Cost Effectiveness and Evaluation Advisory Committee Meeting

DATE: April 30, 2024
TIME: 8:30 AM – 4:15 PM
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AGENDA

TIME	TOPIC	PRESENTER(S)	Electric/ Gas/Both	Link or Page
8:30am – 8:45am (15 min)	**Welcome/Agenda Review** 1. Agenda check 2. Announcements	Jonathan Belais, NEEA Staff		
8:45am – 9:15am (30 min)	**Key Inputs and Assumption Updates** NEEA staff will highlight key assumption updates, including: • UHD Televisions (new savings stream) • Ductless Heat Pumps market data and extrapolation Objective: Inform committee members, gather feedback, and questions regarding updated assumptions.	Ryan Brown and Tim Runyan, NEEA Staff	Both	4
9:15am – 9:30am (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	28
9:30am – 9:40am (10 min)	**BREAK**			
9:40am – 10:10am	**Market Transformation Framework**	Jonathan Belais, NEEA Staff	Both	

TIME	TOPIC	PRESENTER(S)	Electric/ Gas/Both	Link or Page
(30 min)	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.			
10:10am – 10:55am (45 min)	**Market Transformation Savings** Overview of Market Transformation savings categories and NEEA's approach to savings calculation and reporting. Objective: Provide background context for committee members to understand the values they will see in funder savings reports as well as NEEA's corporate-level savings reporting.	Ryan Brown, NEEA Staff	Both	5
10:55am – 11:30am (35 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	
11:30am – 12:30pm (60 min)	**LUNCH**			
12:30pm – 2:00pm (90 min)	**2023 Market Progress and Portfolio Overview** NEEA staff will provide overviews of the 2023 and Business Plan Cycle savings estimates for natural gas and electric portfolios. 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.	Stephanie Rider, Ryan Brown, NEEA Staff	Both	

TIME	TOPIC	PRESENTER(S)	Electric/ Gas/Both	Link or Page
2:00pm – 2:15pm (15 min)	**BREAK**			
2:15pm – 3:00pm (45 min)	**Estimating State Energy Code Savings** NEEA staff will review approach and key assumptions used in estimating and reporting energy savings from state energy codes work. Objective: Provide context for discussion regarding state energy code evaluation.	Susan Hermenet, Christina Steinhoff, NEEA Staff		
3:00pm – 4:00pm (60 min)	**Alternative Approaches for Evaluating NEEA's Influence on State Energy Codes** NEEA Staff will review draft approaches including early assessment from the 3rd party evaluator. Objective: Discuss the draft approaches and receive feedback from the committee.	Amy Webb, NEEA Staff; NMR		
4:00pm – 4:15pm (15 min)	**Wrap up**			

Memorandum – *Agenda item*

April 30, 2024

TO: Cost-effectiveness and Evaluation Advisory Committee

FROM: Ryan Brown, Manager, Planning and Analysis

SUBJECT: Q2 2024 Electric and Natural Gas Key Inputs and Assumptions Update

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 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, data provided in funder reports, and meeting materials and presentation content at each quarterly CEAC meeting (Figure 1). At annual reporting time in April, NEEA staff complete the review and documentation of assumption updates made throughout the year to support the current year annual reporting process and outputs.

[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.

Memorandum

April 30, 2024

TO: Cost Effectiveness and Evaluation Advisory Committee

FROM: Ryan Brown, Manager, Planning and Analytics

CC: Susan Hermenet, Vice President, Analytics, Research and Evaluation
Stephanie Rider, Director, Data, Planning and Analytics

SUBJECT: Electric 2023 Annual Report and Business Cycle Savings Update

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 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, sustainable 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

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

above market transformation baseline **("Co-Created Savings")** for 2023. 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 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
High-Performance Windows	Heat Pump Water Heaters	Reduced Wattage Lamp Replacement
Efficient Fans	Luminaire Level Lighting Controls	Efficient Homes
	Retail Product Portfolio	Ductless Heat Pumps
	Manufactured Homes	Strategic Energy Management
	Extended Motor Products (XMP)- Pumps	
	High-Performance HVAC	
	New Construction: Residential Building Codes	
	New Construction: Commercial Building Codes	
	Products: Federal and State Standards	
	Advanced Heap Pumps	

2023 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 38.9 aMW of savings in 2023, similar to the amount added in 2022.

Table 2: 2023 Electric Co-Created Savings		2022 Reported	2023 Reported
All Investments	aMW	38.6	38.9

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 12.8 aMW through local programs in the markets NEEA is tracking, resulting in Net Market Effect savings of 26.1 aMW for 2023.

Savings Forecast – 2020-2024 Business Plan

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 Cycle 6 has been 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 and federal energy appliance standards, 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 to the U.S. Department of Energy on active federal standard rulemaking for water heating that was signed by efficiency advocates as well as manufacturers and industry groups.

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 80 aMW since 2011 on behalf of the region, and the volume of energy savings through SEM increased by 1.8 aMW from 2022 to 10.4 aMW.

The other primary focus for NEEA's portfolio in Cycle 6 has been 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, sustainable portfolio that creates a continuation of energy savings for the region well into the future. Meaningful progress was made in 2023 in this regard as NEEA advanced the Advanced Heat Pump program into Market Development. In 2024, NEEA will be defining the long term program strategy and viability for the current programs in development: Efficient Fans and High Performance Windows, which, if advanced, are anticipated to bring energy savings to the region in our next funding cycle.

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 has tracked 116 aMW of co-created savings, 11 aMW of local programs, and 105 aMW of net market effects during the first four years of this business cycle[1] (2020-2023).

Table 3: 2020-2024 Electric Savings (aMW) **Savings Category**	**2020-2024 Business Plan Range**	**2020-2024 Current Forecast** *(range)*	**Cycle to Date** (2020-2023)
Co-Created	115-152	147 *(130-150)* [1]	116
Local Programs			11
Net Market Effects			105

[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.

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 goal 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 1.99.

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 2023, 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 79 MW of winter peak and 60 MW of summer peak savings.

For the estimation of avoided carbon emissions, NEEA includes the benefit from all of the co-created savings of the electric portfolio. The 2023 co-created savings value of 38.9 aMW translates to a total of approximately 175,000 tons of avoided carbon emissions in 2023, at a monetized value of $12.3 million.

Table 4: 2020-2024 Additional Co-Created Value Metrics

	Avoided Carbon Emissions (tons)	Winter Peak Savings (MW)	Summer Peak Savings (MW)
2023	175,000	79	60
2020-2024 forecast	775,000-900,000	350-400	260-300

[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 in 2024.

Appendix A: Program-Specific Information

2023 Highlights

NEEA supports the region in meeting energy efficiency goals through market transformation work that spans in-market programs, codes and standards, emerging technology, as well as complementary data collection and research efforts. The sections below highlight that work for 2023.

In-market Programs

NEEA operates a portfolio of Market Transformation programs in seven cross-sector groups—consumer products, building envelope, HVAC, lighting, motors, new construction, and water heating. The programs within these sectors intervene in markets to create lasting change by removing barriers and leveraging opportunities.

Consumer Products

Dryers

NEEA was a founding member in a national coalition of efficiency advocates (the Super-Efficient Dryer Initiative) that helped introduce heat pump clothes dryers in North America through early test procedure and specification development. NEEA followed this with incentives and other engagement with manufacturers to help spur adoption and reduce the first cost barrier for early generations of heat pump dryers. In 2023, two manufacturers introduced new combination washer/dryer units that utilize heat pump drying technology, showing continued evolution of the technology for this end use.

Televisions

NEEA is able to report savings from its work on ENERGY STAR televisions. NEEA's efforts began several years ago, resulting in a NEEA-developed test procedure to better estimate energy usage. The test procedure was adopted by ENERGY STAR and the Consumer Technology Association (CTA-2045-C and D). Additionally, as part of NEEA's work on TVs, major manufacturers have committed to a voluntary agreement to provide their TV energy performance, which will provide consumers with more transparent information on TV energy consumption and inform future midstream incentives through the program. The agreement should lead to a more complete set of product test data becoming publicly available, increasing NEEA's ability to track changes in the full market.

