microsoft Teams**
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AGENDA: Day 1 (4/30)

TIME	TOPIC	PRESENTER(S)	Electric/ Gas/Both	Link or Page
9:00AM (15 min)	**Welcome/Agenda Review** 1. Agenda check 2. Introductions 3. Announcements	**Jonathan Belais, NEEA Staff**		
9:20 (15 min)	**MRE Update** NEEA staff will provide a brief overview and answer any questions regarding the upcoming market research and evaluation activities outlined in the quarterly newsletter. **Objective**: Committee awareness of market research and evaluation activities	**Amy Webb, NEEA Staff**	**Both**	
9:35 (40 min)	**Market Transformation Framework** NEEA staff will provide a brief overview of the market transformation approach used by NEEA. **Objective**: Provide context for more detailed conversations regarding cost-effectiveness and evaluation.	**Jonathan Belais, NEEA Staff**	**Both**	
10:15 (10 min)	**BREAK**			
10:25 (45 min)	**Market Transformation Value** Overview of Market Transformation savings categories and NEEA's approach to value calculations and reporting. **Objective**: Provide background context for committee members to	**Ryan Brown, NEEA Staff**	**Both**	

	understand the values they will see in funder savings reports as well as NEEA's corporate-level savings reporting.		
11:10 (45 min)	**Market Transformation Costs and Benefits** Overview of NEEA's operational guidelines and approach to Market Transformation benefit-cost calculation at the program and the portfolio level. **Objective**: Committee feels informed on NEEA's approach and has opportunity to ask questions.	**Ryan Brown, Evan Hatteberg, NEEA Staff**	**Both**
11:55 (5 min)	**Wrap up**		

AGENDA: Day 2 (5/1)

TIME	TOPIC	PRESENTER(S)	Electric/ Gas/Both	Link or Page
8:30AM (10 min)	**Welcome/Agenda Review** 1. Agenda check 2. Announcements	Jonathan Belais, NEEA Staff		
8:40 (45 min)	**State Energy Code Baseline and Key Assumption Review** Process update and preliminary results as available **Objective:** Inform, discuss, and gather feedback.	Meghan Bean, NEEA Staff, TBD, IEC Staff	Both	
9:25 (50 min)	**Key Inputs and Assumption Updates** NEEA staff will provide a brief presentation on priority updates and answer questions on all updates provided in the meeting packet as requested. **Objective:** Provide opportunity for committee to review and advise on methods and assumptions that impact savings reporting	Ryan Brown, NEEA Staff	Both	
10:15 (10 min)	BREAK			
10:25 (60 min)	**2024 Market Progress and Portfolio Overview: Part 1 – Portfolio Overview** NEEA staff will provide overviews of the 2024 Business Plan Cycle savings estimates for natural gas and electric portfolios, using program examples to highlight themes. In addition, staff will share portfolio benefit-cost assessment, avoided carbon emissions and peak capacity savings. **Objective:** Inform and address committee questions regarding NEEA's savings portfolio and other value metrics.	NEEA Staff	Both	4 (Elec) 12 (Gas)
11:15 (5 min)	BREAK			
11:20 (55 min)	**2024 Market Progress and Portfolio Overview: Part 2 – Market Stories** NEEA staff will provide overviews of the 2024 Business Plan Cycle savings estimates for natural gas and electric portfolios, using program examples to highlight themes. In addition, staff will share portfolio benefit-cost assessment, avoided carbon emissions and peak capacity savings. **Objective:** Inform and address committee questions regarding NEEA's savings portfolio and other value metrics.	NEEA Staff	Both	4 (Elec) 12 (Gas)
12:15 (15 min)	Wrap up			

Memorandum

April 30, 2025

TO: Cost Effectiveness Advisory Committee

FROM: Ryan Brown, Manager, Planning and Analysis, NEEA

SUBJECT: Electric Annual Report 2024 Value Metrics and Cost Effectiveness

Background

NEEA is an alliance of utilities and energy efficiency organizations that pools resources and shares risks to transform markets toward energy efficiency that benefits consumers in the Northwest. NEEA's role is to establish technology and market conditions that advance energy efficiency in markets in a sustainable way.

Energy savings are enabled by the alliance's market transformation efforts in removing market barriers, influencing energy codes and appliance standards, and investment in tools, training, resources, data, and research to support greater efficiency. These market transformation efforts seek to effect long-lasting changes in markets, which then result in energy savings.

NEEA is a dual fuel organization and there is a companion memo to this that outlines the updates for the natural gas portion of NEEA's portfolio. For more information about NEEA's savings and cost effectiveness operational guidelines as well as other reference documentation please visit the Portal on NEEA.org (https://neea.org/portal/savings-reports).

NEEA Energy Savings Approach

NEEA's work in the region and in the market is designed to create long-term changes that transform markets to support greater efficiency over the long-term. NEEA aims to manage a portfolio that spans early development of technologies and market transformation opportunities, through program and market development, and finally to the long-term, sustained state of efficiency well beyond NEEA's direct investment in these markets, such as in a change in an energy code or adoption of a new appliance standard.

NEEA's tracking and reporting of energy savings is a measure of the resulting benefits of change in the market toward energy efficiency. NEEA employs a lifecycle management framework for each program in the portfolio. The programs listed below that are bolded are included in our regional reporting of savings above market transformation baseline **("Co-Created Savings")** for 2024. In all cases, NEEA tracks and reports incremental first year savings on an annual basis to monitor both adoption levels and associated energy savings. NEEA tracks savings above both the

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market transformation baseline and the Power Plan baseline, for various regulatory reporting purposes.

Table 1: Programs in NEEA's portfolio		
Program Development	Market Development	Previous Investments
Efficient Fans	Heat Pump Water Heaters	Reduced Wattage Lamp Replacement
	Luminaire Level Lighting Controls	Efficient Homes
	Retail Product Portfolio	Ductless Heat Pumps
	Extended Motor Products (XMP)- Pumps	Strategic Energy Management
	High-Performance HVAC	Manufactured Homes
	New Construction: Residential Building Codes	
	New Construction: Commercial Building Codes	
	Products: Federal and State Standards	
	Advanced Heap Pumps	

2024 Savings Results

NEEA estimates and reports the annual energy savings from the NEEA portfolio each year to support the ongoing long-term viability and estimation of the market transformation value as well as to serve as a foundation for funder needs and their local regulatory reporting activities.

As with every annual reporting update, NEEA receives and analyzes full year market data as well as new evaluation reports that inform updates to market trends, adoption estimates and unit energy savings estimates or other key assumptions as needed. After incorporating these updates, co-created savings across all investments in NEEA's portfolio of programs added 43.1 aMW of savings in 2024, more than the amount added in 2023 (Table 2).

Table 2: 2023 Electric Co-Created Savings	2023 Reported	2024 Reported
All Investments (aMW)	38.9	43.1

See Appendix A for more details about updates and market progress by program.

Net Market Effect savings are also tabulated as part of NEEA's annual reporting. NEEA staff coordinate with funding partners each year to tally the efficient units that are being tracked and reported at the local level. NEEA does this only to avoid double-counting savings, not to assign attribution to NEEA. This year, NEEA staff aggregated a total of 16 aMW through local programs in the markets NEEA is tracking, resulting in Net Market Effect savings of 27.1 aMW for 2024.

2020-2024 Business Plan Results

It is important to look at a longer time horizon for NEEA's Market Transformation portfolio. The above figures provide an annual and year-over-year snapshot, but they need to be considered in the context of the market transformation horizon in which NEEA works.

A primary focus for NEEA's portfolio for the 2020-2024 business cycle (Business Cycle 6) was to ensure continued growth in two programs--Heat Pump Water Heaters (HPWH) and Retail Products Portfolio (RPP)-- and in increasing diversity in the portfolio. NEEA has seen great traction in both programs. RPP is actively influencing many ENERGY STAR specifications, including ENERGY STAR version 9 for Televisions which is expected to be the largest energy saver for the program going forward. HPWH is seeing continued growth in total units and has become a staple measure in new construction in Washington and Oregon in particular. In addition, NEEA facilitated a joint recommendation with industry groups and efficiency advocates that was influential for the U.S. Department of Energy as they established a standard rulemaking in 2024 for water heating that will require HPWH levels of performance for most storage tank electric water heaters staring in 2029.

NEEA is also tracking the continued utilization of the Strategic Energy Management (SEM) program across the utilities in our region. NEEA launched this program in 2010 within the industrial segment and has since transitioned to managing the education platform, known as the SEM Hub, to enable utilities across the region to expand SEM to the many other customers across commercial and industrial spaces. NEEA has tracked over 93 aMW since 2011 on behalf of the region, and the volume of energy savings through SEM increased by over 3 aMW, from 10.6 aMW in 2023 to 13.6 aMW in 2024.

The other primary focus for NEEA's portfolio in Cycle 6 was to diversify the portfolio composition in terms of sectors addressed, the risk profile of the portfolio and other portfolio metrics. This will aid the development of a long-term portfolio that creates a continuation of energy savings for the region well into the future. During Cycle 6 NEEA made meaningful progress in this regard, advancing the Extended Motor Products: Pumps and Advanced Heat Pump program into Market Development and the Efficient Fans program into Program Development. In 2024, NEEA made a decision to discontinue investment in the High-Performance Windows program due to data access and cost effectiveness challenges. Extra-regional market transformation partners are now working to move this market.

Overall, NEEA is pleased that the forecasted energy and carbon savings for this 2020-2024 business cycle are exceeding the planned expectations as a result of all of our efforts toward sustained efficiency in the region. As seen in Table 3 below, NEEA tracked 147 aMW of co-created savings, 13 aMW of local programs, and 134 aMW of net market effects during this business cycle[1] (2020-2024).

Table 3: 2020-2024 Electric Savings (aMW) Savings Category	2020-2024 Business Plan Range	Cycle Results[1] (2020-2024)
Co-Created	115-152	147
Local Programs		13
Net Market Effects		134

Additional Metrics

In addition to tracking and reporting the co-created savings for NEEA's regional portfolio, NEEA staff also estimates the regional value of a set of additional metrics.

Benefit Cost Assessment

One such metric is the benefit cost assessment of the NEEA portfolio. NEEA's requirement is to have a portfolio benefit-cost ratio greater than 1. A total of six market transformation programs constitute the portfolio benefit-cost assessment: Retail Products Portfolio, Heat Pump Water Heaters, Manufactured Homes, Luminaire Level Lighting Controls, Extended Motor Products (XMP)- Pumps, and High-Performance HVAC (see table 1 above[2]). Leveraging data from the Northwest Power and Conservation Council's (NWPCC) ProCost tool for the 2021 Power Plan, NEEA has assessed the long-term total benefit-cost ratio for the market transformation portfolio at 1.95.

Peak Capacity and Avoided Carbon Emissions

NEEA staff also uses data from the NWPCC to enable the regional reporting for both peak capacity value and avoided carbon emissions. For 2024, the peak capacity value is a regional value assessed on all programs contributing co-created savings (see table 1), for a total benefit to the region of 86 MW of winter peak and 67 MW of summer peak savings (Table 4).

For the estimation of avoided carbon emissions, NEEA includes the benefit from all of the co-created savings of the electric portfolio. The 2024 co-created savings value of 43.1 aMW translates to a total of approximately 200,000 tons of avoided carbon emissions in 2024, at a monetized value of $14.2 million[3].

[1] Strategic Energy Management savings were not included in the forecast at the time NEEA's 2020-2024 Business Plan was under development so they are removed to compare with the business plan forecasted range of savings.

[2] The Advanced Heat Pumps Program advanced into market development in 2023 with a benefit-cost ratio of 79. This is currently not included in the calculation for the portfolio as NEEA works to refine program analysis. Inclusion of this program given current assumptions would increase the portfolio cost effectiveness value above 2.0. NEEA staff will bring the portfolio number including the Advanced Heat Pumps Program back to the Committee when available.

[3] Avoided emissions are monetized using the social cost of carbon with 2.5% discount rate. For 2024 this represents $71.23/ton.

Table 4: 2020-2024 Additional Co-Created Value Metrics			
	Avoided Carbon Emissions (tons)	**Winter Peak Savings (MW)**	**Summer Peak Savings (MW)**
2024	200,000	86	67
2020-2024 Total	859,000	402	304

Appendix A: 2024 Portfolio Highlights

NEEA works with all parts of the market to enable efficient technology choices for consumers: gathering and analyzing data to inform both regional power planning and utility programs, leveraging its relationships with mid and upstream market actors like manufactures and retailers, and improving how products are tested and perform in real life applications. This work brings more efficient products and options to the market, which are made available to consumers and business across the Northwest through their local utilities. The sections below highlight that work for 2024.

Consumer Products

NEEA works with extra-regional program administrators and national retailers to utilize midstream incentives that signal energy efficient options in the supply chain while gaining access to full-category sales data. The incentives encourage manufacturers and retailers to build, purchase, stock and promote high-efficiency products. Products include white goods, air cleaners, televisions and other home electronics. The data retailers provide allows NEEA to identify the most promising affordable energy efficiency opportunities and gain insights that improve energy test procedures, helping consumers distinguish between products. The program saw momentum for both laundry and television products in 2024.

- **Laundry**: The sales volume of residential laundry centers[4] has increased by 62% from 2023 to 2024 (41,000 regional sales in 2024), driven in large part by products that incorporate a heat pump dryer which make up 30% of the laundry center sales in 2024. NEEA influenced advancement of heat pump drying technology as part of its Super-Efficient Dryers program dating back to 2012. Additionally, the market share for ENERGY STAR dryers in the standalone market rose from approximately 45% to 47%. This change indicates an upward trend in market share growth for ENERGY STAR dryers.
- **Televisions:** NEEA is continuing to expand its data pipeline to effectively track the market adoption of ENERGY STAR version 9 televisions—a specification developed by NEEA and its partners. Using product test data that was recently published in the California Energy Commission's Appliance Efficiency Database and sales data NEEA purchases for the Northwest region, the Retail Products Portfolio program can estimate that as much as 26% of the sales meet the ENERGY STAR criteria. NEEA's Retail Products Portfolio is now adding televisions to its midstream program to increase certification levels and gather more market intelligence.

Water Heating

NEEA influenced early adoption of heat pump water heaters in the Northwest by promoting awareness of the product's benefits and building a strong foundation in the Northwest.[5] In May 2024, the Department of Energy published a final rule mandating a shift for most electric storage water heaters to heat pump technology by 2029. NEEA's ongoing engagement is crucial for addressing market barriers and preparing the region to adopt and benefit from the recently adopted

[4] A single product that does both washing and drying, either in the form of a connected, stacked machine or an all-in-one combo unit.

