2023 Annual Report

LETTER TO THE REGION

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The alliance made significant progress throughout 2023 in its continued efforts to help Northwest communities tackle energy challenges and build a more resilient future. Key milestones included a new federal water-heating efficiency standard, completing a regionwide residential data collection study, and advancing greater adoption of energy-efficient products in the region. The culmination of these efforts highlight the ways that NEEA's Market Transformation approach provides long-lasting benefits to Northwest utility customers.

As we look back on 2023, we also look ahead to an energy future of ongoing changes, complex challenges and valuable opportunities. In 2023, NEEA's Board completed a strategic and business planning process for 2025-2029. The plans highlight the continuing value of energy efficiency Market Transformation in our region and point to evolving opportunities for the alliance. And though our future is one of evolution, our core principles of collaboration and innovation will remain the same. In the years to come, our strong and regionally diverse alliance will be more important than ever as we continue working together to find unique solutions for all Northwest utility customers.

With gratitude for the alliance,

Becca Yates
NEEA Executive Director

Michael Colgrove, Energy Trust of Oregon
NEEA Board Chair

INTRODUCTION

The Northwest Energy Efficiency Alliance (NEEA or "the alliance") is a nonprofit organization working in collaboration with more than 140 other Northwest utilities and energy efficiency organizations to pool resources and share risks to transform the market for energy efficiency to the benefit of all consumers in the Northwest. The alliance uses its regional leverage to intervene in the market to remove barriers and accelerate efficiency technologies and market opportunities in ways that create lasting change in the market. The alliance plays a unique role in helping the region meet its energy efficiency and decarbonization goals in a way that supports broader energy system and consumer needs, regardless of fuel choice. This results in cost-effective energy efficiency savings and local benefits to alliance funders.

NEEA estimates that the region achieved nearly 39 average megawatts (aMW) of Co-Created energy savings[1] and more than 805,000 Therms of Co-Created natural gas savings in 2023. The full 2023 metrics are available on neea.org.

Other Co-Benefits of Energy Efficiency Market Transformation

In addition to energy savings, the region's investment in energy efficiency Market Transformation delivers a number of benefits to the region, including:

Reducing Peak Load Demand – Many of the programs in NEEA's Market Transformation portfolio contribute to peak-load reduction in winter, summer or both. Particularly, these contributions come from space and water heating end uses. In 2023, NEEA's portfolio delivered 79 MW of regional winter peak demand savings and 60 MW of summer peak demand savings. In addition, with the increase in technologies like variable speed motors and connected devices, these products have the ability to help utilities control the loads on their systems and reduce peak demand.

Lowering greenhouse gas emissions – By contributing to regional energy savings and locking in efficiency through its codes and standards activities, alliance Market Transformation programs reduce greenhouse gas emissions. In 2023, NEEA's electric and natural gas Market Transformation efforts resulted in an estimated 175,000+ tons of avoided CO_2 emissions.

Increasing quality and quantity of clean energy jobs – NEEA provides energy efficiency training and education to a broad range of clean energy professionals to help differentiate themselves from competitors and build the skills necessary to promote, install, and maintain energy-efficient products. NEEA also partners with organizations across the region to provide technical assistance and training on current and upcoming residential and commercial energy codes, ensuring that Northwest trade allies have the knowledge and skills to meet evolving energy codes. Finally, NEEA engages a broad network of efficiency contractors to support program implementation, research and data-collection efforts around the region.

Improving home and building comfort – Many of the products and practices that NEEA advances through its Market Transformation programs directly increase the comfort of homes and buildings by enhancing space heating and cooling year-round, contributing to a tighter building envelope and improving air quality. Furthermore, NEEA's efforts contribute to more efficient building energy codes and support code compliance.

Improving energy affordability – Energy efficiency reduces energy bills and can help alleviate the energy burden for low-income communities and others. Through its Market Transformation programs, the alliance works with the supply chain to remove barriers for efficient products, including the first-cost barrier for end-use consumers. NEEA also works to advance the development and market adoption of energy-efficient technologies with the potential address the needs of low-income and other traditionally underserved communities like renters.

[1] Co-Created energy savings include all savings above an estimated baseline that occur in the market due to the combined efforts of NEEA and its partners.

2023 KEY ACTIVITIES BY STRATEGY:

NEEA achieves Market Transformation through five, interrelated primary strategies that it has honed over the past two and a half decades: Emerging Technology, Portfolio Execution, Market Intelligence, Codes and Standards, and Convene and Collaborate. Individually, each workstream has broad value to the region. Together, they deliver permanent market change leading to energy savings for alliance funding organizations. Alliance accomplishments in 2023 from each workstream are summarized below. For additional information about alliance programs and activities, NEEA's 2023 Operations Plan is available on neea.org.