Retail Products Portfolio

During 2023, three new utility sponsors joined the ENERGY STAR RPP program, bringing the share of US households represented by program sponsors up to 24.2%. Achieving greater scale is one way NEEA and the ESRPP program increases the collective influence that the program can have on retailer assortment decisions and ultimately manufacturer product roadmaps and new ENERGY STAR specifications.

New Construction

Manufactured Homes

NEEA completed a Transition Market Progress Evaluation Report to assess the market progress of the Northwest Energy Efficient Manufactured Housing (NEEM)+ specification—a certification NEEA supports that is more stringent than ENERGY STAR. The study verified that home sales of NEEM+ has been steady over the past two years and that NEEA should continue to monitor the market to ensure that the homes remain a viable alternative on an ongoing basis.

Standards and Test Procedures

To speed up the rule-making process, NEEA and energy efficiency advocates entered into a multi-product agreement with the Association of Home Appliance Manufacturers (AHAM) to negotiate several appliance standards. AHAM agreed to more stringent efficiency levels in most cases. Meanwhile NEEA and the advocates conceded more time for manufacturers to comply. The agreement helped avoid lawsuits that could have delayed the standards process for many products, including clothes washers, clothes dryers, and refrigerators.

Overall, NEEA responded to more than 27 requests for comment from the Department of Energy regarding Federal standards and test methods. These comment letters covered more than 25 products including consumer furnaces, water heaters, circulating pumps, and clothes dryers. NEEA's comments provided regional data and recommendations to help the DOE set appropriate rules that provide Northwest benefits and are supportable by the market.

Notably, the DOE adopted a new Electric Motors standard. NEEA influence the development of this standard through working with the National Electrical Manufacturers Association (NEMA) to find common ground and through providing comments throughout the rule-making process based on its experience with motor market transformation programs in the Northwest. NEEA now is planning for savings modeling and influence evaluation work to quantify the value of this achievement.

Building Energy Codes

Draft results of a third-party review of NEEA's work show that NEEA is influencing code development both nationally and in the region by bringing proposals to decision makers in Oregon, Washington and to the Internal Energy Conservation Code (IECC), which is the basis for Montana and Idaho codes. NEEA is also filling gaps in the energy code process in each state. Additionally, more than half of commercial and residential market actors report that NEEA-supported training is positively influencing their knowledge, behaviors, or attitudes. NEEA expects to publish the report in Q2 2024.

Emerging Technology

Six ENERGY STAR product categories went into effect, which NEEA provided input. Most significantly, Residential HVAC products, including central and ductless AC and heat pumps, went into effect in January 2023, and ENERGY STAR integrated several key pieces of feedback from NEEA. ENERGY STAR Version 5.0 for water heaters went into effect in April 2023, encompassing heat pump water heaters, whole home tankless, and high efficiency gas storage units. Work on updating the water heater specification began in 2021, and ENERGY STAR incorporated NEEA feedback on performance and connectivity in the final specification. The updated residential Windows, Doors, and Skylights specification went into effect in October 2023. NEEA played a significant role in advancing the specification through our leadership in the Partnership for Advanced Window Solutions. Residential Dishwashers and Light Commercial HVAC also went into effect in 2023, and ENERGY STAR added Residential Cooking products as a category in 2023. Lastly, a Clothes Dryers revision and a new Micro Heat Pump specification opened in late 2023.

Data Collection and Research

Building Stock Assessments

NEEA finished collecting building characteristic and energy consumption data on single-family and multi-family homes and will publish data and reports in Q1 2024. The Residential Building Stock Assessment (RBSA) provides data on the existing housing stock in the Northwest to help with planning. The 2022 RBSA

includes the addition of tracking solar panels, electric vehicle chargers, presence of electric vehicles and accessory dwelling units. NEEA also began planning for the next Commercial Building Stock Assessment, which will be in field in 2024.

Market Data and Research

Several programs are in the midst of their first market progress evaluation report, including the Commercial HVAC programs (High-Performance HVAC and gas Efficient Rooftop Units) and the Extended Motor Products program. These evaluations will bring increased understanding of the market opportunity for these measures, as well as NEEA's progress toward its Market Transformation goals. NEEA is also conducting several state energy code compliance and standard influence evaluations in the field.

End Use Load Research (EULR)

The EULR project is an ongoing regional study designed to gather accurate end-use load profiles for electrically powered equipment in homes and businesses. In 2023, NEEA completed installations for 400 residential homes and 70 commercial office/retail buildings. The Regional Technical Forum used the information from previous years to calibrate its new Energy Efficiency and Demand Response (REEDR) tool, which analyzes residential building energy models in EnergyPlus. Regional utilities and the National Renewable Energy Laboratory used the data to update/calibrate their energy use load shapes. Meanwhile, universities, consultants, utilities, and other organizations from all over the world are downloading the 15-minute interval public data available on neea.org. Now, the project's steering committee and working group will consider proposals to fund and conduct joint analyses of the EULR data. Funders of the project can submit a proposal or sponsor others submitting proposals.

Monitoring & Tracking

NEEA is monitoring the progress in the ductless heat market. NEEA formally began its DHP program in 2008 with a goal to displace inefficient electric heating (such as baseboard heaters and inefficient electric forced-air furnaces) from single-family homes. NEEA's Long-term Monitoring and Tracking Report showed that the total number of counties with access to DHP installers has continued to increase to a total of 135, incented installations for DHPs continues to increase, and the total proportion of HVAC contractors installing DHPs in the Northwest has maintained a steady level.

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

The remainder of this memo explains the key assumptions updates for the Q2 CEAC meeting. Programs with updates since our meeting last quarter are:

- Ductless Heat Pumps*
- Luminaire Level Lighting Controls
- Retail Products Portfolio*
- Extended Motor Products, Pumps
- Residential and Commercial New Construction (Electric and Natural Gas)
- Products: Standards

**These items to be discussed in greater detail during the April CEAC meeting*

Ductless Heat Pumps

The 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. By 2022, more than 150,000 DHPs have been installed. NEEA is now monitoring the diffusion in the market. NEEA is using learnings from this program to support new advance heat pump technology and influence codes.

Key Assumptions Update

New data shows that more adoption has occurred in the Northwest than previously estimated.

NEEA tracks DHP installs through its Heating, Ventilation, and Air-Conditioning (HVAC) supplier dataset. The dataset is comprised of sales of a variety of HVAC equipment types, including DHPs, from suppliers across the Northwest region. From 2008-2016 NEEA collected DHP-only data from a set of distributors that covered an estimated 80-95% of the DHP sales in the region for those years. Starting in 2017, NEEA worked with regional stakeholders to expand this data collection to other equipment types and consolidate HVAC market actor engagement to aggregate the regional utility program interest in this dataset. In that process not all distributors agreed to provide this expanded data, leading NEEA to conservatively extrapolate DHP sales from what was reported based on the historical data. Ecotope reviewed this extrapolation methodology most recently in 2020.[2] In 2023, two pieces of information allowed NEEA to update its estimates for 2017-2022:

- A key missing supplier provided summary data for 2021 and complete sales data for 2022, bringing coverage of the regional sales back to similar levels that were available prior to 2017.
- A study commissioned by the Bonneville Power Administration concluded that NEEA's HVAC dataset covered 80% of the total DHP sales in 2022.[3]

Based on this information, NEEA updated its estimate of total DHP installs for the region by approximately 25% for 2017-2022. NEEA then uses a combination of local utility program data and assumptions sourced from installer interviews[4] to estimate the portion of total DHPs that were installed in the target housing types NEEA tracks (single-family homes displacing electric zonal heat, single-family homes displacing electric forced air furnace, and manufactured homes displacing electric forced air furnace). This market share information will be updated again in the next Long-term Monitoring and Tracking study to be launched in 2024.

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

[2] https://neea.org/resources/2019-alliance-cost-effectiveness-model-review-for-ductless-heat-pumps

[3] Bonneville Power Administration. 2024. BPA HVAC Market Snapshot 2022. Analysis. This report provides an overall estimate of the total Regional Market sales for DHPs (MSHPs) in 2022.