[5] NMR Group, Inc. 2023. Heat Pump Water Heater Market Progress Evaluation Report # 7.

federal standard. NEEA is supporting the Northwest market by working to strengthen the workforce and engage both regionally and nationally to identify solutions to increase adoption of these water heaters across the region, with particular focus on areas with slower adoption rates.

Space Heating

NEEA has been working in the residential space-heating market since the early 2000s, starting with ductless heat pumps and now moving toward advanced heat pumps. The Ductless Heat Pumps program accelerated market acceptance and adoption of inverter-driven ductless heat pumps in electrically heated homes through establishing relationships with manufacturers, distributors, and retailers to enhance product design and availability. NEEA is now leveraging these relations to work on a set of low- and no-cost improvements that meaningfully increase installed heat pump system efficiency. In 2024, NEEA focused on building the market's awareness and capacity for competitively differentiating these advanced heat pump improvements, with efforts on several fronts.

NEEA's leadership and participation in 2024 contributed to updated specifications adopted into: 1) to the Consortium for Energy Efficiency Residential Electric HVAC Specification, 2) ENERGY STAR Product Specification v.6.2 for Central Air Conditioners and Heat Pump Equipment, and 3) the U.S. Department of Energy (DOE) amendment to the Federal test procedure for central air conditioners and heat pumps.

NEEA's new Advanced Heat Pump program's Low Load Efficiency (LLE) laboratory research study was concluded, with six units tested in UL labs over the summer of 2024, followed by a physical "tear down" of units to help identify the mechanical source of LLE savings. These efforts actively engaged a broad spectrum of manufacturers, with the project receiving donated heat pumps from several manufacturers, along with manufacturer staff time to commission products on site. To fully leverage recent studies, NEEA has initiated updated field and lab data analysis and energy modeling to refine estimates of savings rates for advanced heat pump improvements. A Request for Proposals was launched in 2024 for this effort.

In December, NEEA kicked off a new collaboration of technical experts, two national laboratories and manufacturers to build consensus on a new heat pump connected commissioning specification. NEEA expects to report savings from this program in 2025/2026.

Commercial Lighting

NEEA engages commercial lighting manufacturers and their supply chain to enhance promotion and luminaire level lighting controls sales in the Northwest. In 2024, NEEA added a manufacturer to the program that serves Montana and Idaho territories. Including these sales made a significant difference to total observed sales. NEEA works with manufacturers by partnering with manufacturer representatives to educate lighting specifiers, lighting engineers and installers the capabilities and value of luminaire level lighting controls. Recently, NEEA influenced the Illuminating Engineering Society's Lighting Practice committee to add these controls to its Recommended Practice standards. Many lighting designers and building managers reference this standard when making lighting decisions.

New Construction

NEEA's efforts support and encourage innovation within the supply chain and inform voluntary specifications and codes ensuring that consumers and building owners have choices/options for products that are proven to perform well and save energy. In 2024, NEEA started a code compliance evaluation to assesses current building practices including measure compliance and

space and water heating fuel selection in residential new construction. The results of the analysis are informing program design and energy consumption analysis NEEA is conducting for the *2023 Oregon Residential Specialty Code.*

Emerging Technology

NEEA aggregates and leverages the power of the region, creating economies of scale to identify and vet emerging technologies, bringing forward new products that are proven to perform well and save energy. Two major products saw ENERGY STAR specification changes in 2024: Air Source Heat Pumps and Room Air Conditioners. NEEA provided support and suggestions for ENERGY STAR to amend the Air Source Heat Pump specification, increasing the performance stringency to achieve ENERGY STAR Most Efficient performance levels, which went into effect on December 4. NEEA also provided feedback to ENERGY STAR in developing a test method for room air conditioners with heat pump heating modes. This update went into effect in November and more accurately captures the energy efficiency benefits of the emerging category of room heat pumps.

Additionally, ENERGY STAR began revisions of the Residential Clothes Dryer Specification, in which NEEA provided substantial feedback and data from its numerous laundry efforts, including heat pump dryer testing, field laundry research, and laundry pair testing. Increasing the availability of high-performing efficient technologies in the market gives customers more and better options when it comes to the products and technologies they can purchase.

Building Stock Assessments

NEEA has five regional studies that hit milestones in 2024. The 2022 Residential Building Stock Assessment was completed, and the study's final report and datasets were posted to neea.org. The design phase of the 2025 Commercial Building Stock Assessment finished and the study began collecting data through commercial building site visits. The Home Energy Metering Study and Commercial Energy Metering Studies both completed their metering installations and continue to capture metering data on hundreds of buildings. Last, NEEA began designing a new study on motor-driven system characteristics named the 2027 Motor-Systems Stock Assessment.

Market Data and Research

NEEA's Market Research and Evaluation team managed nearly 40 third-party research and evaluation studies to support alliance Market Transformation programs. Seven program market progress evaluations launched or concluded in 2024, including Manufactured Homes, Retail Product Portfolio, Extended Motor Products, Commercial and Residential Building Codes, Luminaire Level Lighting Controls, and two Commercial HVAC programs. These mixed method, longitudinal evaluations are instrumental to understanding the market opportunity for these measures, as well as for tracking NEEA's progress toward its Market Transformation goals. These evaluations together with several market research studies exploring emerging market transformation program themes including consumer use and attitudes toward connected consumer products and the market for agricultural pumps, can deliver high-value and actionable market intelligence for Energy Trust going forward.

Memorandum

April 30, 2025

TO: Cost Effectiveness Advisory Committee

FROM: Ryan Brown, Manager, Planning and Analysis, NEEA

SUBJECT: Gas Annual Report 2024 Value Metrics and Cost Effectiveness

Background

NEEA is an alliance of utilities and energy efficiency organizations that pools resources and shares risks to transform markets toward energy efficiency that benefits consumers in the Northwest. NEEA's role is to establish technology and market conditions that advance energy efficiency in markets in a sustainable way.

Energy savings are enabled by the alliance's market transformation efforts in removing market barriers, influencing energy codes and appliance standards, and investment in tools, training, resources, data, and research to support greater efficiency. These market transformation efforts seek to effect sustainable changes in markets, which then result in energy savings.

NEEA is a dual fuel organization and there is a companion memo to this that outlines the updates for the electric portion of NEEA's portfolio. For more information about NEEA's savings and cost effectiveness operational guidelines as well as other reference documentation please visit the Portal on NEEA.org (https://neea.org/portal/savings-reports).

NEEA Energy Savings Approach

NEEA's work in the region and in the market is designed to create long-term changes that transform markets to support greater efficiency over the long-term. NEEA aims to manage a portfolio that spans early development of technologies and market transformation opportunities, through program and market development, and finally to the long-term, sustained state of efficiency well beyond NEEA's direct investment in these markets.

NEEA's tracking and reporting of energy savings is a measure of the resulting benefits of change in the market toward energy efficiency. NEEA employs a lifecycle management framework for each program in the portfolio. The bolded programs under Market Development in Table 1 are included in our regional reporting of savings above market transformation baseline **("Co-Created Savings")** for 2024 as they are at the stage of recognizing market change and savings above baseline. In all cases, NEEA tracks and reports incremental first year savings on an annual basis to monitor both adoption levels and associated energy savings.

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Table 1: Natural Gas Programs in NEEA's portfolio		
Concept Development	Program Development	Market Development
Dual-fuel Residential HVAC *Program expansion:* High Performance HVAC to include gas HE DOAS *Program expansion:* Efficient RTU dual fuel system Efficient Commercial Laundry	Advance Commercial Water Heating	Efficient Rooftop Units New Construction: Residential Building Codes New Construction: Commercial Building Codes Products: State Standards

2024 Savings Results

NEEA estimates and reports the annual energy savings from the NEEA portfolio each year as one way to support the ongoing long-term viability and estimation of the market transformation value as well as to serve as a foundation for funder needs and their local regulatory reporting activities. Table 2 highlights the actual reported savings for 2024.

Table 2: 2024 Co-Created Savings
887,391 annual Therms

Although the market transformation portfolio for natural gas is in early maturity, 2024 saw an increase in reportable savings for the Efficient Rooftop Program due to some success that NEEA had in expanding participation in the regional HVAC Supplier Data Collection project to include manufacturers' representatives that sell commercial HVAC equipment. The majority of reportable gas savings for 2024 come from new construction, through both residential and commercial building codes. The specific codes NEEA is reporting 2024 savings on are the IECC 2018 Idaho code for residential, the WSEC 2018 code for both residential and commercial, and the OR 2021 OEESC for commercial.

2020-2024 Savings Results

It is important to look at a longer time horizon for NEEA's Market Transformation portfolio. Tables 2 and 3 provide an annual snapshot but need to be considered in the context of the market transformation horizon in which NEEA works.

The natural gas market transformation portfolio remains in early development stages, and in addition to longer than expected product commercialization timelines for efficient gas products in the space and water heating markets, energy savings potential through code advancement has been impacted by rapidly changing state energy codes and policy discussions that are impacting builder fuel decisions in the new construction markets. As a result, the natural gas portfolio did not meet the savings expectations forecast at the time of reporting for business plan range (Table 3).

Table 3: 2020-2024 Savings			2020-2024 Business Plan Range	2020-2024 Results
Fuel	**Unit of Measurement**	**Savings Category**		
Gas	Therms	Total Regional[1]	11-18M	4.7M
Gas	Tons	Avoided Carbon	n/a	23,800 tons

As NEEA continues to invest in emerging technology opportunities for the portfolio, additional savings streams will continue to materialize. NEEA's focus for the 2025-2029 business cycle will be on: dual-fuel, fuel neutral products and systems, and commercial opportunities that are relevant to all funders of the portfolio. NEEA's gas portfolio will be managed with two related goals: 1) maximize near-to-medium term energy savings, and 2) maintain the flexibility to strategically advance products with the highest likelihood for achieving significant savings. See Appendix A below for more information about the portfolio status.

Additional Metrics

In addition to tracking and reporting the co-created energy savings for NEEA's regional portfolio, NEEA staff also estimates the regional value of a set of additional metrics.

Benefit Cost Assessment

One such metric is the benefit cost assessment of the NEEA portfolio. For our current portfolio, there is one market transformation program that has advanced into market development: Efficient Rooftop Units. Leveraging regional assumptions and data from the Northwest Power and Conservation Council's (NWPCC) ProCost tool, NEEA has assessed the benefit-cost ratio for this program at 1.1. As new programs advance into market development, we will add those to the portfolio aggregation for this metric.

Avoided Carbon Emissions

NEEA staff also partners with the NWPCC to enable the regional reporting for avoided carbon emissions. For the estimation of avoided carbon emissions, NEEA includes the benefit from all of the co-created savings of the gas portfolio. The 2024 co-created savings value of 887,391 Therms translates to a total of over 5,900 tons of avoided carbon emissions in 2024, at a monetized value of $420,267[2].

[1] NEEA's 2020-2024 Business Plan only included Total Regional Savings forecast range for Natural Gas.

[2] Avoided emissions are monetized using the Social cost of Carbon with a 2.5% discount rate. This value for 2024 is $71.23/ton.

Appendix A: Regional Gas Portfolio Update

NEEA is developing and advancing new energy efficiency measures to add to its savings portfolio. Annual gas savings will increase over time as programs in the portfolio advance into full-scale market development (Appendix B). Table A.1lists NEEA's expectations for gas savings and the remainder of this appendix provides more detail about the progress toward meeting these goals.

Table A.1: Savings Expectations

Program	Products	Status
Commercial New Construction	Specific proposals advanced in 2018 Washington State Energy Code & future codes	Savings phase out in 2025 with adoption of the 2021 WSEC as the code moves builders to choose electric options. NEEA is shifting focus to future code options for high performance gas technology such as gas water heaters and gas/electric combo heat pumps. NEEA will also conduct research to monitor changes in building practices over time.
Residential New Construction	Specific proposals advanced in 2018 Washington State Energy Code & future codes	
Efficient Rooftop Units (ERTU)	Efficient Rooftop Units (ERTU)	The program accelerates the adoption of efficient gas rooftop units in the like-for-like replacement market while working to influence the adoption of improved test procedures. NEEA is reporting savings from this program. In 2024, NEEA updated the specification to emphasize a fuel-neutral approach focusing on ERTU cabinet design and shell measures. This adjustment should help to gain better attention in the supply chain to secure commitments to this product and increase speed of market adoption
Standards	Commercial Kitchen Equipment (WA)	NEEA compiles critical market data and insights that inform voluntary local, state, and federal standards. No additional savings from new standards occurred in 2024.
Advanced Commercial Water Heating	Gas Heat Pump Water Heaters	The program moved into the Program Development stage of NEEA's Initiative Lifecycle (**Appendix B**) and is investing in research and field demonstrations that will inform market transformation strategy while validating the product performance and energy savings. NEEA will report any savings from field demonstration projects in 2025, with additional savings starting as early as 2026.
Gas High-efficiency Dedicated Outdoor Air Systems (DOAS)	Gas High-efficiency Dedicated Outdoor Air Systems (DOAS)	This program will focus on transforming the market for commercial gas hydronic systems. Due to the ability to build off the market relationships and progress made by the existing Very High Efficiency (VHE) DOAS program in the electric portfolio, NEEA is expecting to propose this program for advancement directly into the Market Development phase of the Lifecycle (**Appendix B**) in 2025.
Residential Dual-fuel Heating Ventilation and Air Conditioning (HVAC)	Dual-fuel system with a heat pump and gas furnace with controller	This program will be brought forward for consideration to advance to the Program Development phase of the Initiative Lifecycle (**Appendix B**) in Q3 2025.

Efficient Rooftop Units

The Efficient Rooftop Units program advanced to Market Development[3] in late 2022. The program's goal is to accelerate the adoption of efficient gas rooftop units in the like-for-like replacement market while working to influence the adoption of improved test procedures and more stringent federal standards.

In 2024, the program updated its measure specification to emphasize a fuel-neutral approach that focuses on the rooftop unit cabinet design and shell measures - cabinet insulation, low-leakage dampers, and heating/energy recovery. This new specification aligns with how builders select rooftop units where the heating type provided is an option after choosing product line and feature sets. The program made the change to enhance NEEA and partner influence to increase adoption of the most efficient options.