PRIMARY BUSINESS PLAN STRATEGY: EMERGING TECHNOLOGY (ELECTRIC + NATURAL GAS)

To ensure the continued availability of energy-efficient products, services and practices to Northwest consumers, the alliance identifies emerging energy efficiency opportunities and works with manufacturers and the market to test and validate product performance and energy savings. Through lab and field testing, or small-scale pilots, NEEA ensures that these products save energy and meet the needs of Northwest consumers. Once a technology is added to NEEA's portfolio, NEEA continues to monitor and test products as they naturally evolve in the market to identify market barriers and inform opportunities for product enhancement. NEEA staff coordinate these regional scanning efforts through the Regional Emerging Technology Advisory Committee (RETAC), and the Natural Gas Advisory Committee (NGAC), two formalized stakeholder groups which are facilitated by NEEA staff and provide ongoing guidance on alliance activities.

In 2023, NEEA conducted research, testing and vetting of a variety of emerging energy-efficient technologies, including:

1. **Central Commercial Heat Pump Water Heaters (HPWHs):** These products are used in multifamily buildings with a centralized water heating system that serves multiple units. In addition to several currently available models, new products from major manufacturers are expected soon. In 2023, NEEA continued its ongoing support of two regional pilot projects. These projects benefit consumers by aiding the alliance in establishing design tools to support installers and manufacturers, in addition to determining whether the product is viable as an efficient electric solution for central water heating. Also in 2023, the alliance published the Central Heat Pump Water Heaters for Multifamily Supply Side Assessment Study, which sought to understand the current landscape of central HPWH adoption in multifamily buildings. These findings and recommendations will help the alliance understand the most effective mechanisms to increase adoption of central HPWHs in multifamily applications. Additionally in 2023, the alliance participated with the Association for Energy Affordability (AEA) on an Electric Program Investment Charge (EPIC) grant to better understand the barriers to retrofitting existing building stock with central HPWHs. AEA has completed two of the five installations, with monitoring underway; most retrofit installations are in low-income housing in urban and rural locations. Finally, the alliance posted the first version of the Commercial HPWH Qualified Products List (QPL) in 2022, which contains information on Residential Multifamily Commercial products that meet the alliance's Advanced Water Heating Specification (AWHS) requirements. Since the publication of the QPL, four commercial HPWH products from four manufacturers have been listed and NEEA anticipates three more manufacturers to submit products for inclusion on the QPL. By adding new products and manufacturers to the QPL, consumers in the Northwest have access to products that meet greater efficiency performance and quality.

2. **Combination Hot Water and Space Heat*:** An integrated system that provides both space and water heating. The system is fueled by natural gas (or electric) and can support dual fuel or hybrid applications. In 2023, the alliance conducted performance testing of two natural gas combi units. This testing intends to demonstrate the performance and adaptability of these systems to provide space conditioning and domestic water heating systems in existing homes and small commercial applications. NEEA expects to publish performance reports for the two natural gas projects in early 2024.
3. **Commercial Gas Dryers*:** Products that have modulating gas valves that allow the dryer to vary its heat output and use less gas. In the Northwest, there are over 50,000 commercial gas dryers, however most of the existing dryers in the region are standard commercial gas-fired dryers with only one firing rate. These single-stage burners waste more energy through the exhaust during the later stages of drying when not as much moisture remains in the textiles and not as much heat is required. A modulating gas dryer adjusts for the changing demand in heat needed. In 2023, NEEA conducted a report to evaluate the savings opportunity of the modulating commercial gas clothes dryer product. This emerging retrofit technology comes in a kit form that replaces a single-stage gas valve in an existing dryer with a two-stage gas valve and associated controls. The final report is available on neea.org. The information and learnings demonstrated in this report resulted in Energy Trust creating an incentive of $700 on new and existing equipment for customers in Oregon and Washington.
4. **Dual Fuel Residential HVAC*:** A forced air gas furnace combined with an electric air source heat pump (ASHP) with integrated controls. In 2023 the alliance lead a workgroup of industry stakeholders to understand potential energy measurement considerations and approaches to dual fuel systems. Additionally, efforts continued to harmonize a CSA Group performance metric for dual fuel systems with AHRI 210/240, a standard that established a method to consistently rate residential central air conditioners and heat pumps. Work is continuing into 2024. Also in 2023, NEEA collected technical and market data to evaluate opportunities and better understand the energy and cost savings from ASHPs. These efforts will help to inform whether these products are efficient solutions for centrally ducted air-conditioning replacement across various representative applications in the Northwest.
5. **Hybrid Gas-Electric Heat Pump*:** An integrated modulating gas heat pump and electric air conditioner that uses natural refrigerants. The technology can provide heating and cooling with natural gas as the primary fuel source. In 2023, NEEA staff completed the evaluation of a residential-duty integrated system in a laboratory setting to validate the product's efficiency. The technology is currently in the prototyping stage, and findings will determine the viability of a hybrid HVAC product in a real-world application. Goals had initially been set for a heating coefficient of performance (COP) of 1.45 at 47°F and a target seasonal energy efficiency ratio of 16. During testing, the alliance achieved a heating COP of 1.42 at the design condition, and the chiller portion achieved a COP of 3.0. These numbers demonstrate that hybrid gas-electric heat pumps are a viable efficient technology with the potential to support regional decarbonization efforts. Further product development is expected over the next two years.