[4] https://neea.org/resources/ductless-heat-pumps-2022-long-term-monitoring-and-tracking-report

Luminaire Level Lighting Controls (LLLC)

The 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, and supports integration of LLLC[5] into energy codes.

Key Assumptions Update

In September 2023, the RTF updated control savings fraction (CSF) and lighting hours of use (HOU) as part of updates to the Non-residential Code Compliant Lighting Standard Protocol. Updates relevant to NEEA's savings calculation include:

- The CSFs for LLLC: values in most space types have increased from 60% to 65%
- HOU for Warehouse: increased from 2600 to 2700.

Also, in 2023, Cadmus revisited the program's baseline CSF recommendation from 2022 Review of Key Assumptions for Luminaire Level Lighting Controls[6]. While the baseline CSFs did not significantly change for new construction, Cadmus recommended NEEA to adjust the retrofit baseline CSF values from 20% to 1.7% for non-warehouse and 8.5% for warehouse applications. The previous baseline CSF recommendation of 20% was based on a national study that was not specific to the Northwest, with a simplified assumption of all controls delivering a CSF equivalent to occupancy sensors. Cadmus reviewed a broader set of studies and revised regional market penetration of lighting controls at the inception of the program using the CBSA.

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

Retail Products Portfolio (RPP)

RPP works with extra-regional program administrators, national retailers, and the ENERGY STAR Program to utilize midstream incentives to influence corporate retail buyer's purchase decisions and give RPP access to full-category sales data. The incentives encourage retailers to purchase, stock and promote higher-efficiency products. The data retailers provide allows NEEA to identify the most promising energy efficiency opportunities and gain insights to influence the stringency of ENERGY STAR specifications and the advancement of federal standards. 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.

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[5] LLLC is a subset of Networked Lighting Controls that combines LEDs, controls, connectivity, and data to create a lighting product that is both efficient and easy to install and offers improved occupant comfort and space utilization.

[6] https://neea.org/resources/2022-review-of-key-assumptions-for-luminaire-level-lighting-controls

Key Assumptions Update

This is the first year that NEEA is reporting energy savings from ENERGY STAR version 9 for televisions. ENERGY STAR adopted the new specification based on a test procedure NEEA developed to estimate energy usage more accurately. NEEA also worked with manufacturers to sign a voluntary agreement, which should be effective in 2024, committing to implementing elements of the new specification.

NEEA is reporting 0.2 aMW of Co-Created savings for 2023 from this work.

The savings estimate for 2023 is conservative. Although the specification is in place, many manufacturers have not certified their models with ENERGY STAR, making it difficult to match regional sales data with energy use estimates. NEEA expects manufacturers to certify their models later this year after the industry finalizes the voluntary agreement. In addition, NEEA expects more complete lab testing data to become available in the near future through either the voluntary agreement process or through regulatory reporting requirements. In the meantime, NEEA is utilizing publicly available lab test data for a portion of models to conservatively estimate the ENERGY STAR market share. The dataset represents approximately 38% of the ultra-high-definition television sales for the year. NEEA is only reporting Co-Created Savings and Power Plan savings for a portion of these sales not attributed to baseline based NEEA's estimate of the efficiency mix prior to ENERGY STAR adoption of the new test procedure.[7] NEEA expects to report more energy savings for 2023 when a more complete dataset is available.

Extended Motor Products Pumps

The program works 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 identification of the efficient products becomes more apparent, market adoption will increase. Ultimately, NEEA will utilize its experience as well as data it collects through the program to influence the passage of more effective Federal Standards.

Key Assumptions Update

The RTF released an updated version of the Circulator Pumps measure workbook in 2023. As part of this update the measure life for circulator pumps changed from 12 years to 10 years based on the DOE TSD estimated the median time to failure. NEEA is updating to 10 years to align with the council update.

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

Residential and Commercial New Construction

NEEA supports advancement in new construction practices through its work on emerging technology, market transformation initiatives, code proposals, and training and education. The region has adopted six

[7] https://neea.org/resources/televisions-energy-star-version-9-specification-influence-assessment-and-baseline-assumptions-review

new residential codes and five new commercial codes since 2020. NEEA conducts energy use modeling and code compliance studies to assess regional effects. The following sections summarize some of the key findings affecting NEEA's savings analysis as well as highlight ongoing research that could influence future savings estimates. The summary is intended to inform Committee members of changes to historical and current savings estimates, prepare for future updates, and provide newly available resources to support regional planning efforts.

Table 1: NEEA Analysis of Building Energy Codes Adopted Between 2020-2024

Code	Adoption Date	Energy Use Modeling	NEEA's Code Compliance Evaluation
2021 Washington State Energy Code - Residential	2023	2024	2026 (Res)
2021 Washington State Energy Code - Commercial	2023	2024	TBD*
2021 Oregon Residential Specialty Code & 2021 Oregon Energy Efficiency Specialty Code	2021	2021	2024 (Res)*
2023 Oregon Residential Specialty Code	2023	2024	2027
2018 IECC with Idaho amendments	2020	2021 (Res); 2018 (Com)	2024
2018 IECC with Montana amendments	2021	2021 (Res); 2018 (Com)	2024
2021 IECC with Montana amendments	2022	2023 (Res); 2022 (Com)	2024 (Res)*

**NEEA anticipates conducting compliance evaluations for Oregon and Washington's commercial sector during its next business plan (2025-2029) and Idaho and Montana in the following business plan.*

Key Assumption Updates

Washington

Washington adopted a new code that uses an energy credit option as the mechanism for driving more efficient space and water heating. This approach avoids an outright ban on natural gas products, but it does create a barrier to construction of buildings with gas heating. The compliance date was delayed from the original 7/1/23 date to allow time for the state to mitigate risk of violating Energy Policy and Conservation Act. The process to revise the 2021 WSEC lasted through November 2023 and NEEA expects to report electric savings by the end of the year at the earliest.

Residential

NEEA is testing the Regional Technical Forum's Residential Energy Efficiency and Demand Response (REEDR)[8] to model energy consumption for the WSEC 2018 and 2021 code changes. The modeling will

[8] REEDR is an EnergyPlus-based residential building simulation tool that eases the process of building, running, and analyzing EnergyPlus models. The current version of REEDR runs on EnergyPlus version 22.2.0.

produce separate whole-home energy use estimates for fuel and space heating combinations by climate zone and housing type (single-family versus multifamily).

For the 2023 analysis, NEEA is using SEEM analysis from Ecotope[9] and a compliance rate from its most recent code compliance evaluations.[10] NEEA applies the results from its most recent compliance study to estimate the share of homes with gas space/water heating technology (21%). However, NEEA needs to complete the energy use analysis mentioned above prior to incorporating the update in its electric savings calculation. For 2023, NEEA is using the conservative estimate of 21% electric based on previous regional assumptions.[11] The update on the electric side should be completed by the end of 2024, resulting in as much as 0.8 aMW additional Co-created Savings for 2023.

Oregon

Oregon adopted 2023 Oregon Specialty Code (residential) in late 2023 and is expected to adopt a commercial version in 2024.

Residential

NEEA is forecasting 12 percent energy savings over prior code. Similar to Washington, NEEA will the use REEDR to model savings from the new code and update its savings estimate for ORSC 2018 if the prudent. The analysis should be ready by the end of 2024.

NEEA is also completing a code compliance study for 2021 Oregon Specialty Code. The evaluation will:

1. Assess statewide compliance among single-family homes built under the 2021 Oregon Residential Specialty Code (ORSC)

2. Provide statewide findings regarding primary space and water heating fuel and above-code elements using data collected on individual code requirements

3. Provide an analysis of builders' choices regarding compliance pathways and efficiency level to which the home is built. For the 2023 analysis, NEEA is using SEEM analysis from Ecotope[12] and a compliance rate (89%) from its most recent code compliance evaluations.[13]

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[9] Washington Code Energy Analysis. 2021. Ecotope. (Analysis) SEEM modeled energy use analysis for WSEC 2018 in comparison to WSEC 2015. & CERF Model. 2016. Ecotope. (Raw data) WSEC 2015.