The program also worked to encourage manufacturers to develop and promote efficient rooftop units for the light commercial market. In 2024, one light commercial manufacturer designed and worked to bring an energy recovery ventilator product to market for use in their light commercial rooftop units. The manufacturer started production on initial products. NEEA continues to vet and support development of additional product lines to expand qualified choices to customers and drive down costs of efficient options.

Finally, the program completed a performance monitoring study for two efficient rooftop units installed in Portland in 2023. The study found that the efficient rooftop unit features contributed to the expected efficiency / energy savings, though it highlighted cost and compatibility barriers that need to be addressed to reach the like-for-like replacement market.

To measure savings, NEEA collects sales data annually from HVAC distributors and manufacturers in addition to data from the annual local utility program survey. NEEA is working to recruit additional distributors and manufacturer reps to gain a better view into efficient unit sales and expects improvement in market insight over time.

Advanced Commercial Water Heating

NEEA's Advanced Commercial Water Heating program centers on utilizing gas heat pumps as the primary heat source in commercial central water heating systems. A gas heat pump functions by transferring heat from one area to another while intensifying the heat during this process. NEEA anticipates the technology will enable water heating applications to achieve efficiencies of greater than 1.0 Thermal Efficiency and hold the technical potential to save the Northwest region more than 22 million Therms over a 20-year projection.

NEEA completed market research in 2024 indicating that most decision makers see gas heat pumps as an exciting new option and are impressed with their features, such as good return on investment and low operating costs.[4] Findings from the research will inform NEEA's market

[3] The purpose of this phase is to create lasting market change through direct market interventions designed to remove barriers, leverage market opportunities and tap influencers and existing channels for diffusion. Interventions are strategic, planned and adaptively managed as market dynamics change and more information is gained. During annual planning, NEEA staff look for the most impactful market levers and activities that could bolster or accelerate the achievement of alliance MT goals.

[4] Lieberman Research. 2025. Market Research on Existing Water Heater in Select Commercial Buildings.

transformation program planning and help identify key target markets for possible inclusion in future program efforts.

During 2025, NEEA is launching a North American Commercial Gas Hater Heating Market characterization funded by the North Amercian Gas Heat Pump Collaborative and led by NEEA and is in the screening and selection process for 2 sites for field demonstrations of the technology.

Gas High-Efficiency Dedicated Outdoor Air Systems

NEEA's goal is to build a portfolio of the most impactful market transformation opportunities for HVAC systems across gas and electric technologies/practices. In 2024, NEEA started a plan to add a gas option to its Very High Efficiency Dedicated Outdoor Air System specification and program. The addition will allow NEEA to more swiftly transform the commercial market through broader market engagement and demand creation. NEEA expects to publish the first Market Progress and Evaluation report for the program in 2025.

Residential Dual-Fuel HVAC

This program is currently in the Concept Assessment phase of the Initiative Lifecycle (Appendix B). The solution would pair a heat pump with a gas furnace to deliver an efficient combined HVAC system. To date, NEEA has partnered on multiple dual-fuel modeling, lab and field-testing projects in addition to convening regional stakeholders to share information about the pilot projects underway. NEEA is expecting to build off these findings to bring forward a proposal to advance to the Program Development Phase in 2025.

Efficient Residential Gas Water Heaters

In 2024, NEEA responded to policy directives in Washington by evolving the Natural Gas Market Transformation Portfolio to prioritize dual-fuel, fuel neutral, and commercial opportunities relevant to all funders. Because of this, as well as market headwinds that these products have been experiencing, NEEA is winding down activities in Efficient Residential Gas Water Heating. NEEA will continue engagement with North American Gas Heat Pump Collaborative, other utilities, and industry groups as a part of scanning to track the commercialization and market response to this product and its viability for inclusion in future building codes or product standards.

Appendix B: Initiative Life Cycle

NEEA has a robust stage-gate process for managing its programs called the “initiative lifecycle”. The ILC provides a set of core business processes & tools that ensure standardized management of investment, risk and best practices. Figure 1 shows how initiatives move through the cycle (from left to right) as NEEA learns more about their promise and potential for the region, the barriers preventing that promise from being achieved, and ways to leverage the power of the region to remove those barriers.The end of each phase is marked by a formal management review called a milestone. NEEA formally solicits approval from Natural Gas Advisory Committees at key program milestones.

Figure 1: Initiative Lifecycle

Memorandum

April 30, 2025

TO: Cost Effectiveness Advisory Committee

FROM: Ryan Brown, Manager, Planning and Analysis, NEEA

SUBJECT: Key Inputs and Assumptions Annual Reporting Update

This is a standing agenda item that is brought to the Cost Effectiveness and Evaluation Advisory Committee (CEAC) quarterly. During this time we bring forward new and updated assumptions and data source updates that inform the organization's market transformation savings and cost effectiveness calculations. As the Q2 2025 aligns with NEEA's annual stakeholder reporting process we are also providing a comprehensive reference for key assumptions NEEA uses in calculations. This Key Assumptions Report is available via the funder portal under the Key Assumptions Reports section.

Background on this standing agenda item:

The Cost Effectiveness and Evaluation Advisory Committee (CEAC) primary functions[1] include:

1. Review and advise regarding NEEA cost-effectiveness and savings information to inform annual reporting, and
2. Review and advise regarding market transformation cost and savings measurement and estimation methods.

NEEA staff provide various touchpoints for committee members throughout the year to support the committee in their execution of these charter objectives.

NEEA maintains a system of documentation and communication that includes three primary means for committee members to access documentation: methodology documents posted to a funder portal via neea.org[2], data provided in funder reports, and meeting materials and presentation content at each quarterly CEAC meeting (Figure 1).

[1] In addition to the two responsibilities listed above there are 3 more in the charter:

3. Review evaluation findings that affect cost and savings information to inform annual reporting.
4. Work with your organization to provide NEEA staff with relevant incentive data for regional tracking and reporting purposes.
5. Review and advise regarding new market research and evaluation methodologies.

[2] Link to the funder portal: https://neea.org/portal/sign-in

Northwest Energy Efficiency Alliance
700 NE Multnomah Street, Suite 1300, Portland, OR 97232
503.688.5400 | Fax 503.688.5447
neea.org | info@neea.org

Figure 1: System of Documentation for Key Inputs and Assumptions

Funder Portal neea.org	Funder Reports Emailed Directly	CEAC Meeting Materials Emailed in Packet
Updated in April	*Updated Q1/Q2, upon request*	*Updated Quarterly*
Data Sources List of data sources NEEA uses to estimate savings & cost effectiveness and explanation of approach	**Annual Report** Memo summarizing annual savings results and market updates	**Annual Summary** Memo summarizing portfolio savings & cost effectiveness results as well as program updates.
Cost Effectiveness Table ProCost Inputs for programs in Market Development	**Customized Workbook** Workbook with annual savings values, variance summaries, methodology descriptions, measure-level units and other key assumptions specific to the individual funder requests.	**Key Assumptions Update** Updates to key assumptions (baselines, savings rates, units estimates, etc.), along with contact information for follow-up questions.
Methodology Documentation Report on energy consumption calculations, data sources and technical assumptions		**Presentations** Slides describing results & updates to inputs used in NEEA's savings and cost effectiveness analyses.
Operational Guidelines Overview on energy savings & cost effectiveness calcs		

Updates for committee review this quarter:

For the Q2 CEAC meeting NEEA is presenting the following updates for the committee's consideration. Please come to the meeting prepared to ask clarifying questions and advise NEEA on any recommended improvements you would like to share.

- Retail Products Portfolio – Televisions
  - NEEA has updated our data processing pipeline with a newly available list of product test data leading to new market share and Unit Energy Savings (UES) estimates.
- Manufactured Homes
  - Unit Energy Savings (UES) values were updated using Regional Technical Forum (RTF) analysis to develop electric savings rates in alignment with the 2021 Power Plan Baseline.
- Residential New Construction
  - Various assumptions and inputs were updated that impact estimated savings from residential building code. See below for a summary and the attached memo for a more detailed description of the updates.
- Extended Motor Products: Pumps
  - The pumps program added two new distributor partners and will incorporate sales data provided by them for reporting and forecasting going forward.
- Luminaire Level Lighting Controls
  - NEEA added an additional participating manufacturer that is now included in the market dataset used for reporting.
- Heat Pump Water Heaters

    - Updated treatment of new construction units reported against the 2021 Power Plan baseline.
    - Inclusion of findings from the Oregon Code Compliance study about the rates of HPWHs used in new construction in the state.
- Ductless Heat Pumps
    - Unit Energy Savings (UES) values were updated for single family homes with zonal heat and single family and manufactured homes with electric forced air furnaces.

Please continue reading below for more details on these updates.

Retail Products Portfolio (RPP)

The program works with extra-regional program administrators and national retailers to utilize midstream incentives that signal energy efficient options in the supply chain while gaining access to full-category sales data. The incentives encourage manufacturers and retailers to build, purchase, stock and promote high-efficiency products. Products include white goods, air cleaners, televisions and other home electronics. The data retailers provide allows NEEA to identify the most promising affordable energy efficiency opportunities and gain insights that improve energy test procedures, helping consumers distinguish between products. Currently, the program is comprised of a portfolio of ENERGY STAR products including Televisions, Refrigerators, Freezers, Clothes Washers, Clothes Dryers, Air Cleaners, and Room Air Conditioners.

Key Assumptions Update

In early 2024 NEEA began developing a data processing pipeline for Televisions that would match models in a purchased set of sales data to product testing information and enhance the dataset with energy use attributes. NEEA developed the test procedure for televisions that is now required by the US Department of Energy (DOE) and while some data is reported by the DOE, it is not sufficient to determine energy performance.

Through most of 2024 the only publicly available set of test data that used this test procedure were the sample of models that NEEA and other efficiency advocates tested. In late 2024 the California Energy Commission required reporting for TVs and published all test data on their Modern Appliance Efficiency Database[3]. Using this test dataset NEEA was able to increase the rate of positive matches in our data pipeline and improve our estimates of the market share of TVs that meet the requirements of ENERGY STAR v9 and that NEEA reports savings on.

This new set of test data allows NEEA to override our previously conservative estimation method for market share and update average wattages that are used in unit energy savings calculations (see table 1 below for an example).

Table 1: Wattage and Unit Energy Savings for Televisions by Screen Size Bin for 4K LED UHD Televisions

	Size	**Non-Qualifying** TVs (W)	**Non-Qualifying** Limit for TVs (W)	**Qualified** TVs (W)	**Qualified** Limit for TVs (W)	UES (W)	UES (kWh)
On-mode power							
Medium	39"<x<=49"	71	69	65	74	11	20
Large	49"<x<=59"	107	95	87	102	27	48
Extra Large	59"<x<=120"	206	164	143	164	64	117
Standby Mode Power							
Medium	39"<x<=49"	15.7		0.5		15.2	106
Large	49"<x<=59"	15.7		0.5		15.2	106
Extra Large	59"<x<=120"	15.7		0.5		15.2	106

[3] MAEDBS Quick Search

Powers are based on the average on mode power for Limit 1 (efficiency only, not the power cap). The UES is determined by looking independently at the difference between the power of non-qualifying TVs and their limit and adding to the difference of qualifying TVs and their limit. This takes into account the fact that qualifying and non-qualifying TVs may not have the same limits and that qualifying TVs are below their limit.

UES (W) = (Non-Qualifying Wattage – Non-Qualifying Limit) + (Qualifed Wattage – Qualified Limit)

Watt savings are then converted to kWh using the following assumptions about hours in on mode.

Conversions	
Days	365.25
Hours On	5
Standby Hours	19
kWh/watts	1000

These wattages replaced prior conservative estimates that were based on the more limited set of available test data mentioned above and resulted in savings rates that increased for on mode from 44 kWh to 78 kWh in 2024. The UES for standby mode changed by less than 1% with this update.

These updates to market share and savings rates taken together significantly increase the amount of reportable savings for 2024 and in the forecast (currently 12.5 aMW of co-created savings for 2025-2029, up from 8.6 aMW in prior forecasts).

For more information contact Eugene Pham-Gittens, Market Analyst, at EPham-Gittens@neea.org.

Manufactured Homes

The Manufactured Homes market transformation program developed an enhanced, above code specification (NEEM 2.0), and demonstrated its market value by providing manufacturers/retailers with tools and resources to drive consumer demand. The program goal is to bring more efficient products and options to the market.

Data collected from the program proved impactful for the U.S. Department of Energy (DOE) when they updated the standard applicable to manufactured homes. The compliance date for multi-section manufactured homes is July 1, 2025. This program moved into the market diffusion (formerly long-term monitoring and tracking) phase of NEEA's Initiative Lifecycle in 2024.

Key Assumptions Update

The Regional Technical Forum recently approved new Unit Energy Savings (UES) values for Manufactured Homes. NEEA is using the RTF analysis to develop electric savings rates in alignment with the 2021 Power Plan Baseline.

For new manufactured homes, NEEA's recent reporting of electric savings against the 2021 Power Plan Baseline has utilized savings rates relative to a non-NEEM average Northwest manufactured home, leveraging RTF Unit Energy Consumption (UEC) estimates. With the recently updated analysis generated by the RTF (v6_0 approved in November 2024), NEEA is updating the 2021 Power Plan Baseline to reflect the estimated 2020 market efficiency mix, calculated based on the shipment market shares of non-NEEM, NEEM v1.1, and NEEM v2.0 manufactured homes. The approach develops separate market efficiency mix baselines for electric-heated homes versus homes using gas or other heat to avoid the potential impacts of fuel selection changes that can affect a combined baseline. The approach also separates homes by size / number of sections – 1, 2, or 3 or more sections so as to control for potential differences in utility value across home sizes. A 2021 Power Plan Baseline market efficiency mix is therefore developed for six segments (2 heating fuels x 3 sizes), using UECs provided in the v6_0 RTF analysis.

Assumptions

Gaps in market data necessitate additional assumptions to inform baseline and savings calculations. In particular, sufficiently granular data is not currently available to distinguish the heating fuel mix of non-NEEM homes, or to distinguish the distributions of heating fuel by home size (# of sections) for those non-NEEM homes. We therefore assume that 70% of non-NEEM homes utilize electric heating, and 30% gas or other fuel. This estimate is intended to be conservative, as rates of electric heating in NEEM homes ranged from 82% to 94% between 2018 and 2024 per NEEA analysis of NEEM data. We additionally assume that the same home size (number of sections) distribution applies to electric and gas heated homes, matching the size distribution for all non-NEEM homes (available in the source data) for that year. Consistent across all analyses, we also assume that for electrically heated homes, 40% use a heat pump and 60% use electric resistance heating (per RTF).