*As a dual-fuel organization, the alliance manages a portfolio of natural gas and electric Market Transformation initiatives. Technologies with an asterisk indicate gas and dual-fuel opportunities.

6. **Industrial Heat Pumps:** Industrial heat pumps can harvest low-grade heat and turn it into useful heat for manufacturing processes or space conditioning. In 2023, NEEA staff began exploring an industrial heat pump opportunity for energy savings and market potential with regional partners. Initial work will determine the opportunity's scale and scope, manufacturers and suppliers for the technologies, and barriers to adoption and possible solutions, ultimately leading to measure-based solutions and/or calculators.
7. **Micro Heat Pumps:** A small heat pump designed to condition a single room. The heat pump may be installed in a window, like a window air conditioner, or portable so it can easily be moved from room to room. In 2023, the alliance continued to conduct consumer research and field testing from Q4 2022. Phases 1 and 2 of the research concluded in May of 2023 and uncovered valuable feedback on the installation, use and comfort of the units tested. Additionally, the alliance is coordinating with three original equipment manufacturers on developing a test procedure and rating to enable the Consortium for Energy Efficiency (CEE) to define tax credit criteria for micro heat pumps. A future lab testing project and possible field pilots are under development, with the goal to gather data and validate real-world performance.
8. **Power Drive Systems (PDS):** PDS combine an electric motor and variable speed controls to control the speed of the motor. By reducing the speed of the motor, the power consumption is reduced. In 2023, the alliance sought to better understand the market and savings opportunities associated with the use of an adjustable speed motor in both variable and constant loads (i.e. a PDS) in the Northwest. Findings from the report will allow the alliance to continue to characterize the energy savings opportunity for PDS in retrofit applications, clarify previously identified barriers, refine the target portion of the market, and establish a vetted product definition.
9. **Residential Laundry Field Study:** The residential appliances for washing and drying clothes. In 2023, NEEA began a study which collects data on water usage, load sizes, textile mix, washer and dryer cycles selected, how efficiently washers remove water from the load, and how efficiently clothes dryers perform. These insights will allow updates to energy savings opportunities, inform future U.S. DOE rulemakings, and facilitate collaboration with other partners to replicate the study in their territories. NEEA anticipates publishing a final report of findings in 2024.
10. **Secondary Windows*:** Retrofit products comprised of one or more panes of material such as glass, polymer or acrylic, with or without low-e coatings, which are mounted in a frame that is attached either to the interior or exterior of existing windows without replacing the primary glass or frame. In 2023, the alliance installed commercial secondary windows at six pilot sites throughout the Northwest. The pilot sites seek to assess product performance in real world applications and will inform the opportunity for the product’s adoption in the Northwest. Post installation metering was completed, and a final report is anticipated in 2024. Additionally, one of the pilot sites recently received a U.S. DOE Building Envelope Campaign Retro 30 Award, which recognizes envelope retrofits that achieve a >30% improvement in envelope efficiency.
11. **Ultra-High Definition (UHD) TVs:** These products are 4K UHD TVs with various forms of advanced display technologies. In 2023, all major TV manufacturers signed on to a voluntary agreement to meet standby mode power of <2 watts and to establish an on-mode power compliance level in early 2024. This was enabled through several years of alliance efforts to support development of a new test procedure that has now been adopted by the

Consumer Technology Association (CTA), ENERGY STAR®, the U.S. DOE and the California Energy Commission and is currently in use by TV manufacturers worldwide. The test procedure (ANSI/CTA-2037-D) became a requirement for manufacturers in Q3 2023 and by the end of the year more than 315 TV models were tested using the new test procedure. ANSI/CTA-2037-D is much more reflective of actual energy use by TVs and will improve the efficiency of televisions, in turn allowing consumers across the Northwest and nation to have access to more efficient products. Energy use data from multiple manufacturers' TV testing is expected to be available in 2024.