[10] Washington Residential Code Evaluation. 2023. TRC Consulting. (Analysis) NEEA uses this study to estimate code compliance (76%) for WSEC 2018. & 2019-2020 Washington Residential New Construction Code Study. 2020. CLEAResult. (Analysis) NEEA uses this study to estimate compliance for WSEC 2015 (91%).

[11] https://neea.org/resources/2019-2020-washington-residential-new-construction-code-study

[12] CERF Model. 2018. Ecotope. (Analysis) Modeled energy use for Or. Specialty Code 2017 against the prior code by climate zone and space/water heating technology.

[13] Oregon Residential Specialty Code Field Study. 2020. Pacific Northwest National Laboratory. (Analysis)

Idaho

Idaho adoption IECC 2018 with amendments in 2020. The code is roughly 3.9% more efficient than prior commercial code[14] 11.6% more efficient than the prior residential code.[15]

Residential

To better understand the effects of the code, NEEA completed a compliance evaluation in 2023. Industrial Economics, Inc. (IEc) used data collected through permit review, site visits to residential new construction building sites, and interviews with market actors, to provide updates to the compliance rates and fuel selection estimates NEEA uses to report energy savings. From a whole-home EUI perspective, the weighted modeling results predict 97.8% compliance statewide to the current code. Additionally, most of the single-family homes will use gas space heating. The results align closely with previous assumptions (Table 2). The full report will be published on neea.org in Q2 2024.

Table 2: Key Assumption Update for Idaho Residential Codes

Source	Compliance to Statewide Code	% Natural Gas Space Heating (Single-family)
Pacific Northwest National Laboratory. 2019. Idaho and Montana Residential Energy Code Field Studies.	97.3%	96.0%
Industrial Economics, Inc. (IEc), Resource Refocus LLC. 2024. Idaho Residential Code Compliance Evaluation.	97.8%	95.7%

NEEA also updated the savings rate for 2012 IECC[16] using the new data and updated climate zone weights from the Regional Technical Forum. While conducting the update, NEEA found that the previous savings rate comprised savings from Idaho jurisdictions that adopted the unamended version of IECC 2012, resulting in overlap with savings counted through IECC 2018 with amendments, which was compared with the Idaho amended version of the 2012 IECC. NEEA corrected the overlap by aligning the savings rates with the state minimum requirements starting midway through 2021 when NEEA starts reporting savings for 2018 IECC with amendments. Table 3 shows the results of the updates. The 2023 savings rate represents the average change in electric energy consumption from meeting the IECC 2009 requirements to meeting the 2012 IECC with amendments requirements for a home build in 2023.

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[14] PNNL-28125.pdf

[15] Go to neea.org, portal login, savings, codes.

[16] NEEA reports IECC 2012 w ID amend. savings to its electric funders in Idaho through the middle of 2026.

Table 3: Savings Rate Update for 2012 IECC in Idaho

Years	Prior kWh/Homes	Current kWh/Home	Change in Co-Created Savings (aMW)
Pre 2021	215	215	0.00
2021	215	142	-0.13
2022	215	102	-0.18
2023	N/A	102	N/A

Montana

Montana adopted the 2018 IECC code with amendments in February 2021 and then quickly adopt the 2021 IECC with amendments in June 2023. For 2018 IECC, NEEA estimates the total energy savings is 2.5%[17] for an average home in Montana and 5%[18] for an average commercial building in comparison with the prior code.

Residential

NEEA will complete its savings analysis for 2021 IECC with amendments later this year. Similar to Idaho, NEEA contracted IEc to conduct a code compliance study. Given the short time frame between the two codes, NEEA delayed the data collection effort so that IEc could measure the effects of the current code. IEc will use data collected through site visits to residential new construction building sites and interviews with market actors, to provide updated compliance rates and fuel selection estimates. NEEA will report energy savings for 2021 IECC after the study is completed. NEEA estimates the Co-Created savings will be 0.06 aMW.

Commercial

In 2022, PNNL analyzed energy savings of the 2021 IECC for Commercial Buildings[19] by assessing the energy performance of new buildings constructed to the commercial energy efficiency provisions of the 2018 and 2021 editions of the IECC using whole-building energy simulations in a suite of 16 prototype building models for the 6B climate zone. The analysis estimated 11% additional site energy savings on average for commercial new construction in Montana.

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

[17] ID-MT-OR_ResidentialCodeSavings_20220317.docx (neea.org)

[18] https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-28125.pdf

[19] https://www.energycodes.gov/sites/default/files/2022-09/2021_IECC_Commercial_Analysis_Final_2022_09_02.pdf

For more information on Residential New Construction contact Christina Steinhoff, Principal Analyst, at csteinhoff@neea.org

Products: Standards

NEEA works on standards and test procedures to set the floor for efficiency and drive the motivation for innovation of new products NEEA can support through its market transformation initiatives and its emerging technology work. Market Transformation program strategies often identify standards as opportunities to increase market adoption of energy efficiency. NEEA also leverages its market experience, technical expertise, and data to influence adjacent standards opportunities.

Key Assumptions Update

NEEA has incorporated findings from an influence assessment completed in 2023 by Michaels Energy on the Oregon and Washington commercial equipment appliance standards[20]. The company determined that NEEA and its partners had a primary role in providing regional data and generating alignment among stakeholders on the Oregon and Washington commercial kitchen equipment standards. Findings from the evaluation show the most significant influence that NEEA and its partners had on the standards was providing market and equipment data as well as potential energy and cost savings that overcame manufacturer opposition to the standards. Michaels Energy estimated that NEEA and its partners influenced 10.4% of the total energy savings for the commercial kitchen equipment standard.

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

[20] https://neea.org/resources/oregon-and-washington-high-cri-bulb-and-commercial-kitchen-equipment-state-standards-evaluations

Memorandum

April 30, 2024

TO: Cost Effectiveness Advisory Committee

FROM: Ryan Brown, Manager, Planning and Analytics

CC: Susan Hermenet, Vice President, Analytics, Research and Evaluation
Peter Christeleit, Manager, Natural Gas Portfolio
Stephanie Rider, Director, Data, Planning and Analytics

SUBJECT: Natural Gas 2023 Annual Report and Business Cycle Savings Update

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, sustainable 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 2023 as they are at

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

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.

Table 1: Natural Gas Programs in NEEA's portfolio

Concept Development	Program Development	Market Development
Efficient Gas Water Heaters	Commercial Gas Water Heaters	Efficient Rooftop Units
	High-Performance Windows	New Construction: Residential Building Codes
		New Construction: Commercial Building Codes
		Products: State Standards

2023 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 2023.

Table 2: 2023 Co-Created Savings
805,224 annual Therms

The market transformation portfolio for natural gas is in early maturity. The reportable gas savings for 2023 come predominantly from new construction, through both residential and commercial building codes. The specific codes NEEA is reporting 2023 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.

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 2023 co-created savings value of 805,224 Therms translates to a total of over 5,371 tons of avoided carbon emissions in 2023, at a monetized value of $376,778.

Savings Forecast

It is important to look at a longer time horizon for NEEA's Market Transformation portfolio. The above figures 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 is not expected to meet the savings expectations forecast at time of the business plan for this cycle.

Table 3: 2020-2024 Savings			2020-2024 Business Plan Range	2020-2024 Current Forecast *(range)*
Fuel	**Unit of Measurement**	**Savings Category**		
Gas	Annual Therms	Total Regional[1]	11-18M	3.0M *(2.5M-3.2M)*
Gas	Tons	Avoided Carbon	n/a	19,700 *(16,675-21,300)*

As NEEA continues to invest in emerging technology opportunities for the portfolio, additional savings streams will continue to materialize. NEEA is preparing for the 2025-2029 cycle by focusing on: gas heat pumps, dual-fuel and fuel-neutral products, and gas equipment. 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.