Our data sources additionally have a gap in tracking how non-NEEM siting is distributed across regional climate zones. We therefore utilize climate zone weights (Table 1) derived from an analysis of the RBSA II manufactured homes sample to represent the distribution of new manufactured homes across regional climate zones for calculating the 2021 Power Plan baseline. This weighting considers both heating and cooling zone, and differs from the most recent RTF analysis (v6_0) which aggregates cooling zones within each heating zone.

Table 1: Climate Zone Weights

Heating Zone	Cooling Zone	Weight
HZ1	CZ1	45%
HZ1	CZ2	8%
HZ1	CZ3	15%
HZ2	CZ1	6%
HZ2	CZ2	17%
HZ2	CZ3	1%
HZ3	CZ1	8%
HZ3	CZ2	1%
HZ3	CZ3	0%

Results

Estimated 2024 savings rates for non-NEEM, NEEM 1.1, and NEEM 2.0 new manufactured homes are presented in Table 2 (gas or other heat) and Table 3 (electric heat), utilizing the previous reference (non-NEEM home efficiency) and the updated 2021 Power Plan baseline (2020 market efficiency mix).

Table 2: Gas or Other Heat Homes estimated 2024 Savings Rates and updated 2021 Power Plan Baseline

			Number of Sections		
Space Heat	**Comparison**	**Efficiency**	**1x**	**2x**	**3x**
Gas or Other	2020 Market Average UEC (for 2021PP Baseline)	All	1,181	1,231	1,378
	2024 Savings Rate vs non-NEEM	Non-NEEM	0	0	0
		NEEM v1.1	403	398	454
		NEEM v2.0	493	494	560
	2024 Savings rate vs 2021PP Baseline	Non-NEEM	(53)	(100)	(175)
		NEEM v1.1	350	297	279
		NEEM v2.0	440	394	386

Table 3: Electric Heat Homes estimated 2024 Savings Rates and updated 2021 Power Plan Baseline

			Number of Sections		
Space Heat	**Comparison**	**Efficiency**	**1x**	**2x**	**3x**
Electric	2020 Market Average UEC (for 2021PP Baseline)	All	5,418	6,852	10,107
	2024 Savings Rate vs non-NEEM	Non-NEEM	0	0	0
		NEEM v1.1	2,091	2,201	3,023

		NEEM v2.0	2,564	2,882	3,971
	2024 Savings rate vs 2021PP Baseline	Non-NEEM	(760)	(1,159)	(1,961)
		NEEM v1.1	1,330	1,042	1,062
		NEEM v2.0	1,804	1,723	2,010

Data sources:

- 2020 and 2024 NEEM program data provided to NEEA by Northwest Energy Works
- New Manufactured Homes and HVAC workbook v6_0 approved at the November 2024 RTF meeting
- Census MHS data through November 2024; full year 2024 results are extrapolated

For more information contact Aaron Ingle, Senior Market Analyst, at AIngle@neea.org.

Residential New Construction: Building Energy Codes

NEEA aggregates and leverages the power of the region to identify and vet emerging technologies and create the market conditions necessary for the technologies to take hold. This work supports builder decisions and practices to become more energy efficient, making homes more affordable to operate. The alliance helps the region instill these voluntary interventions by informing codes that represent Northwest business needs.

Key Assumptions Update

Many of the inputs NEEA uses to estimate savings from residential new construction come from energy use modeling and code compliance evaluations. Table 1 lists some of the updates made for the *2024 Annual Savings Report* based on these and other new data sources. The attached memo provides more detail.

Table 1: Key Assumptions Updates for Residential New Construction

Region	Key Assumptions Update	Key Notes
Montana	Added savings from the 2021 International Energy Conservation Code (IECC) w/Montana amend. Based on Simplified Energy Enthalpy Model (SEEM) by Energy 350.	Analysis resulted in 3-7% electric savings over the prior code from: • Improved ventilation fan efficiency • Improved lighting efficiency improvement • Additional packages (select one): envelope thermal resistance, HVAC equipment efficiency, water heating equipment efficiency, HVAC distribution system efficiency, and envelope air sealing + ventilation efficiency.
Montana	Updated Market Assumptions based on draft code compliance evaluation.	Increased the percentage of homes built with electric space heating from 2 to 11%. Increased the assumed code compliance from 73% to ~85%.
Oregon	Added electric savings from the 2023 Oregon Residential Specialty (ORSC) using a combination of data sources: • Energy Studies in Buildings Laboratory, University of Oregon. Aug. 21, 2023. Performance Comparison among 2005, 2017, 2021, and 2023 Oregon Residential Specialty Code and Department of Energy Zero Ready Home National Program Requirements.[4] • Oregon Building Code Division. 2024. Master Progression 2005-2017-2021-2023-ZERH-2026 Results (3-1-25).xlsx.	Analysis resulted in 5-6% electric savings per home and 12-15% gas savings per home with gas space heating over the prior code. NEEA will finalize its savings analysis in Q3 based on ongoing SEEM analysis by Ecotope.

[4] UO-ESBL_ORSC_DOE-ZERH_comparison_technical_report.pdf

	• Ecotope. 2021. OR_SEEMTemplate_v1_9. Analysis of the ORSC 2027 and 2021.	
Oregon	Updated market assumptions based on a draft code compliance evaluation.	Increased the percentage of homes built with electric space heating from 19 to 41%.
Oregon	Corrected the multifamily savings rate for the 2021 ORSC to account for a larger share of multifamily homes using zonal space heating systems.	The savings rate declined from 310 kWh per multifamily home to 0 kWh. The zero savings reflect how the code was written and the modeling selections as opposed to the actual building practices.
Washington	Added electric savings from the 2021 Washington State Energy Code (WSEC)	Analysis resulted in 1-4% electric savings per home. Gas savings phase out in September 2024.
Washington	Updated the 2018 WSEC Savings Rate	Increased electric savings rate by 45% to 1,507 kWh/Home
All	Updated new construction estimates	Idaho saw the largest change of +39% new construction over 2023. Oregon and Washington saw a slight decline.

For more information contact Christina Steinhoff, Principal Analyst, at csteinhoff@neea.org.

XMP Pumps

The XMP Pumps program engages with manufacturers, distributors, and trade associations to increase adoption of energy efficient motor-driven products through improving product differentiation and increasing market awareness. As awareness increases and the identification of efficient products becomes more apparent, market adoption will increase. Ultimately, NEEA will utilize its experience as well as data it collects to support businesses and homeowners in choosing products that perform well and save energy.

Key Assumptions Update

The XMP Pumps program recently added two new distributor partners to the program. These partners are active across the NEEA region and in Montana in particular. The addition of these partners to the program will improve the coverage of NEEA's data collection across the region and will begin the XMP pumps program's expansion into the agricultural sector. Savings from these partners will be tracked beginning with 2025 reporting.

For more information contact Evan Hatteberg, Senior Technical Market Analyst, at ehatteberg@neea.org.

Luminaire Level Lighting Controls

The Luminaire Level Lighting Controls (LLLC) program engages key manufacturers and their supply chain to enhance promotion and sales in the Northwest, builds market awareness and capabilities via regional and national industry organizations as well as key market influencers and early adopters. LLLC is a current voluntary option for meeting code requirements. The program works towards LLLC becoming a common practice to affordably and efficiently light new and existing commercial buildings.

Key Assumptions Update

Through a third-party data aggregator, NEEA has been collecting shipment data for LLLC from seven LLLC manufacturers on the DesignLights Consortium's (DLC) Qualified Products List, covering the four Northwest states: Idaho, Montana, Oregon, and Washington. In 2024, an additional LLLC manufacturer began contributing shipment data, resulting in a notable increase in the total reported volume. NEEA estimates that shipments from these eight participating manufacturers represent approximately 50% of all LLLC shipments within the region.

To estimate total LLLC shipments in the region, NEEA assigns market shares to each DLC-listed LLLC manufacturer based on historical sales data obtained from regional lighting distributors[5], as well as more recent market intelligence and insights gathered through ongoing engagement with key market actors. These estimated market shares are then used to extrapolate the shipment data collected by the third-party aggregator to represent the broader Northwest market. In 2022, the Cadmus Group reviewed[6] the extrapolation methodology and found it to be reasonable and supported by both quantitative and qualitative sources. NEEA continuously seeks opportunities to collect additional LLLC data to provide the most accurate estimate of LLLC shipments in the Northwest.

For more information contact Kathryn Bae, Principal Market Analyst, at kbae@neea.org.

[5] NEEA concluded LLC shipment data collection from lighting distributors in 2020 to pursue collecting data from LLLC manufacturers.

[6] https://neea.org/img/documents/2022-Luminaire-Level-Lighting-Controls-Key-Assumptions-Review.pdf

Heat Pump Water Heaters

The Heat Pump Water Heater program works upstream with water heater manufacturers to influence product development and build capability in the supply chain on heat pump technology and quality installation. NEEA's ongoing engagement is crucial for addressing market barriers and preparing the region to adopt and benefit from the recently adopted federal standard. NEEA is supporting the Northwest market by working to strengthen the workforce and engage both regionally and nationally to identify solutions to increase adoption of these water heaters across the region, with particular focus on areas with slower adoption rates.

Key Assumptions Update

NEEA coordinated with Northwest Power and Conservation Council staff to better align savings accounting practices with the original Power Plan baseline for Heat Pump Water Heater units installed in new construction to meet Washington code. NEEA is now using the current Regional Technical Forum savings values for above-code new construction when reporting savings from installations in Washington new construction rather than discounting savings to account for the impacts of codes. Because the units are used to meet a state code, NEEA is allocating the savings to its funders that use the Power Plan baseline report based on a service territory methodology. This update is specific to savings reported for the 2021 Power Plan and will only impact savings provided in the 2021 Power Plan Report

NEEA has also updated the market share for new construction based on results from the ORSC 2021 Residential Code Compliance Evaluation[7]. As seen in table 2 below, the study observed a 15% increase from 37% to 52% in new homes built with electric water heating. Of those, approximately 83% installed a heat pump water heater. These updates are reflected in NEEAs 2024 and forecasted estimates for new construction units.

Table 2. Oregon domestic hot water fuel source and type

		Statewide
Fuel Source	Natural Gas	48%
	Electric	**52%**
Type	Gas Tank	19%
	Gas Tankless	29%
	Electric Resistance	9%
	Electric Heat Pump	43%
Share of Electric DHW that is Heat Pump		43%/52%= **83%**

For more information contact Tim Runyan, Senior Market Analyst, at trunyan@neea.org.

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Ductless Heat Pumps

The Ductless Heat Pump program accelerated market acceptance and adoption of inverter-driven ductless heat pumps in electrically heated homes through establishing relationships with manufacturers, distributors, and retailers to enhance product design and availability. NEEA formally began its program in 2008 with a large-scale pilot project to demonstrate the product and assess its performance in the field. As of now, more than 150,000 Ductless Heat Pumps have been installed. NEEA is now monitoring the diffusion in the market. NEEA is using learnings from this program to support new advanced heat pump technology.

Key Assumptions Update

In Q4 of 2024, the Regional Technical Forum (RTF) updated savings rates for Ductless Heat Pumps installed under measures for Single Family Zonal and Electric Forced Air Furnace for Single Family and Manufactured Homes. Despite discussing an alternative approach with CEAC in Q4 2024, in subsequent discussions with NW Power and Conservation Council and Regional Technical Forum staff it became clear that the appropriate approach would be for NEEA to align with the updated savings rates for these measures. Through these discussions it became clear that the RTF's approach was better aligned with NEEA's datasource and estimation methods than it appeared when this topic was brought to the committee in Q4 2024.

These updates decreased the savings rates by an average of 3% for single family zonal units and an average of 28% for single family homes with electric forced air furnaces.

For more information contact Tim Runyan, Senior Market Analyst, at trunyan@neea.org.

Memorandum

April 11, 2025

TO: Cost Effectiveness Advisory Committee

FROM: Christina Steinhoff, Principal Analyst

SUBJECT: Residential Codes Key Assumptions Updates

NEEA's work to bring energy efficiency to market often informs codes, leading to additional energy savings to report. NEEA measures these code savings as the difference in whole-building electric or gas energy use between the new building energy code requirements and the prior code requirements. NEEA reports the savings out for 10 years.[1]

Although codes can push industry practices to go beyond code minimums, the intent of code-to-code measurement is to:

1. **Inform Code Development:** Building practices range from noncompliance to exceeding code requirements. NEEA does not attempt to measure energy savings based on the change in building practices. Instead, NEEA is measuring the value of locking in more stringent requirements and tracking code progress over time to support long-term planning. Understanding the code-to-code effect provides a basis to measure the code without incorporating assumptions about changes in building practices.
2. **Avoid Double Counting:** Regional programs often use codes as a baseline condition for their energy efficiency measures. The code-to-code savings approach is a straightforward method to avoid double counting savings reported through other regional programs.
3. **Provide Transparency:** Reporting code-to-code savings does not require tracking and communication of additional assumptions about above-code activities captured in the savings analysis. This transparency allows the region to use the analysis in its load planning efforts.
4. **Reduce Uncertainty:** Incorporating industry standard practice into the savings modeling requires research to define the standard practice and analysis on the code's influence of those practices. These variables create additional uncertainty in the savings analysis.

Many of the inputs NEEA uses to estimate these savings come from energy use modeling and market data from code compliance evaluations. This memo covers updates to these assumptions for Montana, Idaho, Oregon, and Washington.

[1] For funders aligning with the Northwest Power and Conservation Power Plan, NEEA reports the savings for code approved after 2021.

Contents

Montana

NEEA is reporting Net Market Effects savings in 2024 for the 2012[2], 2018, and 2021 International Energy Conservation Code (IECC). The 2018 and 2021 codes also count toward the 2021 Power Plan conservation targets.

NEEA updated the savings analysis for the 2024 Annual Report based on:

- New energy use modeling for the 2021 IECC with Montana amendments,[3]
- Market driven and Compliance changes identified in NEEA's recent code compliance evaluation,[4]
- Climate zone alignment with the Regional Technical Forum (RTF),[5]

[2] Montana adopted the 2012 IECC in late 2014 and jurisdictions began enforcement in 2015.
[3] Nicholas O'Neil, Director of Research & Evaluation Energy 350. 2025 2021 Code Savings Assumption Review
[4] Inc. (IEc), Resource Refocus LLC. 2025. Draft Montana Code Compliance Evaluation by Industrial Economics.
[5] Regional Technical Forum. 2022. Climate Zone Calculation Workbook.