PRIMARY BUSINESS PLAN STRATEGY: EFFECTIVE PORTFOLIO EXECUTION

In 2023, NEEA staff managed a portfolio of electric and natural gas Market Transformation programs in seven cross-sector Product Groups: Building Envelope, Consumer Products, HVAC, Lighting, Motor-Driven Products, New Construction and Water Heating. Each Product Group includes one or more programs and emerging technologies that share supply-chain opportunities with one another. Alliance programs strategically intervene in markets to influence decision-makers throughout the supply chain to remove barriers, find leverage and create lasting change. This approach allows the alliance to leverage shared relationships and market channels among programs, which delivers efficiencies for NEEA and its supply-chain partners.

BUILDING ENVELOPE PRODUCT GROUP

This Product Group engages the manufacturers, distributors, retailers and end consumers of the physical separator between the interior and exterior of a building, including walls, fenestration and roofs. In 2023, there was one program in the Building Envelope Product Group, High-Performance Windows. Window Attachments was discontinued as a stand-alone Market Transformation program in 2023, primarily due to program challenges with replicable measurability and inherent complexity of integration of envelope retrofits with other building upgrades. NEEA will continue to explore Market Transformation opportunities for commercial secondary windows, especially as the product is likely more suited as a key tool for a whole building approach. Additionally, NEEA will continue key market relationships and activities under the Building Envelope Product Group work.

High-Performance Windows – The alliance's High-Performance Windows program accelerates the adoption of high-performing windows by advancing the latest ENERGY STAR criteria and influencing leading manufacturers to scale production of windows that reach a minimum 0.22 U-value. With strong support from NEEA, the ENERGY STAR v7.0 Program Requirements for Residential Windows, Doors, and Skylights was finalized in Q4 2022 and went into effect in October 2023, lowering the U Factor requirements from 0.27 to 0.22 for the Northern Climate Zone. The new specification supports the alliance's Market Transformation efforts in the Northwest for high-performance windows by providing manufacturers with the criteria to produce the most efficient products to put on the market.

Also in 2023, the alliance identified opportunities to work with market partners to install high-performance windows in real world applications. This included conducting a builder pilot to spread awareness of and generate greater demand for high-performance window solutions among residential builders and consumers. Additionally, it aimed to provide the business case for manufacturers to meet demand through scaled-up production, ultimately resulting in reductions in product costs. Two of the builders that participated in the volume builder pilot in 2022 have committed to continue their use of high-performance windows in future builds as their standard offering in new homes in the Northwest. Also in 2023, the alliance identified opportunities to work with market partners to install high-

performance windows in real world applications. This included continued work with a national builder to install thin triple pane windows in a 100-home development in the region. Construction has begun, and windows have been installed in approximately two dozen homes. In addition, two new brands entered the thin-triple market in 2023, one of which is specifically targeting the northern climate zones and announced construction of a dedicated manufacturing plant. They join six other major manufacturers offering triple pane products in the northern climate zone, which helps to ensure high-performance window products are available and scalable to meet demand for consumers in the Northwest.

Finally, to support the proliferation of high-performance windows in the Northwest, the alliance continued facilitating the national Partnership for Advanced Window Solutions (PAWS) Collaborative. PAWS promotes cost-effective, high-performance window solutions for the nation's new and existing building stock. By doing so, the collaborative aims to accelerate the national availability and adoption of advanced and highly efficient windows and window attachments that improve occupants' comfort and reduce building energy use. Funded by the U.S. DOE, PAWS is facilitated by NEEA and includes government agencies and research organizations, regional energy-efficiency groups, utilities, builders and window-solutions manufacturers.

CONSUMER PRODUCTS PRODUCT GROUP

This Product Group engages the manufacturers, distributors, physical and online retailers, contractors and installers that deliver consumer goods and services in high volume, as well as the end-customers who purchase them. In 2023, Retail Product Portfolio was the sole electric program in this Product Group.