In addition to the code and standard savings that are currently being reported to funders, the following programs are projected to deliver savings in the coming years:

Table 4: Savings Expectations		
Program	**Products**	**Year Expected for Reporting**
New Construction: Commercial Code	Specific proposals advanced in WA 2018 Specific proposals advanced in 2021 OEESC Working on future code development in ID	2021 2021 TBD
New Construction: Residential Code	Residential Codes WA 2018 IECC 2018 with Idaho amendments Or. Specialty Code 2023	2021 2021 2024
Efficient Rooftop Units	Efficient Rooftop Units	2023
Products: State and Federal Standards	Commercial Kitchen Equipment (WA) Commercial Kitchen Equipment (OR) Commercial Boilers (Federal)	2021 2022 2023
High-Performance Windows	Windows	2024/2025
Efficient Gas Water Heater	Gas Heat Pump Water Heaters	TBD[2]
Commercial Gas Water Heaters	TBD	TBD
Other concepts under consideration for 2025-2029	Dual-fuel HVAC Commercial Gas Heat Pumps Efficient Commercial Gas Dryers	TBD – pending advancement

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

[2] Efficient Gas Water Heater and Commercial Gas Water Heater programs are still in early development phases so the expected first year of savings reporting remains uncertain.

Appendix A: Program-Specific Updates

The following descriptions of progress made in each of the areas of NEEA's gas Market Transformation portfolio were provided in the memos provided to funders along with 2022 Natural Gas Savings Reports.

New Construction: Building Codes

Draft results of a third-party review of NEEA's work show that NEEA is influencing code development both nationally and in the region by bringing proposals to decision makers in Oregon, Washington and to the Internal Energy Conservation Code (IECC), which is the basis for Idaho codes. NEEA is also filling gaps in the energy code process in each state. Additionally, more than half of commercial and residential market actors report that NEEA-supported training is positively influencing their knowledge, behaviors, or attitudes. NEEA expects to publish the report by Q2 2024.

The sections below describe the status for each individual state code process.

New Construction: Residential Building Codes

Washington

NEEA is reporting energy savings from its work on the 2018 Washington State Energy Code (WSEC) through 2024. On November 28, 2023, the Washington State Building Code Council (SBCC) adopted changes for WAC 51-11C Washington State Energy Code - Commercial Provisions and WAC 51-11R, Washington State Energy Code - Residential Provisions. This followed months of additional development work and public testimony that resulted in revisions to the previously approved 2021 codes. The code changes adopted on November 28 are intended to avoid preemption violations for Federal appliance standards. Original versions of the 2021 code included restrictions on gas heating for both residential and commercial buildings. The updated code reverts to the 2018 code approach of using the energy credit option sections (Section R406 / C406) as the mechanism for driving more efficient space and water heating. This approach avoids an outright ban, but it does create a barrier to construction of buildings with gas heating. Despite these barriers, some builders are likely to continue to include natural gas appliances in new buildings. NEEA's continued involvement in code support activities will ensure these builders have the information they need to choose natural gas and comply with code requirements. Also, the process for the 2024 code is expected to start sometime this year, and NEEA's involvement could help reinforce the importance of efficient options for both gas and electric end uses.

The 2021 Code will likely continue to be effective from 2024 through 2026 or 2027. During this time, NEEA expects builders will continue to include natural gas in homes and remain interested in using natural gas heating. NEEA's code activities will help these builders navigate the code and economics to make the best decisions for their customers.

In 2024, the SBCC is expected to begin the development process for the next round of code. NEEA plays an important and active role in this process, providing data, research and technology details that are important in developing effective codes.

Oregon

Oregon Specialty Code 2023 was adopted in October 2023 with an effective date of April 2024. NEEA is forecasting that the code will save 15% over the prior code and will finalize this value prior to reporting 2024 energy savings. NEEA is also planning an Evaluation Compliance Study to start in 2026/2027 after builders have had time to adjust to the new requirements.

Idaho

Idaho adopted IECC 2018 in 2021. Gas savings from the new code was approximately 13% across all homes.[3] This reflects the effects of code-mandated insulation/window improvements and air tightness improvements on gas-heated homes.

New Construction: Commercial Building Codes

Washington

The 2022 savings come from work on the 2018 Washington State Energy Code, which went into effect in February 2021. The share of new construction floor area permitted under the code begins to ramp up from the code effective date. The savings analysis comes from NORESCO.[4] NEEA also worked on code proposals for the 2021 Washington State Energy Code, which was approved in late 2022. Similar to the process on the residential side, NEEA will monitor the effects the new code will have on the adoption of gas-fuel products in commercial new construction. NEEA expects savings to decrease in 2024 with anticipation of WSEC 2021's effective date, which includes restrictions on gas heating in commercial buildings and multifamily high rise.

Oregon

The 2021 savings come from work on the 2021 Oregon Energy Efficiency Specialty Code, which went into effect in October 2021. The share of new construction floor area permitted under the code begins to ramp up in late 2021. The savings analysis comes from Pacific Northwest National Laboratory.5 The adoption process of the next version of the OEESC has begun, and the code is anticipated to be adopted in 2024, with a 6-month phase-in period.

Idaho

Idaho's version of IECC 2018 became effective in 2021 but had little effect on commercial natural gas usage, according to analysis by PNNL[6]. NEEA will continue to work on the next code cycle.

Products: Standards

NEEA works on standards and test procedures to set the floor for efficiency and drive the motivation for innovation of new products NEEA can support through its market transformation initiatives and its emerging technology work. Market Transformation program strategies often identify standards as opportunities to increase market adoption of energy efficiency. NEEA also leverages its market experience, technical expertise, and data to influence adjacent standards opportunities.

Federal Standards

The Department of Energy (DOE) published a new Commercial Packaged Boilers standard in 2020. NEEA and its energy efficiency partners influenced the outcome of the rule making by supporting a more stringent efficiency level, according to an evaluation completed by Michaels Energy in 2022[7]. The standard goes into effect in 2023. However, 2023 will be the only year NEEA reports savings from this standard because the DOE had to vacate the rule while it faces legal challenges evidence used as basis for the standard.

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[3] See analysis at neea.org, portal login, savings, codes.

[4] NORESCO. 2022. 2018 Washington State Energy Code Energy Savings Analysis for Nonresidential Buildings.

[5] https://www.energycodes.gov/prototype-building-models

[6] Pacific Northwest National Laboratory. 2018. Energy and Energy Cost Savings Analysis of the 2018 IECC for Commercial Buildings. Raw data. Analysis of 2018 IECC energy use intensity for commercial new construction.

[7] https://neea.org/resources/commercial-boilers-standard-evaluation

State Standards

NEEA is reporting Net Market Effects savings from the Oregon and Washington commercial equipment appliance standards based on evaluation results from Michaels Energy. The company determined that NEEA and its partners had a primary role in providing regional data and generating alignment among stakeholders on the Oregon and Washington commercial kitchen equipment standards.[8]

Programs

Efficient Rooftop Units (ERTU)

The Efficient Rooftop Units program advanced to Market Development9 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.

Savings above baseline are forecast to begin accelerating in the next 2 - 4 years. 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 expects this data collection to improve over time as the number of participating manufacturers and distributors grows, with recent progress with manufacturer's reps who sell most of the compliant efficient RTUs currently in the market. Distributor sales data are available six to eight months after the end of each reporting year, and going forward will be reported at the next annual reporting cycle. For example, full-year 2023 sales data are expected to be available in June/July of 2024, and will be reported as 2024 units at the time of annual reporting for 2024 (early 2025). Currently, the program is forecasting 1,000-2,000 therms of observable10 co-created savings for the 2020-2024 Business Plan.

High Performance Windows

The program goal is to stimulate national builder and consumer demand for high-performance windows, and will partner with manufacturers to meet that demand with scaled production. NEEA worked closely with ENERGY STAR to increase the current specification level to a 0.22 U-value performance level and plans to work within the building code process to include this specification level as a measure in future building codes. This program has been in development over the last few years and NEEA is will be determining the advancement path in 2024.

Commercial Gas Water Heaters

The Advanced Commercial Water Heating program will focus on stimulating market conditions that accelerate technological advancements and generate demand for gas heat pump (GHP) water heating systems. The program will transform the commercial and multifamily water heating retrofit and new construction market through increased adoption of GHP water heating systems, resulting in reduced gas

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[8] https://neea.org/resources/oregon-and-washington-high-cri-bulb-and-commercial-kitchen-equipment-state-standards-evaluations

[9] 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

[10] NEEA's current market tracking infrastructure provides very limited visibility to efficient RTU sales, as these units are relatively custom and are typically sold through Manufacturer's reps. NEEA expects improving visibility of efficient unit sales over the next few years based on recent successes with key relationships as well as the development of a supplementary commercial HVAC installation tracking process. NEEA forecasts full market co-created savings of 2,000 to 65,000 therms for the 2020-2024 Business Plan.

consumption and carbon emissions in these sectors. GHP water heating systems work by using a combination of natural gas and electricity to extract heat from the surrounding air or water and transferring it to the water that needs to be heated. This process is more efficient than directly generating heat using only gas combustion, as it leverages the principles of heat transfer and thermodynamics.