- Final new construction estimates based on the Department of Housing and Urban Development (HUD) permits and Dodge Data & Analytics construction estimates.[6,7]

Overall, the changes increased the 2024 estimate by 40% to 0.78 aMW from NEEA's prior forecast.

The following sections explain the updates.

Energy Use Modeling

NEEA worked with Energy 350 to develop a savings rate for the 2021 IECC with Montana amendments using the RTF's Simplified Energy Enthalpy Model (SEEM). The analysis assumes that builders will choose a combination of ducts inside and HVAC system upgrades (assuming 10 HSPF and 16 SEER Heat Pump) to meet the new code. Table 1 shows the resulting savings rates. This analysis provided an additional 0.21 aMW savings in 2024. More information about the analysis will be available from Energy 350 in May upon request.

Table 1: Electric Energy Savings Estimate for IECC 2021 with Montana amendments

Housing Type[8]	Energy Consumption (kWh/Home)		Savings Rate per Home (kWh/Home)
	IECC 2018 with Montana Amendments	IECC 2021 with Montana Amendments	
Single-family Home	7,047	6,416	631
Multi-family Home	10,214	9,964	251

Analysis by Energy 350. 2025. See Nicholas O'Neil, Director of Research & Evaluation Energy 350. 2025. 2021 Code Savings Assumption Review for details. This update affects 2023 savings as well.

Market Driven Changes and Compliance

NEEA also updated market assumptions based on a draft version of the Montana Residential Code Compliance Evaluation.[9] The evaluation, which will be published by NEEA in Q2 2025, measures the market's response to residential building energy codes and assesses statewide compliance with both the 2018 and 2021 IECC with Montana amendments, The following sections explain some of the updates pulled from the evaluation.

Fuel Selection

The draft evaluation showed a shift from gas to electric space heating (Table 2), which increased the savings rate for the 2021 code by 45% due to HVAC system upgrades. In contrast, the savings rate for the 2018 code and the earlier 2012 IECC with Montana amendments remained largely unchanged (<3%) because most savings were derived from non-space-heating measures like lighting and fan energy.

Table 2: Updates to the Fuel Selection Weights

Fuel System	Previous Weights	Update Weights
Gas without AC	1%	1%
Gas with	97%	88%
Heat Pump	2%	9%
Zonal	0%	2%

[6] Department of Housing and Urban Development. February 2025. Permit Data ID, MT, OR, and WA.
[7] Dodge Data & Analytics. 2025. Construction Starts Information - 4th Quarter Forecasts based on Historical Data as of 2024Q3. States of ID, MT, OR, WA.
[8] Single-family includes townhomes and condos. Multifamily represents attached units less than 4 stories high.
[9] The study follows the methodology specified in the U.S. Department of Energy (DOE)'s Residential Building Energy Code Field Study: Data Collection & Analysis

Update is based on draft results from Montana Code Compliance Evaluation by Industrial Economics, Inc. (IEc), Resource Refocus LLC. Previous value came from PNNL. April 2019. Montana Residential Energy Code Field Study.

Building Size and Foundation

The study also found more use of crawl spaces than the prior estimates (Table 3). The update decreased the 2018 code savings rate by 6% and the 2021 code savings by 4%.[10]

Table 3: Foundation and Size Weights

Square Feet	Foundation	Previous Weights	Updates
1344	Slab	14%	7%
1344	Crawl Space	6%	19%
2200	Slab	27%	13%
2200	Crawl Space	14%	44%
2688	Basement	37%	17%
5000	Basement	3%	1%

Update based on draft results from Montana Code Compliance Evaluation by Industrial Economics, Inc. (IEc), Resource Refocus LLC. Previous value came from Ecotope.

Code Compliance

The compliance study estimated that 85.9% of residential homes are code-compliant under the 2018 IECC with Montana amendments, and 84.7% under the 2021 IECC with Montana amendments. These results are higher than NEEA's placeholder of 73%. The 73% value was a Pacific Northwest National Laboratory (PNNL) field study[11] showing compliance for envelope tightness was 73%, although many homes exceeded the requirements.

Climate Zone Distribution

NEEA also updated the climate zone weights for the statewide savings rate based on the RTF's Climate Zone Calculation Workbook v3.2[12] (Table 4). The update had minimal effect on the savings for the codes.

Table 4: Climate Zone Weights

Heating and Cooling Zones	Previous Weights	Update Weights
Heating Zone 2 Cooling Zone 1	7%	13%
Heating Zone 2 Cooling Zone 2	29%	32%
Heating Zone 2 Cooling Zone 3	0%	2%
Heating Zone 3 Cooling Zone 1	50%	42%
Heating Zone 3 Cooling Zone 2	14%	8%
Heating Zone 3 Cooling Zone 3	0%	4%

Update based on Regional Technical Forum. 2022. Climate Zone Calculation Workbook. Previous value came from Ecotope.

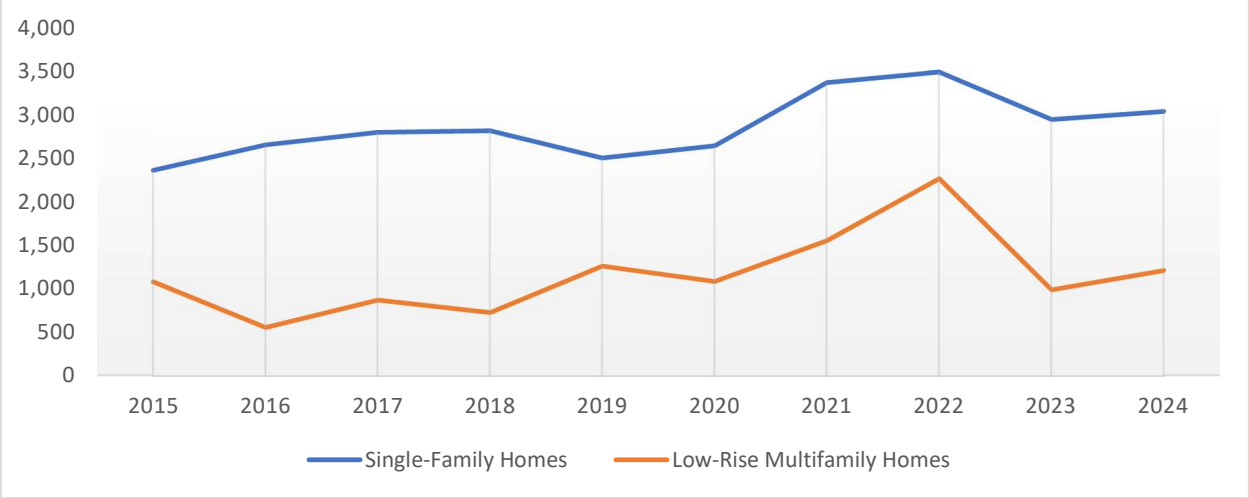
New Construction

Finally, NEEA updated the new construction estimates for the state of Montana. The new construction estimates are based on permit data from HUD. NEEA lags the permitting date by six months to account for construction time. NEEA estimates the share of 5+ multifamily units that meet the

[10] NEEA did not have granular enough data to update the foundation and building size assumptions for *IECC 2012 with Montana amendments*.
[11] Pacific Northwest National Laboratory. *2019 Idaho and Montana Residential Energy Code Field Studies*.
[12] Climate Files | Regional Technical Forum

definition of low-rise multifamily (4 stories or less) using construction estimates by Dodge Data & Analytics. Figure 1 shows that the new construction units increased from 2023.

Figure 1: New Construction Estimates for the State of Montana



The new construction estimates are based on permit data from the Department of Housing and Urban Development. To account for construction time, NEEA lags the permitting date by six months to estimate construction completion. NEEA estimate the share of 5+ multifamily less than 4 stories high using construction estimates by Dodge Data & Analytics.

Idaho

NEEA is reporting Net Market Effects savings in 2024 for the 2018 IECC with Idaho amendments and some savings for the 2012[13] version of the code. The 2018 code also counts toward the 2021 Power Plan conservation targets.

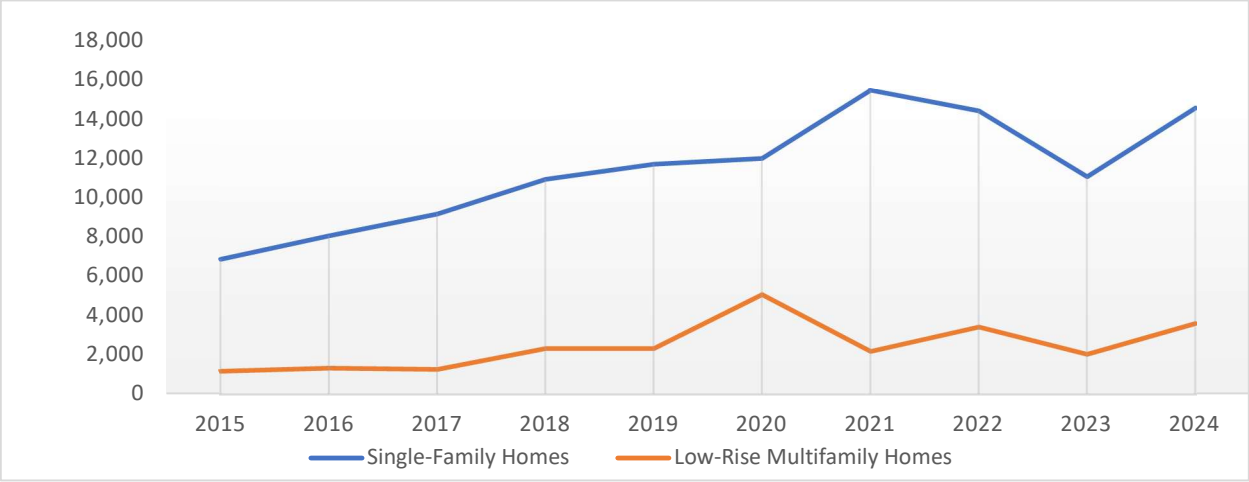
NEEA completed a code compliance evaluation[14] for Idaho in 2023 and updated the compliance and fuel mix assumptions as part of the *2023 Annual Savings Reports*. For the *2024 Annual Savings Report*, the updates were limited to final new construction estimates.

New Construction

The new construction estimates are based on permit data from the HUD. NEEA lags the permitting date by six months to account for construction time. NEEA estimates the share of 5+ multifamily units that meet the definition of low-rise multifamily (4 stories or less) using construction estimates by Dodge Data & Analytics. Figure 2 shows that the new construction single-family units increased by 39% from 2023.

[13] Idaho adopted the 2012 IECC in 2014 with an effective date in 2015.
[14] https://neea.org/resources/idaho-residential-code-compliance-evaluation

Figure 2: New Construction Estimates for the State of Idaho



The new construction estimates are based on permit data from the Department of Housing and Urban Development. To account for construction time, NEEA lags the permitting date by six months to estimate construction completion. NEEA estimate the share of 5+ multifamily less than 4 stories high using construction estimates by Dodge Data & Analytics.

Oregon

NEEA is reporting Net Market Effects savings in 2024 for the 2017, 2021, and 2023 Oregon Residential Specialty Code (ORSC). The 2021 and 2023 codes also count toward the 2021 Power Plan conservation targets.

NEEA updated the savings analysis based on:

- Draft savings rates estimated for the 2023 code using a combination of data sources,
- Market driven changes identified in NEEA's draft Code Compliance Evaluation for Oregon,
- A correction to the HVAC system weightings for multifamily homes complying with ORSC-2021,
- Final new construction estimates based on HUD permits and Dodge data.

Overall, the changes decreased the 2024 estimate by 4% to 1.54 aMW from NEEA's prior forecast.

The following sections explain the updates.

Energy Use Modeling

NEEA aligns with the RTF when modeling energy consumption at a system level. Recently, the RTF moved from SEEM to an EnergyPlus tool called the Residential Energy Efficiency and Demand Response tool (REEDR). NEEA planned to switch to REEDR after running a comparison against SEEM. However, challenges to changing inputs for ventilation and water heating performance led NEEA's contractor, Ecotope, to recommend using SEEM. These unexpected challenges also pushed out the timeline to September for Ecotope to complete work on the 2023 ORSC. In the meantime, NEEA combined the following resources to estimate 0.06 aMW of savings in 2024 for the new code.

- Energy Studies in Buildings Laboratory, University of Oregon. Aug. 21, 2023. Performance Comparison among 2005, 2017, 2021, and 2023 Oregon Residential Specialty Code and Department of Energy Zero Ready Home National Program Requirements.[15]

[15] UO-ESBL_ORSC_DOE-ZERH_comparison_technical_report.pdf

- Oregon Building Code Division. 2024. Master Progression 2005-2017-2021-2023-ZERH-2026 Results (3-1-25).xlsx.
- Ecotope. 2021. OR_SEEMTemplate_v1_9. Analysis of the ORSC 2027 and 2021.

The University of Oregon study provides total consumptions for the ORSC 2021 and the 2023 code (Table 5). NEEA applied weights from its draft Oregon Code Compliance Evaluation to estimate a decline of 6.5 % for the average home with heat pump systems. NEEA assumes these homes also use electric water heating.

Table 5: Savings Calculation for Single-family Homes with Heat Pump Space Heating

Climate Zone	Foundation	Energy Use Intensity (EUI) (kBtu/Ft^2-year)			Compliance Evaluation Weights
		ORCS-2021	ORSC-2023	Change	
4C	Slab	24.2	22.5	7.0%	3%
	Crawlspace	24.6	23.1	5.8%	78%
5B	Slab	28.3	25.1	11.3%	1%
	Crawlspace	28.6	26.1	9.0%	18%
		Heat Pump savings assumption:			**6.5%**

Energy Studies in Buildings Laboratory, University of Oregon. Aug. 21, 2023. Performance Comparison among 2005, 2017, 2021, and 2023 Oregon Residential Specialty Code and Department of Energy Zero Ready Home National Program Requirements. Tables 10 & 11. Weights come from draft results by Industrial Economics, Inc. (IEc), Resource Refocus LLC based on draft results of the Oregon Code Compliance Evaluation. The EUI is for regulated energy use only.