Retail Product Portfolio (RPP) – RPP is a midstream retail program that partners with utilities and large retailers around the country to offer midstream sales incentives for a portfolio of consumer products. These incentives help to influence corporate retail buyer's purchase decisions and give the alliance access to full-category sales data. Additionally, by providing midstream incentives, retailers are encouraged 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. During 2023, three new utility sponsors joined the ENERGY STAR Retail Products Platform (ESRPP) program, bringing the share of U.S. households represented by program sponsors to more than 24%. Achieving greater scale helps NEEA to amplify the voice of the region, creating more opportunities for Northwest consumers through participating retailers and through ENERGY STAR to increase consumers' access to more efficient product options. In the Northwest, this program has coordinated with retailers and distributors to get energy-efficient refrigerators, clothes washers and clothes dryers on shelves in more than 300 store locations across the Northwest. As a result, nearly 500,000 ENERGY STAR qualified products sold through more than 115 participating retailers in 2023. Also, in 2023 the alliance submitted comments on the U.S. DOE's multi-product agreement proposal for new appliance efficiency standards that covers refrigerators, cooking products, clothes washers, clothes dryers and dishwashers. If adopted, the changes would provide significant efficiency benefits for consumers. Lastly, the alliance provided comments on the Environmental Protection Agency's (EPA) Dryer Discussion Guide as a precursor to the new ENERGY STAR specifications that will go into effect in 2024. The new specification will ensure that new features and functions that offer significant efficiency gains are available across brands, while also maintaining product performance.

HVAC PRODUCT GROUP

This Product Group engages the manufacturers, distributors, specifiers, designers, installers and consumers of commercial and residential HVAC products. In 2023, there were three programs in the HVAC Product Group: Advanced Heat Pumps (*formerly Variable Speed Heat Pumps*), High-Performance HVAC, and Efficient Rooftop Units (Efficient RTUs).

Advanced Heat Pumps – The Advanced Heat Pump program, formerly the Variable Speed Heat Pump program, aims to identify and drive adoption of product features, capabilities and ratings that will deliver higher efficiency in all residential two-stage and variable speed heat pumps installed in the Northwest. In 2023, the alliance identified opportunities to improve high value product features and capabilities that will enhance the efficiency of advanced heat pump products. To ensure availability of advanced heat pump products with improved efficiency, the alliance sought to gain manufacturer support of the identified improvements. To do so, the alliance attended the Air Conditioning, Heating and Refrigeration (AHR) Expo in 2023, the world's largest heating, ventilation, air conditioning, and refrigeration marketplace event with more than 1,800 exhibitors displaying the latest technology and an estimated 30,000 to 35,000 attendees. The program team met with 15 leading heat pump manufacturers to share research-to-date on the program's identified heat pump improvements to begin building buy-in and partnerships, collect feedback on market feasibility, see the newest technologies, and learn about new improvements on the horizon. As a result, six manufacturers agreed to collaborate with the alliance to develop the connected commissioning certification criteria, which is one of the high-priority improvements. And, due to the coordination and support from the alliance, the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Unitary Small Equipment Standards Technical Committee included elements that address four of NEEA's lower-priority improvements in its proposed changes to the test procedure and rating standard. This resulted in the AHRI test procedure draft expected to be proposed in the U.S. DOE's public process as early as 2024. By aligning manufacturers on advanced heat pump product improvements, the alliance is in turn aiming to provide consumers across the Northwest with access to the most efficient product options.

High-Performance HVAC – This program aims to transform the commercial HVAC market in the Northwest by accelerating the adoption of high-efficiency HVAC systems and components, resulting in substantial energy and non-energy benefits throughout the region, such as healthier buildings, improved indoor air quality and improved tenant comfort. In 2023 the alliance continued to refine and socialize its system definition and design recommendations documentation, which provides manufacturers, designers and installers of very high efficiency DOAS with performance requirements and guidance for application in the Northwest climate zones. As a result of this effort, in 2023 the first lower-cost ventilation model was included in NEEA's compliant product list. By the end of Q4 2023, the total number of compliant products grew to 86 models, a roughly 100% increase over the total number of compliant products listed at the end of 2022. By increasing the number of compliant models, consumers have diverse choices to enhance the energy efficiency of buildings in the Northwest. Also in 2023, the alliance engaged in activities aimed at fostering interest and enhancing market capabilities for an all-electric, high-performance HVAC solution called very high efficiency DOAS. Specifically, the alliance coordinated 19 events across the Northwest region, reaching over 600 engineers, architects, facility managers, and other commercial building industry market actors. Finally, NEEA staff completed work on market data/analysis in 2023 that will inform a proposed DOAS definition revision for 2024 IECC and parallel incorporation into ASHRAE 90.1-2025, a key step along the way to locking this into codes.