This program advanced into the program development phase in late 2023 and is undertaking foundational market characterization research starting in 2024. More information about adoption and savings forecasts will be made available as the program develops those in the coming years.

Efficient Gas Water Heaters

This program remains in the concept development stage and NEEA will propose to move this to the program development stage once a commercialized product launch is expected. Any product launch for a Gas Heat Pump Water Heater will likely be preceded by a large scale North American field study which will include the first units installed in the NW. NEEA will provide forecasted savings when a product launch timeline and associated market adoption forecast are more certain. This technology has a large technical potential of 100-200 MM Therms for Oregon, Washington, and Northern Idaho.

2024 Q1 Market Research & Evaluation Quarterly Newsletter

WHAT'S NEW:

Hello there!

The Northwest Energy Efficiency Alliance's (NEEA) Market Research & Evaluation (MRE) team jumped headfirst into the new year by kicking off several new studies in the first quarter. These include the first Market Progress and Evaluation Report (MPER) for the Extended Motor Products Market Transformation program, a market research effort to assess consumers' use and attitudes toward connected consumer products, market research with home energy raters in the Northwest, and Residential Code Compliance Evaluations for both Montana and Oregon. This list provides a great snapshot of the all the types of research and evaluation that NEEA's MRE team scopes, manages and delivers to support NEEA's Market Transformation programs. Together, these different types of research and evaluation studies serve two outcomes: they support the continuous improvement of NEEA's Market Transformation programs, and they provide unbiased, third-party assessments of new program concepts and current programs' successes and opportunities for improvement.

We hope you find the newsletter informative, and we look forward to hearing from you. Please feel free to reach out anytime with questions or suggestions.

Wishing you a happy springtime!

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

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Questions about this report may be addressed to:

Amy Webb

Sr. Manager, Market Research & Evaluation

awebb@neea.org

PUBLISH DATE: March 15, 2024

At a Glance

MARKET RESEARCH & EVALUATION PROJECTS

		PLANNING*	FIELDING*	REPORTING*
Integrated Systems	Efficient Rooftop Units: *Market Progress Evaluation Report #1*		✓	
	High-Performance HVAC: *Market Progress Evaluation Report #1*		✓	
	High-Performance Windows: *Residential Market Share Study*			✓
	BetterBricks: *Commercial Building Market Research*			✓
	Extended Motor Products: *Agricultural Pumps Market Research*	✓		
	Extended Motor Products: *Market Progress Evaluation Report #1*		✓	
	Efficient Fans: *Fan System Market Characterization*			✓
	Luminaire Level Lighting Controls: *Key Assumptions Review*			✓
	Luminaire Level Lighting Controls: *Market Sizing for Exterior Parking Lot Applications*			✓
Products	Efficient Gas Water Heaters: *Condensing Gas Water Heater Qualitative Market Research*	✓		
	Efficient Gas Water Heaters: *Existing Water Heaters in Select Commercial Buildings Market Research*	✓		
	Heat Pump Water Heaters: *Cold Climate Demonstration Installation & Water Heater Installer Focus Group*			✓
	Retail Product Portfolio: *Connected Consumer Products Market Research*		✓	
	Retail Product Portfolio: *Retailer and Manufacturer Sustainability Goal Literature Review*			✓

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

	PLANNING*	FIELDING*	REPORTING*
Codes: *Market Progress Evaluation Report #2*			✓
Codes: *Home Energy Raters Market Research*		✓	
Residential Codes: *Idaho Residential Code Compliance Evaluation*			✓
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*		✓	
Standards: *Battery Chargers Standard Evaluation*		✓	
Standards: *Non-Weatherized Gas Furnaces and Mobile Home Furnaces Standard Evaluation*			✓
Manufactured Homes: *Transition Market Progress Evaluation Report*			✓
New Construction: *Energy-Efficient Technology in Cold Weather - Bridger View On-Site 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

Market Progress Evaluation Report #1

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

As of late 2022, NEEA's Efficient RTU program is actively promoting efficient RTUs for 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:

1. Provide timely and actionable formative evaluation findings and recommendations to enable continuous improvement of the program.
2. Assess Market Transformation progress as measured by program Market Progress Indicators.
3. 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. In Q1 2024, the evaluation team plans to hold focus groups with two small groups of commercial building decision makers (e.g., building owners, operators, and facilities managers); survey commercial building decision makers across the region; and interview individuals who have or have considered having an efficient RTU on their building.

The study is being conducted in close coordination with the Market Progress Evaluation for the High-Performance HVAC program, which is also being completed by Apex Analytics and NMR Group.

The evaluation will be ongoing through fall 2024, with a final report anticipated in Q4 2024.

MRE Scientist: Chris Cardiel
ccardiel@neea.org
503.688.5488

Market Progress Evaluation Report #1

High-Performance HVAC | **FIELDING**

As of late 2022, NEEA's High-Performance HVAC program is intervening to transform the market for very high efficiency 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:

1. Provide timely and actionable formative evaluation findings and recommendations to enable continuous improvement of the program.
2. Assess Market Transformation progress as measured by program Market Progress Indicators.
3. 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 Q1 2024, the evaluation team will present findings from HVAC system designer and manufacturer representative surveys and prepare for its assessment of the program's Market Progress Indicators.

This study is being conducted in close coordination with the Market Progress Evaluation for the Efficient RTU program, which is also being completed by Apex Analytics and NMR Group.

The evaluation will be ongoing through fall 2024, with a final report anticipated in Q4 2024.

MRE Scientist: Chris Cardiel
ccardiel@neea.org
503.688.5488

Residential Market Share Study

High-Performance Windows | **REPORTING**

NEEA contracted with Ducker Carlisle to complete a high-performance residential window market share study on behalf of NEEA and the Center for Energy and Environment (CEE) in Q3 2024. This project is complimentary to the completed windows market characterization report which is posted to neea.org, providing a grounded estimate of window sales in the Northwest based on a national sales dataset and interviews with manufacturers and distributors (completed in Q4 2023). Ducker Carlisle estimated that close to 2.9 million windows were sold in the Northwest in 2022, with a little over half (54%) being installed in new construction residential buildings. About 3% of these sales may have been high-performance windows as defined by NEEA (with a U-Factor of 0.22 or less).

A final report is anticipated in late Q1 2024.

MRE Scientist: Zdanna King
zking@neea.org
503.688.5439

Commercial Building Market Research

BetterBricks | **REPORTING**

The research objective for this market research effort is to refine and expand on NEEA's understanding of the building upgrade journey for commercial building decision makers in order to generate recommendations on how NEEA could support decision-makers and their networks. It will also inform NEEA's exploration of interventions and resources for decision-makers as they consider making energy-efficient upgrades to their buildings.

The key research question is: What is the building upgrade journey for commercial building decision makers? NEEA contracted with ETHNO to address this question through the analysis of secondary materials and by conducting interviews and site visits with commercial building decision makers across the region.

Interviews began in Q4 2023. Data collection was completed in Q1 2024, and a final report is anticipated in Q2 2024.

MRE Scientist: Zdanna King
zking@neea.org
503.688.5439

Agricultural Pumps Market Research

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

In order to support ongoing program planning and opportunity assessment, NEEA intends to field a research study exploring the dynamics of the agricultural pump market across NEEA's four-state region. Study methods are likely to include secondary research accompanied by primary data collection (e.g., in-depth interviews, electronically administered surveys) to seek input and insight from professionals active in this market. The project kickoff is anticipated in Q3 2024.