NEEA conducted the same analysis for homes with gas furnaces (Table 6). To estimate the share of these savings attributable to electric energy consumption, NEEA used estimates from the Building Code Division showing the difference in the percent decline from gas-heated homes with air conditioning and those without was 0.5%. NEEA multiplied the 0.5% by 12.9% to get 0.06% electric savings from homes with gas furnaces and air conditioning.

Table 6: Savings Calculation for Single-family Homes with Natural Gas Space Heating

Climate Zone	Foundation	Energy Use Intensity (EUI) (kBtu/Ft^2-year)			Compliance Study Weights
		ORCS-2021	ORSC-2023	Change	
4C	Slab	32.4	27.9	13.7%	3%
	Crawlspace	32.8	28.8	12.3%	78%
5B	Slab	38.5	32.0	16.9%	1%
	Crawlspace	38.9	33.0	15.0%	18%
		Gas-fired Furnace savings assumption:			**12.9%**

Energy Studies in Buildings Laboratory, University of Oregon. Aug. 21, 2023. Performance Comparison among 2005, 2017, 2021, and 2023 Oregon Residential Specialty Code and Department of Energy Zero Ready Home National Program Requirements. Tables 10 & 11. Weights come from draft results by Industrial Economics, Inc. (IEc), Resource Refocus LLC based on draft results of the Oregon Code Compliance Evaluation.

NEEA multiplied these percentage by its energy unit intensity estimates for the 2021 ORSC to get a savings rate of 331 kWh/home for single-family homes. **This is a proxy savings rate until NEEA can complete its own analysis using SEEM in September 2025.** The 2024 savings resulting from this analysis is less than 0.06 aMW because NEEA does not start counting savings until six months after the code compliance date (April 2024) to allow for build time.

Table 7: Electric Savings Rate for 2023 ORSC (Single-Family Homes)

	2021 ORSC	2023 ORSC		
	Electric EUI (kWh/Home)	Percent Savings	Weights	Electric EUI (kWh/Home)
Gas with Air Conditioning	6,034	0.1%	39%	4
Electric only Home	12,435	6.5%	41%	802
			Average Savings per Home:	**331**

The 2021 values come from Ecotope. 2021. OR_SEEMTemplate_v1_9. Analysis of the ORSC 2027 and 2021. Weights come from draft results by Industrial Economics, Inc. (IEc), Resource Refocus LLC. 2025. Oregon Code Compliance Evaluation.

NEEA used the same analysis for multifamily homes. However, to find the savings rate for zonal applications, NEEA used analysis by the Building Code Division showing that zonal savings is equivalent to 80.8% of the savings for homes with heat pumps, leading to an average savings per multifamily home of 327 kWh (Table 8). **This is a proxy savings rate until NEEA can complete its own analysis using SEEM in September 2025.** The 2024 savings resulting from this analysis is less than 0.01 aMW.

Table 8: Electric Savings Rate for 2023 ORSC (Multifamily Homes)

	2021 ORSC	2023 ORSC		
	Electric EUI (kWh/Home)	Percent Savings	Weights	Electric EUI (kWh/Home)
Gas without Air Conditioning	4,415	0.0%	0%	0
Gas with Air Conditioning	4,852	0.1%	20%	3
Electric Heat Pump	7,7487	6.5%	5%	483
Electric Zonal	9,204	5.2%	63%	480
			Average Savings per Home	**327**

The gas savings rate ranges from 12.9 to 14.7% for homes with gas space and water heating based on the Building Code Divisions estimates and the University of Oregon rates. **NEEA will update these estimates in September 2025 with analysis by Ecotope that accounts for varying adoption of gas space and water heating.** The draft 2024 savings resulting from this analysis 79,095 therms.

Market Driven Changes

NEEA also updated market assumptions based on a draft version of the Oregon Residential Code Compliance Evaluation.[16] The evaluation, which will be published in Q2 2025, measures the market's response to residential building energy codes and assesses statewide compliance with the 2021 ORSC, the following sections explain some of the updates pulled from the evaluation.

Fuel Selection

The draft evaluation shows a shift from gas to electric space heating in single-family homes (Table 9), which nearly doubled the average electric savings rate for the 2021 code to 336 kWh/home. In

[16] The study follows the methodology specified in the U.S. Department of Energy (DOE)'s Residential Building Energy Code Field Study: Data Collection & Analysis

contrast, the savings rate for the 2018 code had minimal change because much of the savings comes from lighting measures.

Table 9: Updates to the Fuel Selection Weights, Oregon

Fuel System Type	Previous Weights	Update Weights
Gas without AC	28%	20%
Gas with	56%	39%
Heat Pump	14%	41%
Zonal	2%	0%

Update based on draft results from Oregon Code Compliance Evaluation by Industrial Economics, Inc. (IEc), Resource Refocus LLC. Previous value came from PNNL. 2020. Oregon Residential Energy Code Field Study.

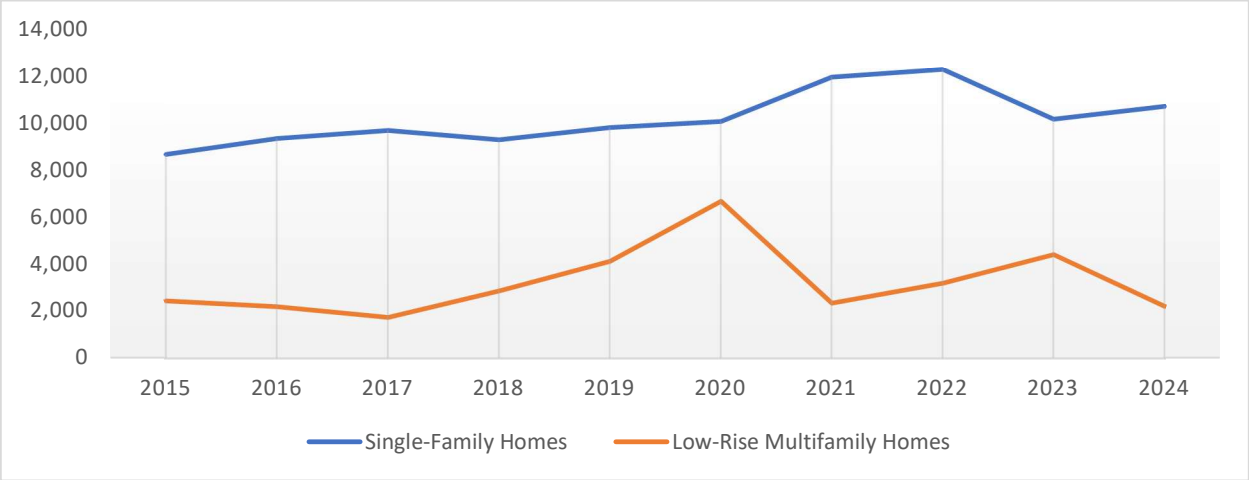
Correction to 2021 Code Savings Rate for Multifamily Homes

While updating the fuel mix for homes built in 2024, NEEA noticed the savings rate provided by Ecotope for the 2021 ORSC multifamily homes underestimated the share of homes with zonal heating systems. NEEA updated the weights based on prior assumptions provided by Ecotope, resulting in the savings rate declining from 310 kWh per multifamily home to 0 kWh. The zero savings reflect how the code was written and the modeling selections as opposed to the actual building practices. The state reduced the number of additional measure options in the 2021 code from two (one envelope + one HVAC/Water heating) to one. Under the 2017 ORSC, the model selected a high efficiency HVAC equipment package in 100% of cases. But under the 2021 ORSC, the HVAC option was only selected 29% of the time and the multifamily home zonal heating system assumption reverted to electric resistance for the other 71% of the time, leading to zero quantifiable savings for homes with zonal heating systems in comparison to how the 2017 code was written. The update reduced NEEA's reported Net Market Effects savings for 2023 by 0.14 aMW. NEEA will review this assumption as it models savings from the 2023 ORSC in late 2025.

New Construction

The new construction estimates are based on permit data from the HUD. NEEA lags the permitting date by six months to account for construction time. NEEA estimates the share of 5+ multifamily units that meet the definition of low-rise multifamily (4 stories or less) using construction estimates by Dodge Data & Analytics. Figure 3 shows that the new construction single-family units increased slightly from 2023 while low-rise multifamily building decreased.

Figure 3: New Construction Estimates for the State of Oregon



Washington

NEEA is reporting Net Market Effects savings in 2024 for the 2015[17], 2018, and 2021 Washington State Energy Code (WSEC). The 2021 code also counts toward the 2021 Power Plan conservation targets.

NEEA updated the savings analysis based on:

- Energy consumption modeling for the 2021 WSEC and the 2018 WSEC
- Updates to the fuel-selection mix for the 2018 WSEC
- Final new construction estimates based on HUD permits and Dodge data.

Overall, the changes decreased the 2024 estimate by 6% to 4.38 aMW from NEEA's prior forecast.

The following sections explain the updates.

Energy Use Modeling

NEEA estimated savings from the 2021 WSEC based on draft SEEM analysis for the 2018 and 2021 codes. NEEA will update the analysis in Q3 2025 to account for the draft analysis assuming builders selected a less efficient water heating option under the 2021 code, leading to a negative change in electric water heating consumption. To report energy savings for 2024, NEEA held the water heating consumption constant between codes to come up with a savings rate of 167.5 kWh per home based on heating and cooling savings (Table 10), leading to 0.05 aMW of savings in 2024. **NEEA will update these estimates in September 2025 with analysis by Ecotope that aligns the water heating assumptions between codes while assuring the new options selected still meet the 2021 code requirements.**

Table 10: Electric Savings Rate for 2023 ORSC (Single-family Homes)

	Electric Energy (kWh/Single-family Home)			HVAC Weights
	2018 WSEC	2021 WSEC	Change	
Gas without Air Conditioning	7,654	7,403	250	14%
Gas with Air Conditioning	7,988	7,710	278	7%
Electric Heat Pump	10,443	10,300	143	79%
	Average Savings per Home			**168**

Ecotope. 2025. Measure_Analysis_2018_WSECR-results.xlsx.
Ecotope. 2025. Draft W-2021 SEEM -cleanresults-2.xlsx.

NEEA initially assumed 153 kWh/home savings for multifamily based all multifamily homes choosing ductless heat pumps. This switch, however, means that builders no longer need to choose ENERGY STAR appliances to meet code for some prototypes, resulting in no incremental savings from the code-to-code model. NEEA will make a -0.02 aMW update to the 2024 savings in its next set of reports to Washington funders.

NEEA is not reporting gas energy savings from the 2021 WSEC until a future compliance study or other data can verify code-compliant, gas-heated homes are being built. The next compliance study is expected in late 2026.

[17] The savings NEEA reports as Co-Created from this code goes to zero in 2027.

Update to the Fuel Selection Assumptions

NEEA completed a code compliance evaluation for the State of Washington in 2023.[18] The study showed that the share of new single-family homes using electric space heating increased to 79% from the 17% NEEA assumed in its savings rate estimate for the 2018 WSEC. Energy 350 reviewed NEEA's approach to update the calculation for electric savings. More information about the analysis will be available from Energy 350 in May upon request. Overall, the 2022-2023 historical savings increased by 1.94 aMW based on this update.

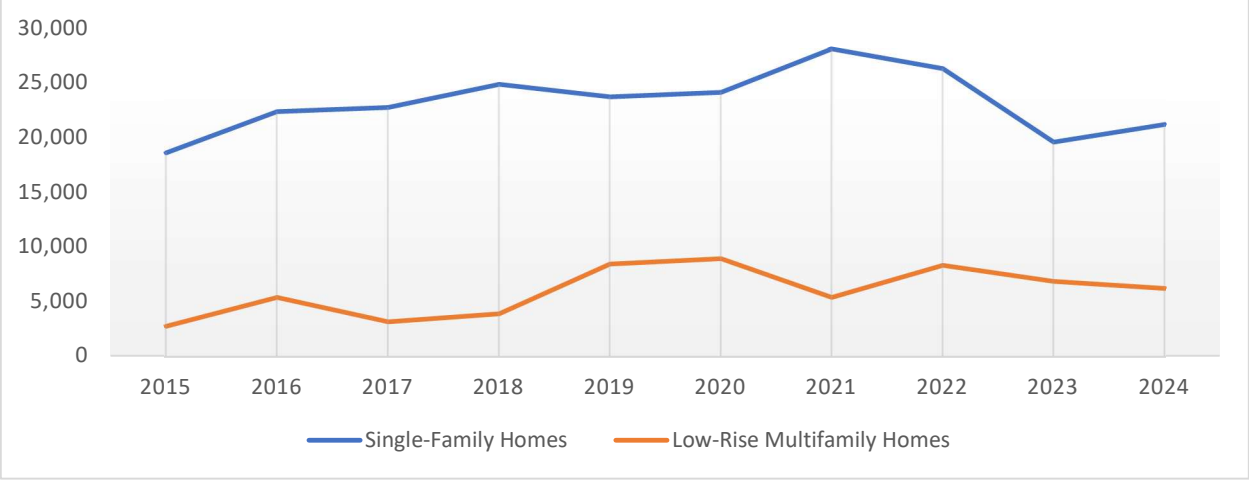
NEEA phased out reporting natural gas savings in late 2024 based on the adoption of the 2021 WSEC. The new code implemented an overall energy efficiency requirement. For gas equipment, Section 406 of the code requires the adoption of additional efficiency measures to achieve the required overall home energy performance. Taken together, these requirements may make it cost prohibitive to achieve comparable levels of overall energy savings using gas heating systems. As a result, NEEA is pausing reporting gas savings from residential new construction starting the middle of September 2024.[19] The 2024 savings amount to 357,879 therms.

NEEA is working on future code options for high performance gas technology such as gas water heaters and gas/electric combo heat pumps. NEEA will also conduct research to monitor changes in building practices over time.

New Construction

The new construction estimates are based on permit data from the HUD. NEEA lags the permitting date by six months to account for construction time. NEEA estimates the share of 5+ multifamily units that meet the definition of low-rise multifamily (4 stories or less) using construction estimates by Dodge Data & Analytics. Figure 4 shows that the new construction single-family units increased slightly from 2023 while low-rise multifamily building decreased.

Figure 4: New Construction Estimates for the State of Washington



[18] https://neea.org/resources/washington-residential-code-evaluation

[19] NEEA assumes homes are being completed under the new code 6 months after the state compliance date.