Efficient Rooftop Units (RTU) – The Efficient RTU program works to increase the efficiency of RTUs through product differentiation, which can ultimately assist in elevating Federal Standards. In 2023, the program focused on engaging with the HVAC supply chain to build awareness and understand the interventions and value propositions that would result in greater sales of efficient RTUs. The program also worked to socialize and build alignment around NEEA's Efficient RTU Specification. For example, the program team worked with a light commercial manufacturer that developed an energy recovery option for their RTUs in 2023 to allow for qualification on the Efficient RTU Performance Path, which is one of the two efficient solutions identified in the Efficient RTU Specification. Additionally, the alliance began working with Minnesota's Center for Energy and Environment (MNCEE), Nicor Gas and Resource Innovations to collaborate on commercial HVAC measures, primarily around RTUs that are gas-fired, dual-fuel, or high-performance, and include common features included in the alliance's Efficient RTU specification. This alignment will show increased demand to manufacturers for qualifying products, in turn resulting in more qualifying products available to consumers in the Northwest. The installation of two units in Portland completed in late Q1 of 2023 and monitoring is underway. Results will inform plans to promote and accelerate the adoption of efficient RTU products in the Northwest.

LIGHTING PRODUCT GROUP

This Product Group works to increase promotion of energy-efficient lighting by engaging manufacturers, distributors, specifiers, designers and installers, and by educating decisionmakers. In 2023, the Luminaire Level Lighting Controls program was the sole program in this Product Group.

Luminaire Level Lighting Controls (LLLC) – This product combines LEDs with integrated controls and sensors to offer improved building performance and occupant comfort while increasing energy savings. In 2023, NEEA staff actively engaged with several organizations to align on shared priorities for advancing lighting controls adoption, including the Illuminating Engineering Society (IES), the Pacific Northwest National Laboratory (PNNL) and the U.S. DOE's Integrated Lighting Campaign. Additionally, the program is communicating with other LLLC market transformation programs to ensure alignment, such as the ones being launched by MNCEE and by Ameren Illinois. Additionally, the alliance continued its efforts to boost awareness and foster product adoption by partnering with local manufacturer sales channels to engage and educate lighting specifiers. As a result of these efforts, the alliance participated in 12 industry events and held 16 strategic engagements with local manufacturing representative agencies. Finally, LLLC products are becoming a nationally recognized product category of lighting controls. They are being embraced by the supply chain with a range of products now available for consumers at different price points. As of 2023, there are 36 LLLC systems available on the DesignLights Consortium's (DLC) QPL from 30 manufacturers. The DLC QPL is the largest verified list of high performing and energy saving lighting solutions in the world. These numbers are continuing to increase, with most manufacturers expanding the types of products available that include integrated LLLC technology. These efforts all work to increase visibility and demand for LLLC, thereby increasing the availability of LLLC products for consumers across the Northwest.

MOTOR-DRIVEN PRODUCTS PRODUCT GROUP

This Product Group works with the manufacturers, distributors, specifiers, designers and installers of a variety of motor-driven products, as well as the decision-makers who influence their purchase. Specific motor products include pumps, fans, compressed-air systems and high-performance motors. For 2023, there were two programs in the motor-driven product group: Efficient Fans and Extended Motor Products – Pumps.

Extended Motor Products – Pumps (XMP) – The XMP Pumps program works to accelerate the adoption of more efficient pumps and circulators. The alliance provides midstream incentives and other support to motivate pump and circulator distributors to preferentially stock and sell efficient pump products. In exchange, distributors provide NEEA with full-category sales data, which informs program strategy and enables the measurement of market progress. In 2023, the alliance continued to leverage relationships with pump manufacturers, distributors, and industry associations to accelerate the pace of smart pump and variable load pump sales growth. Activities included active participation with eight pump and circulator manufacturers' representative firms, resulting in an increase in Smart Pump market share over the previous year. In 2023, Smart Pump market share reached 18% and Smart Circulator market share reached 23%. Also in 2023, to raise awareness of energy-efficient pumps, the Hydraulic Institute Energy Rating label, and the specific benefits of smart pumps related to installation and maintenance cost, the alliance supported hands-on trainings, webinars, lunch-and-learns and special events with pump buyers and specifiers. Throughout the year, various participating manufacturers' representatives held numerous lunch and learns, conducted webinars, and held and other forms of training with pump buyers and specifiers.