MRE Scientist: Chris Cardiel
ccardiel@neea.org
503.688.5488

Market Progress Evaluation Report #1

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

NEEA contracted with ADM Associates, Inc., to field the inaugural XMP Market Progress Evaluation Report (MPER), which serves as the first evaluation of the program's Market Transformation efforts. The program's overarching objectives for the study are to:

1. Review the XMP Market Transformation Theory, Program Logic Model, and Market Progress Indicators (MPIs) to assess their clarity and alignment in conveying (1) the program's strategy and planned activities to overcome market barriers and drive market changes that will increase efficient clean-water pump and circulator adoption, and (2) NEEA's proposed approach for evaluating XMP market progress.
2. Conduct the first year of tracking MPIs to lay the groundwork for year-over-year evaluation, and report progress on several near-term outcomes.

A project kick-off was held in January 2024, and data collection with multiple market actor groups (including pump and circulator manufacturers' representatives, distributors, specifiers, contractors, and project owners, as well as NEEA program staff and partners) is scheduled to commence in late Q1 2024 and continue through Q3 2024. A final report is anticipated in Q4 2024.

MRE Scientist: Chris Cardiel
ccardiel@neea.org
503.688.5488

Fan System Market Characterization | Efficient Fans | REPORTING

NEEA contracted with DNV Energy Insights, Inc., to conduct a Market Characterization study to inform development and planning efforts for the Efficient Fans program, which is in the program development stage of NEEA's Initiative Life Cycle. The program aims to accelerate adoption of efficient fans and fan system products, including motors, drives, and controllers, by working upstream with manufacturers and highlighting efficiency metrics within their selection software. The initial program is in the commercial and industrial sectors.

The objectives for this Market Characterization study included:

1. Profiling and sizing of the regional fan system market.
2. Identifying and prioritizing market barriers.
3. Documenting market actor motivations and fan system path-to-purchase.

A project kick-off was held in February 2023, and data collection with multiple market actor groups (e.g., fan system manufacturers, manufacturers' representatives, distributors, and end users) commenced in Q2 2023 and continued through mid-Q2 2023. The study concluded in Q4 2023. A number of findings were produced regarding market dynamics, barriers, and opportunities for intervention, as well as a conservative estimate of roughly 27,000 fans sold annually in the Northwest under the program's current definition of "non-embedded."

A final report is available on neea.org.

MRE Scientist: Chris Cardiel
ccardiel@neea.org
503.688.5488

Key Assumptions Review

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

NEEA contracted with Cadmus in late Q3 2023 to conduct a review of key assumptions underlying its benefit-cost model for its LLLC program. The research objective for this study was to revise LLLC modeling assumptions in order to refine co-created energy savings reporting for the LLLC program. Research questions included:

1. Is it appropriate for NEEA to adjust the Regional Technical Forum's (RTF) combined Controls Savings Fraction (CSF) for occupancy sensor with daylighting controls to the mathematical sum of the separate CSF values or below? If so, what values might be more appropriate?
2. Is NEEA's approach to adjusting new construction baseline CSF to reflect the code requirement of various lighting control types in various space types appropriate?
3. Is it appropriate for NEEA to adjust the baseline CSF that it nets out of retrofits?

Cadmus addressed the research objectives through the selection and review of secondary sources. Study findings recommended that NEEA continue to use the combined controls CSF value, adjust non-warehouse CSF to 28% in new construction, and adjust baseline CSF to 1.7% for retrofit non-warehouse and 8.5% for warehouse applications.

A final report is available on neea.org.

MRE Scientist: Zdanna King
zking@neea.org
503.688.5439

Market Sizing for Exterior Parking Lot Applications

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

NEEA's LLLC program is considering adding exterior parking lot lighting to its portfolio. This study's research objective was to attain supported estimates for the number of luminaires in parking lots, current LLLC market penetration, and the potential for market growth in exterior LLLC with NEEA intervention, in order to inform the naturally occurring baseline and projections of costs and benefits (including energy savings) over time. Research questions included:

1. What is the market size for exterior LLLC in parking lots?
2. What is the potential market size for exterior LLLC in parking lots over the next twenty years?

Cadeo reviewed secondary sources to address the research questions, and provided estimates using various methodologies that ranged from 860,000 to 3.5 million luminaires existing in outdoor parking lots today. Study findings indicate that the number of parking lot luminaires are likely to increase by 3% over the next 20 years.

Research was completed in Q4 2023, and a final report is available on neea.org.

MRE Scientist: Zdanna King
zking@neea.org
503.688.5439

Condensing Gas Water Heater Qualitative Market Research

Efficient Gas Water Heaters | **PLANNING**

The Efficient Gas Water Heater program would like to better understand the purchase motivators among owners of the most efficient currently available gas storage water heaters (condensing gas water heaters) across North America. The program team recognizes this is a niche market; current estimates are that <10% of residential gas storage water heaters are made up of condensing units. However, the current hypothesis is that there is potential to utilize this market as a beachhead for early gas heat pump water heater (GHPWH) adoption by converting sales that would have been condensing gas water heaters to GHPWH. The program is interested to learn the likelihood of capturing a larger piece of this niche market. Key research objectives are under development and may include exploration of consumer path to purchase for gas condensing water heaters, any barriers they confronted in purchasing the product, and willingness to adopt the product.

Work is anticipated to begin sometime in Q2 2024 with a final report available in Q4 2024.

MRE Scientist: Anu Teja
ateja@neea.org
503.688.5421

Existing Water Heaters in Select Commercial Buildings Market Research

Efficient Gas Water Heaters | **PLANNING**

NEEA staff developed a Market Transformation program concept for Advanced Commercial Gas Water Heating that was added to the portfolio in Q4 2023. As the program enters the program development phase of NEEA's Initiative Life Cycle, NEEA staff are focusing on stimulating market conditions to accelerate technological advancements and generating demand for GHPWH systems by identifying which gas heat pump technology and design configuration is ideal for different building types in the Northwest. NEEA determined that a subset of commercial buildings including restaurants and lodging facilities (hotels and motels) and multifamily buildings (i.e., low rise and non-mixed use), offer the greatest savings and opportunity to launch its program efforts given their high usage of hot water.

NEEA seeks to gather insights on current water heating systems for these building types, including the purchase process, value propositions and barriers to adoption.

Work is expected to begin in Q2 2024 with a final report anticipated in Q4 2024.

MRE Scientist: Anu Teja
ateja@neea.org
503.688.5421

Cold Climate Demonstration Installation & Water Heater Installer Focus Group

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

The Northwest Energy Efficiency Alliance (NEEA) contracted with ILLUME Advising in Q4 2022 to pursue two concurrent studies around water heater installers. The first was intended to focus on observational research of cold climate heat pump water heater (HPWH) installations in the Northwest to better understand the depth of previously established installation challenges, specifically in cold climate scenarios. The second study (also qualitative in nature) was geared to better understand any challenges installers and plumbers in the region might face around recommending and installing HPWHs in existing single-family homes, and their hesitation to do so. In both studies, NEEA included installers with little to no prior experience in HPWH installation across the Northwest.

Key takeaways identified opportunities to support installers in recommending HPWHs to customers. For example, findings highlight that providing more design and size options for retrofit situations may increase installer comfort and confidence in recommending HPWHs. Furthermore, observational research found that installers believe HPWHs can be installed in most homes, and that it is comparable to "installing a traditional water heater." However, the study identified opportunities to improve product options and availability to enhance the feasibility of installations. Given these discoveries, there is a valuable opportunity to engage in additional collaborations with installers to amplify their confidence in recommending HPWHs.

A final report is available on neea.org.

MRE Scientist: Anu Teja
ateja@neea.org
503.688.5421

Connected Consumer Products Market Research

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

On behalf of its RPP program, NEEA is conducting market research to assess consumers' use and attitudes toward purchasing connected consumer products. The RPP team expects to kick off the project in late Q1 2024 or early Q2 2024.