2025 Q1 Market Research & Evaluation Quarterly Newsletter

WHAT'S NEW:

Greetings to all of you!

Welcome to spring and the Market Research and Evaluation (MRE) team's first newsletter of 2025! Here in the Northwest, the days aren't necessarily sunnier, but they are definitely longer.

The MRE team is busy wrapping up several large and long-running studies, including three building code compliance studies (for the states of Idaho, Montana and Oregon) and the first Market Progress Evaluation Reports (MPERs) for two of NEEA's Commercial HVAC programs. The latter launched nearly two years ago, so the team is looking forward to the conclusion of these inaugural studies.

Four other MPERs are also kicking off that will provide evaluation findings and actionable market insights to the programs they support, including: Retail Product Portfolio, Luminaire Level Lighting Controls, Heat Pump Water Heaters, and Commercial and Residential Codes. Read on to learn more and, as always, please reach out with any questions or suggestions.

~ **Amy Webb, Sr. Manager**, Market Research & Evaluation ~

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At a Glance

MARKET RESEARCH & EVALUATION PROJECTS

		PLANNING*	FIELDING*	REPORTING*
Regional Studies	Northwest Market Characterization			✓
Integrated Systems	Efficient Rooftop Units: *Market Progress Evaluation Report #1*			✓
	High-Performance HVAC: *Natural Gas High-Efficiency DOAS Market Research*		✓	
	High-Performance HVAC: *Market Progress Evaluation Report #1*			✓
	Efficient Fans: *Fan Manufacturer Representative and Specifier Market Research*		✓	
	Extended Motor Products: *Agricultural Pumps Market Research*		✓	
	Extended Motor Products: *Market Progress Evaluation Report #2*	✓		
	Motor-Driven Systems: *Industrial Market Research*	✓		
	Luminaire Level Lighting Controls: *Exterior Luminaire Level Lighting Controls in Parking Lots*			✓
	Luminaire Level Lighting Controls: *Market Progress Evaluation Report #3*		✓	
	High-Performance Windows: *ENERGY STAR Windows, Doors, and Skylights Version 7.0 Evaluation*			✓
	Whole Building Special Project: *Commercial Whole Buildings Implementation and Market Research*	✓		
Products	Heat Pump Water Heater: *Market Progress Evaluation Report #8*		✓	
	Retail Product Portfolio: *Televisions Voluntary Agreement Evaluation and Model Review*		✓	
	Retail Product Portfolio: *Market Progress Evaluation Report #3*		✓	
	Retail Product Portfolio: *Connected Consumer Products Market Research*			✓

DUAL-FUEL (Electric & Natural Gas) PROJECTS:

NATURAL GAS PROJECTS:

***PLANNING:** MRE projects from inception through proposal selection

***FIELDING:** MRE projects from kick-off through the completion of field work

***REPORTING:** MRE projects in the analysis/synthesis stage through report posting

At a Glance

MARKET RESEARCH & EVALUATION PROJECTS

Codes, Standards, New Construction

Market Diffusion

		PLANNING*	FIELDING*	REPORTING*
Standards: *Battery Chargers Standard Evaluation*	**Notice of Withdrawal Issued by DOE**			
Standards: *Portable AC and Air Compressor Standards Evaluations*			✓	
Codes: *NEEA Codes Baseline and Assumption Review*				✓
Codes: *Market Progress Evaluation Report #6*			✓	
Residential Codes: *Home Energy Raters Market Research*				✓
Residential Codes: *Montana Residential Code Compliance Evaluation*				✓
Residential Codes: *Oregon Residential Code Compliance Evaluation*				✓
Commercial Codes: *Idaho Commercial New Construction Code Compliance Evaluation*			✓	
Commercial Codes: *Montana Commercial New Construction Code Compliance Evaluation*				✓
Ductless Heat Pump Market Diffusion Evaluation, Year 3				✓

DUAL-FUEL (Electric & Natural Gas) PROJECTS:

NATURAL GAS PROJECTS:

***PLANNING:** MRE projects from inception through proposal selection

***FIELDING:** MRE projects from kick-off through the completion of field work

***REPORTING:** MRE projects in the analysis/synthesis stage through report posting

Northwest Market Characterization | REPORTING

NEEA contracted with LD Consulting in Q2 2024 to conduct a characterization of the market for Northwest consumers. Specifically, the research project aimed to contrast and compare characteristics of rural, suburban, and urban markets to identify market transformation strategies that could accelerate the delivery of program benefits to rural markets. The study used the National Center for Education Statistics (NCES) classification system for geographic locales, which defines areas as either rural, town, suburban, or urban. The mixed methods study included a literature review, interviews with NEEA staff, and a quantitative analysis of existing data sources (such as American Community Survey data and U.S. Energy Information Administration data) to compare consumer and supply chain characteristics across the four locales. Results from the data analysis show that median incomes for rural and urban households in the Northwest are similar. On average, suburban household income is much higher, and town household income is much lower. Twenty-one percent of rural households in the Northwest are considered energy burdened, more than twice the rate of urban and suburban households. Many preferences related to purchasing habits do not vary significantly across locales.

Beginning in late Q4 2024, fielded qualitative research to investigate themes from the data analysis that suggested opportunities to close relative gaps in the delivery of market transformation program benefits. Qualitative methods included interviews with residential consumers, supply chain market actors, and community-based organizations involved in energy and energy efficiency. The study concluded with “data parties” where research participants were invited to receive, verify and help contextualize findings.

A final report is expected in Q2 2025.

MRE Scientist: Amy Webb
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Market Progress Evaluation Report #1

Efficient Rooftop Units (RTU) | **REPORTING**

As of late 2022, NEEA's Efficient RTU program is actively working to transform the market for efficient RTUs in gas-heated commercial buildings across the region. This study will be the first evaluation of the program's Market Transformation efforts. The program's overarching objectives for the study are to:

- Provide timely and actionable formative evaluation findings and recommendations to enable continuous improvement of the program.
- Assess market transformation progress as measured by program Market Progress Indicators (MPIs).
- Qualitatively assess program influence on observed market transformation.

NEEA contracted with Apex Analytics and NMR Group to conduct the evaluation. NEEA kicked off the Efficient RTU evaluation in June 2023. The evaluation team conducted focus groups with two small groups of commercial building decision makers (e.g., building owners, operators, and facilities managers); surveyed commercial building decision makers across the region; and interviewed individuals who have or have considered having an efficient RTU on their building. In late 2024, the evaluation team conducted focused interviews with a small number of manufacturer representatives active in the Northwest RTU market. The evaluation team is finishing up their review of NEEA documentation and materials related to identified MPIs.

This study is being conducted in close coordination with the Market Progress Evaluation Report (MPER) for the High-Performance HVAC program, which is also being completed by Apex Analytics and NMR Group. Coordination between these studies brings about several efficiencies, such as reducing the burden on the market actors recruited to participate in the research and streamlining NEEA staff time and other resources.

The evaluation will continue through winter 2024-2025, with a final report anticipated in Q2 2025.

MRE Scientist: Kirstin Moreno
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Natural Gas High-Efficiency DOAS Market Research

High-Performance HVAC | **FIELDING**

In order to support potential expansion of the High-Performance HVAC program to include Gas High-Efficiency (HE) Dedicated Outdoor Air Systems (DOAS), NEEA intends to field a research study exploring market barriers to adoption and supply chain perspectives.

The objectives of this study are to:

- Confirm which opportunities and barriers previously identified for the uptake of very high-efficiency DOAS also apply to Gas HE DOAS, and identify any additional barriers and opportunities specific to Gas HE DOAS
- Gather specifiers' perspectives on advantages, disadvantages, and use cases of potential Gas HE DOAS configurations
- Describe building types, market actors, early adopters, value proposition and decision processes for Gas HE DOAS highlighting how they differ from all-electric very high-efficiency DOAS

Study methods are likely to focus on primary data collection (e.g., in-depth interviews) to seek input and insight from professionals active in this market, especially HVAC designers and specifiers. Project kickoff is anticipated for Q2 2025.

MRE Scientist: Kirstin Moreno
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Market Progress Evaluation Report #1

High-Performance HVAC | **REPORTING**

As of late 2022, NEEA's High-Performance HVAC program is intervening to transform the market for very high efficiency (VHE) Dedicated Outside Air Systems (DOAS) for electrically heated commercial buildings across the region. This study will be the first evaluation of the program's Market Transformation efforts. The program's overarching objectives for the study are to:

- Provide timely and actionable formative evaluation findings and recommendations to enable continuous improvement of the program.
- Assess market transformation progress as measured by program MPIs.
- Qualitatively assess program influence on observed market transformation.

NEEA contracted with Apex Analytics and NMR Group to conduct the evaluation. NEEA kicked off the High-Performance HVAC evaluation in July 2023. In Q2 2024, the evaluation team completed the analysis of HVAC system designer and manufacturer representative survey data. The evaluation team is also in the midst of reviewing NEEA documentation and materials related to identified market progress indicators. The team is also conducting a webscan of teaching materials that draw on NEEA's VHE DOAS principles.

This study is being conducted in close coordination with the MPER for the Efficient RTU program, which is also being completed by Apex Analytics and NMR Group. Coordination between these studies brings about several efficiencies, such as reducing the burden on the market actors recruited to participate in the research and streamlining NEEA staff time and other resources.

The evaluation will be ongoing through winter 2024-2025, with a final report anticipated in Q2 2025.

MRE Scientist: Kirstin Moreno
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Fan Manufacturer Representative and Specifier Market Research

Efficient Fans | **FIELDING**

NEEA contracted with DNV Energy Insights, Inc. to conduct a market research study in support of continued refinement of the Efficient Fans program's design and intervention strategy. The study focuses specifically on addressing the following objectives:

- Compile a robust list of C&I stand-alone fan manufacturer representatives and specifying engineers active in the four-state region (ID, MT, OR, and WA);
- Identify and document key communication and relationship dynamics between fan system market actors (including particularly influential sources of information);
- Identify and document persistent challenges endemic to the stand-alone fan specification, sale, and installation process as experienced by manufacturer representatives and specifying engineers; and
- Solicit input from regionally active stand-alone fan manufacturer representatives and specifying engineers regarding the clarity, sensibility, and appropriateness of programmatic language and terminology related to in-scope fan systems.

The study kicked off in December 2024. Instrument development, sample preparation, and respondent recruitment are currently underway, with data collection (specifically in-depth interviews with relevant market actors) scheduled to continue through Q2 2025.

Data analysis and report preparation are scheduled for late Q2–early Q3 2025. The final report is anticipated in Q3 2025.

MRE Scientist: Chris Cardiel
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Agricultural Pumps Market Research

Extended Motor Products (XMP) | **FIELDING**

In order to support ongoing program planning and opportunity assessment for the XMP - Pumps program, NEEA contracted with Resource Innovations to field a research study exploring the dynamics of the agricultural pump market across NEEA's four-state region. Specific objectives of this study are as follows:

- Identify and prioritize agricultural market barriers to uptake of highly efficient pumps for irrigation purposes;
- Document market actor motivations and agricultural irrigation pump path-to-purchase; and
- Assess the accuracy of key market projections documented in NEEA's 2013 Agricultural Irrigation Market Characterization, specifically as pertaining to regional irrigated agricultural acreage and market actor technology usage.

The study kicked off in Q4 2024, with instrument development, sample preparation, and respondent recruitment currently underway. Study methods include a robust literature review paired with in-depth interviews with members of key agricultural professionals (manufacturers and representatives, specifying engineers, contractors, and end users) to seek input and insight from professionals active in the agricultural pump market.

Primary data collection is scheduled to run from Q1 through Q2 2025, followed by data analysis and report preparation. The final report is anticipated in Q3 2025.

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Market Progress Evaluation Report #2

Extended Motor Products (XMP) | **PLANNING**

As of Q2 2022, NEEA's XMP - Pumps program is actively engaging with manufacturers' representatives, trade associations, and other market actors to increase adoption of energy-efficient motor-driven products (specifically clean-water pumps and circulators at or below 50 horsepower) across the four-state region. This Market Progress Evaluation Report (MPER) will be the second evaluation of the program's Market Transformation efforts and will build on findings from the recently completed MPER #1, which is available on neea.org. The overarching objectives for the study are to:

- Provide timely and actionable formative evaluation findings and recommendations to enable continuous improvement of the program;
- Assess market transformation progress as measured by program MPIs; and
- Qualitatively assess program influence on observed market transformation.

Specific study objectives, MPIs to be assessed, and recommended methodologies will be identified through Q3 2025. The evaluation will be ongoing through Q2 2026, with a final report anticipated in late Q2 or early Q3 2026.

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Industrial Market Research

Motor-Driven Systems | **PLANNING**

To improve market insight across programs within the Motor-Driven Systems Product Group (including Efficient Fans and Extended Motor Products) and to inform opportunity assessment related to adjustable-speed drives, NEEA intends to field a research study exploring the dynamics of the regional industrial market for these technologies. Specific objectives of this study are under development but may include assessment of market actor relationships, decision-making factors related to selection of relevant products, and identification of market barriers distinct to the industrial sector. Project kickoff is anticipated in Q3 2025.

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Exterior Luminaire Level Lighting Controls in Parking Lots Market Research

Luminaire Level Lighting Controls (LLLC) | **REPORTING**

NEEA is considering adding exterior LLLC in parking lots to the LLLC program. To support this, NEEA is contracting with Cadmus to conduct interviews with parking lot lighting installers and purchasers in Q3 2024. This study will:

- Determine and describe all items that trigger a parking lot lighting replacement or upgrade decision, as well as what factors go into the upgrade and/or replacement decision, so that NEEA can assess alignment of exterior LLLC with their existing LLLC Program.
- Assess the known and potential benefits of LLLC systems compared with other lighting solutions to assist NEEA in refining the value proposition for installing LLLC in exterior parking lots.

A report is anticipated in Q2 2025.

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Market Progress Evaluation Report #3

Luminaire Level Lighting Controls (LLLC) | **FIELDING**

In late 2024, NEEA contracted with Cadmus to complete its third MPER for the LLLC Program. This evaluation follows the Program's second MPER, posted on neea.org in November of 2023, and is crucial for tracking changes in the market that indicate whether the LLLC program is effective in overcoming identified market barriers.