Efficient Fans – This program focuses on non-embedded (i.e., stand-alone) motor-driven fan systems that are not packaged by the manufacturer as part of any equipment with additional operating functions (e.g., HVAC, make-up air or outdoor-air units), and may include a fan, motor and drive (including controls). The alliance is working to develop a standardized specification, testing method and label to properly reflect the performance and energy use of each product. Currently, system efficiency is indicated using the new Fan Energy Index (FEI) label, which describes the fan efficiency at a design point compared to a "minimally compliant" reference fan at that same operating point. FEI is the best metric to characterize efficient fans at a particular operating point. Proper sizing of the fan for design conditions leads to more efficient operations; however, FEI is rarely used by designers and specifiers in their fan selection. In 2023, the first Federal Test Procedure on Fans and Blowers used FEI as the energy efficiency metric, marking an industry milestone and building on the momentum and visibility of this metric. Also in 2023, the alliance completed a Fan Systems Market Characterization study, which focused on describing the path to purchase for efficient fans, including the roles, motivations, and perspectives of relevant market actor groups. Additionally, the program collected fan sales data from two manufacturers and signed an agreement with one major manufacturer to work on updating their fan selection software to highlight the FEI, and to test targeted interventions to promote efficient fans.

NEW CONSTRUCTION PRODUCT GROUP

Working closely with the alliance's Codes and Standards team, this Product Group maximizes energy efficiency opportunities for new residential and commercial buildings by enabling code advancement through the market adoption of energy-efficient products and practices. In 2023, Manufactured Homes remained the standalone Market Transformation program in the alliances New Construction Product Group. As the program is near the end of the Market Development phase it will transition to Long-term Monitoring and Tracking in 2024.

Manufactured Homes – This program works to increase voluntary adoption of NEEM+ manufactured homes, an advanced tier of energy-efficient manufactured homes that leverage the NEEM program. The program works with the supply chain to increase availability and demand for NEEM+ certified energy-efficient manufactured homes with the goal of supporting advancement of the Housing for Urban Development code (HUD) Federal Standard. In 2022, the U.S. DOE published a final rule on the manufactured housing Energy Conservation Standards that would make slight improvements for single-

wide homes and significant improvements to double-wide and larger manufactured homes. However, due to uncertainty surrounding enforcement of the new rule, the U.S. DOE shifted the effective date from 2023 to 2025. Although delays to the new final rule will slow changes in the Northwest Manufactured Homes market, NEEA identified opportunities to support compliance with the new rule when it goes into effect. For example, as part of its emerging technology efforts, the alliance is investigating Heat Pump Ready ENERGY STAR Manufactured Homes. These are defined as homes that can be shipped as "Heat Pump Ready" to comply with the new ENERGY STAR manufactured home specification. The alliance is working with the U.S. DOE and the NEEM program administrator to define U.S. DOE program requirements that give credit for the NEEM program's continuous process improvement, air sealing and duct sealing aspects. An analysis of the Inflation Reduction Tax Act identified elements of the specification that would continue to allow manufacturers in the Northwest to easily certify that the homes meet ENERGY STAR specification requirements, which will in turn ensure that ENERGY STAR manufactured homes are available to Northwest consumers. Finally, NEEA's recently completed Manufactured Homes Market Progress Evaluation Report (MPER) indicated that the market will remain stable and found that NEEM+ sales have remained steady or increased. As a result, NEEA discontinued direct market engagement in the manufactured homes market in 2023 but will continue to monitor the market to ensure that NEEM+ homes remain a viable alternative for consumers across the Northwest.

WATER HEATING PRODUCT GROUP

This Product Group engages the manufacturers, distributors (wholesale and retail), specifiers, designers, installers and consumers of natural gas and electric commercial and residential water heaters. In 2023, there were two programs in the Water Heating Product Group: Efficient Gas Water Heaters and Electric Heat Pump Water Heaters. Additionally, NEEA staff developed a Market Transformation program concept for Advanced Commercial Gas Water Heating that was added to the portfolio in Q4 2023. Program activities will begin in 2024.

Heat Pump Water Heater (HPWH) – The HPWH program aims to increase adoption of HPWHs for emergency and planned replacements in single-family homes, while also influencing the Federal Standard to require heat-pump-level efficiency for all electric storage tanks 45 gallons or larger. In 2023, the U.S. DOE published the proposed new federal efficiency standards for water heaters to transition the majority of electric storage water heaters to heat pump technology, based on recommendations submitted to DOE in 2022 by members of a diverse stakeholder coalition of industry partners – including the alliance. The alliance participated in this joint recommendation in October 2022 to ensure that the needs of consumers in the Northwest were met, including those in cold climates, with challenging installation locations and across all income levels. As of April 2024, the DOE published the new final rule which will transition the majority of electric storage water heaters to heat pump technology. To ensure the Northwest market is ready for these changes, the alliance conducted research in 2023 to understand any potential barriers to market acceptance of the standard. The study 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 is available on neea.org as of Q1 2024. Also in 2023, the program sought to increase installer adoption of HPWHs in retrofit installations by providing training sessions and content around key topics including "The Pros and Cons of Mixing Valves for Customers" and "Dispelling Myths about HPWHs." This content is available HotWaterSolutionsNW.org.