MRE Scientist: Meghan Bean
mbean@neea.org
503.688.5413

Retailer and Manufacturer Sustainability Goal Literature Review

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

NEEA contracted with Apex Analytics to conduct a literature review of television and major appliance retailer and manufacturer sustainability goals. The study will publicly available information on organizations' sustainability goals as well as academic and industry articles to meet the following objectives:

- Compile information on regulatory and investor motivations that are driving organizations' sustainability efforts.
- Compile retailer and manufacturer sustainability goals and provide a summary of retailers/manufacturers sustainability goals, focus areas, and strategies.
- Assess which organizations are considered leaders or are investing heavily in sustainability/efficiency and which are investing less.
- Provide recommendations for how the ENERGY STAR® Retail Products Platform program could provide value to retailers/manufacturers pursuing sustainability goals.

This project kicked off in Q4 2023, and a final report is anticipated in Q2 2024.

MRE Scientist: Meghan Bean
mbean@neea.org
503.688.5413

Market Progress Evaluation Report #2

Codes | **REPORTING**

NEEA contracted with ADM Associates to conduct an Market Progress Evaluation Report (MPER) for its commercial and residential codes efforts. Using information gleaned through document review, interviews with NEEA staff, market actors, and implementers/trainers for NEEA-supported trainings, and a survey with recent trainees ADM concluded that:

- NEEA is successfully influencing more robust energy codes in the Northwest and nationally.
- NEEA's training and education efforts are effectively supporting market actors, but NEEA should improve its efforts to track the use and outcomes of these activities.
- The recently revised NEEA's Codes program logic model accurately captures the team's training and education work, but that the logic model should be updated to better reflect the nuances of the team's work to influence the development and adoption of energy codes in the Northwest.

A final report is expected in late Q1 2024.

MRE Scientist: Meghan Bean
mbean@neea.org
503.688.5413

Home Energy Raters Market Research

Codes | **FIELDING**

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

This project kicked off in February 2024, and a final report is anticipated in Q3 2024.

MRE Scientist: Meghan Bean
mbean@neea.org
503.688.5413

Idaho Residential Code Compliance Evaluation

Residential Codes | **REPORTING**

NEEA contracted with Industrial Economics, Inc. (IEc) to review assumptions underlying its estimation of energy savings resulting from NEEA's and its partners' involvement in the Idaho 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 with Idaho 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.

This work kicked off in Q1 2023, and the final evaluation of Idaho's residential energy code is expected in Q2 2024.

MRE Scientist: Meghan Bean
mbean@neea.org
503.688.5413

Montana Residential Code Compliance Evaluation

Residential Codes | **FIELDING**

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 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 Q4 2024.

MRE Scientist: Meghan Bean
mbean@neea.org
503.688.5413

Oregon Residential Code Compliance Evaluation

Residential Codes | **FIELDING**

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, site visits to residential new construction building sites, and 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 Q4 2024.

MRE Scientist: Meghan Bean
mbean@neea.org
503.688.5413

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 mid-Q3 2023, with planning and sample development continuing through Q4 2023. Data collection, including interviews with site contacts, desk review of permit data, and in-person/virtual site visits, are scheduled to commence in Q1 2024 and conclude in Q3 2024. This study includes analysis of billing data; collection of this data is planned to continue through the end of Q3 2024, with analysis and report preparation to follow. A final report is anticipated in Q4 2024.

MRE Scientist: Chris Cardiel
ccardiel@neea.org
503.688.5488

Montana Commercial New Construction Code Compliance Evaluation

Commercial Codes | **FIELDING**

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 is scheduled to conclude in Q1 2024, while in-person/virtual site visits commenced in Q4 2023 and are scheduled to conclude in Q1 2024. This study includes analysis of billing data; collection of this data is planned to begin in mid-Q1 2024 and continue through early Q2 2024, with analysis and report preparation to follow. A final report is anticipated in Q2 2024.

MRE Scientist: Chris Cardiel
ccardiel@neea.org
503.688.5488

Battery Chargers Standard Evaluation

Standards | FIELDING

NEEA's Codes and Standards team engaged in efforts to increase the stringency of the battery chargers standard. 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 (U.S. DOE) timeline for publishing the final rule. Michaels Energy will re-launch the project in August 2024, at which point they will review NEEA records and publicly available documents and will conduct interviews with key stakeholders from NEEA, U.S. DOE and other organizations. A final report is anticipated Q4 2024.

MRE Scientist: Meghan Bean
mbean@neea.org
503.688.5413

Non-Weatherized Gas Furnaces and Mobile Home Furnaces Standard Evaluation

Standards | REPORTING

NEEA's Codes and Standards team engaged in efforts to increase the stringency of the standard for non-weatherized gas furnaces and mobile home furnaces. 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, and Michaels Energy is reviewing NEEA records and publicly available documents and conducting interviews with key stakeholders from NEEA, U.S. DOE and other organizations. A final report is anticipated in Q2 2024.

MRE Scientist: Meghan Bean
mbean@neea.org
503.688.5413

Transition Market Progress Evaluation Report

Manufactured Homes | **REPORTING**

In the spring of 2023, the Northwest Energy Efficiency Alliance (NEEA) contracted with Apex Analytics to conduct a Transition Market Progress Evaluation Report for its Manufactured Homes Program. NEEA's program supports the adoption of manufactured homes meeting the Northwest Energy Efficient Manufactured Housing Program™ (NEEM)+ specification, developed by Northwest Energy Works. NEEM+ is a more stringent standard than the ENERGY STAR Version 2 specification, which has been in effect throughout the program's history.

The study addressed four key objectives:

- Confirm that the NEEM+ specification will remain viable without NEEA's intervention.
- Summarize initiative history in a narrative that describes the program's work and achievements from its inception to present day.
- Track select market progress indicators.
- Recommend viable approaches for conducting subsequent long-term monitoring and tracking efforts.

Report findings indicate that while NEEM+ market share is currently low, it is, in the opinion of manufacturers and retailers, still stable in the near term. Manufacturers and retailers agreed that their NEEM+ home sales were steady or had risen in the past two years. Since market forces are changing because of the new ENERGY STAR specification which takes effect in 2026, it is advised that NEEA should continue to monitor the market to ensure that NEEM+ homes remain a viable alternative on an ongoing basis.

A final report is available on neea.org.

MRE Scientist: Anu Teja
ateja@neea.org
503.688.5421

Energy-Efficient Technology in Cold Weather - Bridger View On-Site Research

New Construction | **REPORTING** | -

NEEA contracted with JG Research & Evaluation, LLC in the fall of 2021 to conduct a study of the new Bridger View housing development in Bozeman, Montana. The purpose of the study was to better understand how a cold weather climate may influence the adoption and performance of various technologies which included:

- Building envelope and insulation
- Triple pane windows
- Ductless heat pumps (DHP)
- Heat pump water heaters (HPWH)

This research took place over a period of approximately two years and covered each phase of the construction of Bridger View, which included 1) planning and design, 2) construction, and 3) homeowner lived experiences in the homes. The study concluded that decision makers (such as project consultants) were confident that the technologies would perform well in cold climates while installers expressed concern about installing HPWH and DHPs. This concern stemmed largely from unfamiliarity with the technologies. However, study findings show that Bridger View installation process appears to have positively changed these perceptions. Additionally, homeowners interviewed cited positive experiences and those who lived in the homes through a winter said they were impressed by the technology performance, such as maintaining consistent temperatures and overall lower energy bills.

A final report is available on neea.org.

MRE Scientist: Anu Teja
ateja@neea.org
503.688.5421

CONTACT US:

Amy Webb
Sr. Manager, Market Research & Evaluation

awebb@neea.org
503.688.5448

Anu Teja
Sr. MRE Scientist

ateja@neea.org
503.688.5421

Meghan Bean
Sr. MRE Scientist

mbean@neea.org
503.688.5413

Chris Cardiel
Sr. MRE Scientist

ccardiel@neea.org
503.688.5488

Zdanna King
MRE Scientist

zking@neea.org
503.688.5439

TOGETHER *We Are Transforming the Northwest*

AVISTA · Bonneville Power Administration · Cascade Natural Gas Corporation · Chelan County P.U.D. · Clark Public Utilities · EnergyTrust of Oregon · Idaho Power An IDACORP Company · NorthWestern Energy · NW Natural · Pacific Power · Portland General Electric · PSE Puget Sound Energy · Seattle City Light · Snohomish County PUD Public Utility District No. 1 · Tacoma Power Tacoma Public Utilities