Interviews and surveys are being collected in Q4 2024 through Q1 2025 with stakeholders, manufacturers, installers, designers, architects, engineers, and commercial building decision makers to address the following objectives:

- Review and verify that the LLLC program has conducted the strategic activities described in its quarterly progress tracking documents and outlined in its logic model since the previous MPER;
- Track identified MPIs focused on measuring the reduction of identified market barriers and conduct year-over-year analyses when indicated, in order to report progress on several program outcomes predicted by the logic model; and
- Conduct market research to describe the rationale of buyers and sellers of LLLC that include it in their initial project plans, but do not follow through with the sale.

A final report is anticipated in Q3 2025.

MRE Scientist: Zdanna King
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ENERGY STAR Windows, Doors, and Skylights Version 7.0 Evaluation

High-Performance Windows | **REPORTING**

NEEA has contracted with Apex Analytics, LLC to conduct a study that will explore if and how NEEA's High-Performance Window program activities have influenced the new ENERGY STAR® Version 7.0 rating for windows and doors. Through the program's involvement in the Partnership for Advanced Window Solutions (PAWS), its letters to ENERGY STAR, and other related work, it is possible that NEEA influenced the adoption of the new rating. In order to document these findings, Apex Analytics is reviewing documents and interviewing PAWS members, NEEA staff, and ENERGY STAR representatives in Q3 2024. A final report is anticipated in Q2 2025.

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Commercial Whole Buildings Implementation and Market Research

Whole Building Special Project | **PLANNING**

The vision for NEEA's Commercial Whole Building Special Project is to motivate the commercial building sector to undertake deep energy efficiency retrofits in a way that is widely available, scalable, and affordable for owners and occupants. To better understand this market, NEEA is conducting market research to support the Whole Buildings Special Project. The two research objectives are:

- Determine approximate quantity of each type of key market actor that influences building decision makers, and market share of the largest ones of each type operating in the Northwest. This information will help inform market leverage points NEEA might target in its Market Transformation efforts.
- Gather and synthesize insights into how building owners and asset managers plan for and finance operations and maintenance (O&M) and capital expenditures.

This study, which is specially funded, will build on the recent BetterBricks Commercial Buildings Decision Maker study. The kickoff is expected in Q2 2025.

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Market Progress Evaluation Report #8

Heat Pump Water Heaters (HPWH) | **FIELDING**

Work on the eighth MPER for the HPWH program will kick off in late Q1 2025 with the NMR Group. The MPER will track program progress over the last 18 months. Key objectives include:

- Reviewing and verifying that the program has conducted the strategic activities it set out to complete in 2024.
- Tracking identified MPIs focused on measuring a specified set of program outcomes per the program logic model.
- Identifying nature and prevalence of callbacks to discern how that impacts installers' in recommending and installing HPWHs.

Data collection activities and analysis will continue through the end of Q3 2025, resulting in a final report expected by the end of 2025.

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Televisions Voluntary Agreement Evaluation and Model Review

Retail Product Portfolio (RPP) | **FIELDING**

In Q2 2025, NEEA will explore and document how the RPP program may or may not have affected the Voluntary Agreement on Energy Efficiency for Televisions. This will include a third party review of the program's modeling for reporting co-created energy savings for televisions, including its naturally occurring baseline, predicted outcomes with the program's interventions, and the key modeling assumptions. Specific research objectives are still being drafted. The project is planned to begin in Q2 2025 with a public report expected in Q4 2025.

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Market Progress Evaluation Report #3

Retail Product Portfolio (RPP) | **FIELDING**

NEEA is currently finalizing research objectives for its third RPP MPER. The study, which follows the program's second MPER, will assess the program's progress towards its outcomes by tracking year over year progress on its MPIs. The RPP Program provides mid-stream incentives to retailers for sales of qualifying efficient products, such as refrigerators and clothes washers, to influence retail assortment and product promotion, obtain access to sales data, and ultimately influence the ENERGY STAR® specification or federal standard. This study will begin in Q2 2025 and a final report is expected in Q1 2026.

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Connected Consumer Products Market Research

Retail Product Portfolio (RPP) | **REPORTING**

NEEA contracted with Level 7 Market Research from June to December of 2024 to describe consumer acceptance of, experiences with, and willingness to purchase connected consumer products. Additionally, this research ventured to describe predictors of consumer interest and uptake, in order to inform NEEA's RPP Market Transformation program's strategic planning around these new appliances.

Level 7 conducted a mixed method market research project. They reviewed relevant primary documents, surveyed over 2,000 consumers from the Northwest region, led focus groups, and utilized online bulletin board discussion groups to address these research objectives. The study found that despite low ownership and utilization of the features provided by these appliances, there is widespread awareness of connected consumer products. Customers were excited by the potential of connected consumer products to lower energy bills and reduce usage, but were concerned about additional costs for these features, as well as potential problems with data privacy and cyber security.

The final report is available on neea.org.

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Battery Chargers Standard Evaluation, Notice of Withdrawal Issued by DOE

Standards | **WITHDRAWN**

NEEA's Codes and Standards team engaged in efforts to increase the stringency of the federal efficiency standard for battery chargers. NEEA contracted with Michaels Energy to conduct a qualitative assessment of NEEA's influence on the standards processes and provide a quantitative estimate of the share of savings resulting from the standards that are the result of NEEA and other efficiency organizations' efforts. The project kicked off in September 2023 but paused in late 2023 due to a change in the U.S. Department of Energy's (DOE) timeline for publishing the final rule. In January 2025 DOE published a Notice of Withdrawal for the standard, citing pushback from multiple parties. Because a final rule will not be published, NEEA has cancelled the evaluation.

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Portable AC and Air Compressor Standards Evaluations

Standards | **FIELDING**

NEEA's Codes and Standards team engaged in efforts to increase the stringency of the federal standards for portable air conditioners and air compressors. NEEA contracted with Michaels Energy to conduct a qualitative assessment of NEEA's influence on the standards processes and provide a quantitative estimate of the share of savings resulting from the standards that are the result of NEEA and other efficiency organizations' efforts. Both evaluations kicked off in November 2024. Michaels Energy will review NEEA records and publicly available documents and will conduct interviews with key stakeholders from NEEA, U.S. DOE and other organizations. Final reports are anticipated in late Q2 2025.

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NEEA Codes Baseline and Assumption Review | Codes | FIELDING

NEEA contracted with Industrial Economics (IEc) and Resource Refocus to conduct a third-party review of its Naturally Occurring Baselines for commercial and residential energy codes in the Northwest. Specifically, the IEc team will:

- Assess whether NEEA's approach of tracking 100% of the Total Regional Savings as Co-Created Savings for 10 years after construction starts without applying an additional adjustment factor is still the most reasonable Natural Market Baseline for codes.
- If not, make recommendations for how NEEA should update its baseline and other assumptions to more accurately capture NEEA and its partners' influence on code changes in the Northwest.
- Assess whether it is appropriate to apply the same approach to all states in the Northwest and to both the residential and commercial sectors.

This project kicked off in Q4 2024, and the final report will be published in Q2 2025.

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Market Progress Evaluation Report #6

Codes | **FIELDING**

NEEA contracted with NMR Group, Inc., to field the sixth MPER for its commercial and residential codes efforts. This study is intended to build on and complement the learnings generated through the recently completed Codes MPER #5 and will include ongoing assessment of NEEA's progress in the Northwest codes market relative to recently established MPIs. Specific objectives for the study are to:

- Assess NEEA's progress on selected logic model outcomes, including those associated with (a) the Codes team's training and education activities, (b) voluntary certification and above code construction, and (c) jurisdictional goals and state-level code support;
- Conduct a qualitative analysis of NEEA's progress on outcomes associated with its code influence activities conducted during code cycles occurring from 2018 onward, with a particular focus on code influence activities occurring from 2023 onward; and
- Conduct formative evaluation regarding market actor awareness, use, and valuing of key code compliance tools, including the Washington State Energy Code Commercial Technical Support website and webtool, COMcheck, and REScheck.

A project kick-off was held in mid-Q4 2024, with sample development and instrument preparation currently underway. Data collection is scheduled to occur during Q1–Q2 2025, including interviews with NEEA Codes program staff and a wide range of code market actors, as well as surveys with individuals who have completed NEEA-sponsored code trainings. Data analysis and initial report preparation are scheduled to occur in Q2 2025, with a final report anticipated in early Q3 2025.

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Home Energy Raters Market Research

Residential Codes | **REPORTING**

NEEA contracted with TRC to conduct market research with home energy raters in the Northwest to meet the following objectives: 1) Develop an estimate of the number of home energy raters currently working in the new construction market in each state in the Northwest, and 2) Provide an assessment of:

- Current raters' business practices
- Raters' perceptions of the current market for home energy ratings
- How raters' practices and perceptions differ across urban and rural areas

TRC identified 111 unique raters in the Northwest, most of whom have been working in the field for over five years. Interviews and surveys revealed that both raters and the organizations that certify and support home energy raters believe that the market for home energy rating services will grow due to Inflation Reduction Act (IRA) funds incentivizing above-code homes. While raters report using similar business practices in both urban and rural areas, they perceive less demand for their services in rural areas.

The final report is available on neea.org.

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Montana Residential Code Compliance Evaluation

Residential Codes | **REPORTING**

NEEA contracted with IEc to review assumptions underlying its estimation of energy savings resulting from NEEA's and its partners' involvement in the Montana state code processes. Using data collected through permit review, site visits to residential new construction building sites, and interviews with market actors, this research will address the following objectives:

- Assess statewide compliance with selected code requirements among single-family homes built under IECC 2018 and 2021 with Montana amendments.
- Develop estimates of statewide energy code compliance and compliance within urban and rural jurisdictions separately.
- Provide statewide findings regarding primary space and water heating fuel and above-code elements using data collected on individual code requirements.

This work kicked off in Q1 2023 but paused in mid-2023 due to challenges with collecting permit data. The project re-launched in January 2024 with a new data collection plan that relies on on-site data collection. A final report is expected in Q2 2025.

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Oregon Residential Code Compliance Evaluation

Residential Codes | **REPORTING**

NEEA contracted with IEc to review assumptions underlying its estimation of energy savings resulting from NEEA's and its partners' involvement in the Oregon state code processes. This evaluation will:

- Assess statewide compliance among single-family homes built under the 2021 Oregon Residential Specialty Code (ORSC).
- Provide statewide findings regarding primary space and water heating fuel and above-code elements using data collected on individual code requirements.
- Provide an analysis of builders' choices regarding compliance pathways and efficiency level to which the home is built.

IEc will collect data from permits, conduct site visits to residential new construction building sites, and conduct interviews with market actors. In addition, NEEA contracted with NMR Group to collect data on inhabited homes using homeowner self-audits. These data will be provided to IEc for analysis.

This project kicked off in February 2024, and a final report is expected in Q2 2025.

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Idaho Commercial New Construction Code Compliance Evaluation

Commercial Codes | **FIELDING**

The Idaho Commercial New Construction Code Evaluation study focuses on (a) assessing the path(s) by which and degree to which code compliance is achieved with the amended 2018 International Energy Conservation Code (IECC) in newly constructed buildings, and (b) measuring the energy performance of a subset of these buildings as compared with the average energy performance of buildings constructed under previous code. The results of the study will provide direction to the development and implementation efforts of the NEEA Codes team and will provide other regional code stakeholders guidance in targeting their energy efficiency work in the commercial new construction sector.

NEEA contracted with Opinion Dynamics to undertake this study. The study design and methodology selected for this project focuses on permit data and building plans as the primary sources of construction and compliance information, with virtual or in-person site visits planned for a subsample of participating buildings in order to validate the accuracy of permit data. The project kicked off in Q3 2023, with planning and sample development continuing through Q1 2024. Data collection focusing on desk review of permit data began in Q2 2024 and is scheduled to conclude in Q1 2025, with site visits to a subsample of buildings scheduled for Q1 2025. This study includes analysis of billing data. Collection of this data is planned to continue through Q2 2025, with analysis and report preparation to follow.

A final report is anticipated in Q3 2025.

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Montana Commercial New Construction Code Compliance Evaluation

Commercial Codes | REPORTING

The Montana Commercial New Construction Code Evaluation study focuses on (a) assessing the path(s) by which and degree to which code compliance is achieved with the 2018 IECC in newly constructed buildings, and (b) measuring the energy performance of a subset of these buildings as compared with the average energy performance of buildings constructed under previous code. The results of the study will provide direction to the development and implementation efforts of the NEEA Codes team and will provide other regional code stakeholders guidance in targeting their energy efficiency work in the commercial new construction sector.

NEEA contracted with Michaels Energy to undertake this study. The study design and methodology selected for this project focuses on permit data and building plans as the primary sources of construction and compliance information, supplemented by telephone or virtual interviews with building owners and operators to contextualize and enrich the results of permit and plan analysis. The study also includes virtual or in-person site visits planned for a subsample of participating buildings in order to validate the accuracy of permit data. The project kicked off in mid-Q2 2022, with planning and sample development continuing through Q1 2023. Data collection, including interviews with site contacts and desk review of permit data, commenced in Q2 2023 and concluded in Q2 2024, while in-person/virtual site visits commenced in Q4 2023 and concluded in Q2 2024. Billing data collection was attempted for this study but has been excluded from ongoing project activities due to a prohibitively low response rate from eligible building contacts.

Compliance analyses were completed in Q4 2024; a final report outlining the result of compliance analysis and comparative site visits was completed in Q4 2024 and is available on neea.org.

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Ductless Heat Pump Market Diffusion Evaluation, Year 3 | REPORTING

NEEA actively worked to accelerate adoption of Ductless Heat Pumps (DHPs) in the Northwest from 2008 to 2020. Once NEEA scales back investments in a Market Transformation program, the organization continues to monitor market diffusion of the energy-efficient product or practice through a series of annual longitudinal evaluations called market diffusion evaluations. NEEA contracted with OWL Research Partners to conduct the third diffusion evaluation study for the DHP program. The study kicked off mid-November 2024. The objective for this evaluation, consistent with the prior two diffusion evaluation studies, is to track diffusion of DHPs across the Northwest's residential HVAC market, specifically within the program's three target markets to confirm whether market transformation outcomes are being sustained.

A key activity of the study has been to conduct phone surveys with HVAC installers. The HVAC installer survey seeks to understand trends in DHP installations, the types of homes they are being installed in, the percentage of incented installations, total customer cost, and changes in the DHP market.

The survey aimed to gather responses from 232 installers across the Northwest and was wrapped up in February 2025. Survey response analysis and related secondary data analysis are ongoing.

The final report is anticipated in Q2 2025.

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