In April 2024, the U.S. DOE officially published the new federal efficiency standard for consumer water heaters. The new standard is a direct result of nearly 20 years of leadership by the alliance, its market partners, and many stakeholders across the country. For example, the U.S. DOE cites NEEA's Advanced Water Heating Specification (AWHS) as reference material for its final rule. The adoption of the final rule represents a major milestone in alliance Market Transformation efforts and is a win for all Northwest customers.

Efficient Gas Water Heaters (EGWH) – This program works to 1) develop the market for efficient gas water heating products, 2) bring a natural gas heat pump water heater (GHPWH) to market, and 3) influence the passage of a Federal Standard by 2030. Residential GHPWHs are projected to have the technical potential to save more than 100 million annual Therms. In 2023, the program focused on understanding the likelihood of major manufacturers committing to commercializing a residential GHPWH and to assess utility support for the product once it is launched. As part of this effort, the alliance worked toward product advancement by partnering with a technology developer and additional co-funders to test adsorption of GHPWH technology product's potential to achieve a Uniform Energy Factor (UEF) of 1. Achieving a UEF greater than 1 will ensure GHPWHs are more energy efficient and cost less to operate. Also in 2023, to improve understanding around commercialization timelines, the alliance continued discussions with manufacturers and technology developers. These continued conversations will help to ensure the commercialized GHPWH products meet the needs of consumers in the Northwest.

INFRASTRUCTURE PROGRAMS

In addition to its Market Transformation programs, the alliance develops and implements enabling infrastructure programs that build market capability, awareness and demand for energy-efficient products, services and practices. NEEA's infrastructure programs in 2023 are: BetterBricks, Integrated Design Labs and Strategic Energy Management.

BetterBricks – Launched in 1999, BetterBricks leverages its long-standing relationships and communication channels to support alliance programs by providing access to target-market audiences, including building owners, property managers, building staff, architects, designers, engineers and contractors. Multiple alliance programs utilize BetterBricks as a central investment to help overcome market barriers, including by raising awareness and demand for energy-efficient technologies in commercial buildings. In 2023, BetterBricks continued supporting its long-standing partners by providing educational opportunities and resources. For example, an energy modeling guide for high-performance HVAC technologies was created in 2023 to enhance energy modelers' accuracy in predicting energy use and future savings for very high efficiency DOAS in typical commercial building applications. Additionally, a very high efficiency DOAS design guide was created to provide guidance to manufacturers, designers and specifiers regarding the key components of very high efficiency DOAS products. Also in 2023 the alliance updated and repackaged outdated resources on BetterBricks, including the creation of a new Building Renewal Series of educational articles, which helps commercial building owners and operators identify areas for energy efficiency improvements, financial planning and investment strategies, building and system upgrades and retrofits, and the ongoing operations and maintenance of a commercial property. And, a list of utility incentives available in the Northwest for LLLC products was added to the BetterBricks website to aid commercial building owners in the region to identify and take advantage of incentive opportunities from their local utilities. In addition, two case studies on recent LLLC installs were posted to BetterBricks, one of which featured an installation in an industrial facility in Everett, WA, while the other featured a manufacturing plant in Mukilteo, WA. These

case studies highlight the benefits of the technology for commercial and industrial buildings in the Northwest. Finally, throughout 2023, BetterBricks program team members attended and presented at over 30 Northwest conferences, webinars and/or lunch-and-learns covering topics ranging lighting and HVAC, to new programs like centralized HPWHs and efficient fans.

Integrated Design Labs (IDLs) – The IDLs work to transform the design, construction and operation of commercial, institutional and residential buildings to advance energy-efficient, high-performance and healthy buildings in the Northwest. Located on university campuses in each of the four Northwest states, the IDLs provide regional design teams access to the best building-performance knowledge available, while offering project-by-project support, education and training on designing, constructing and operating the healthiest, most productive and energy-efficient buildings. The alliance provides annual base funding to support each IDL, which serve as critical partners to alliance programs. In 2023, the IDLs supported training, awareness and adoption in the building professional community for LLLC, high-performance HVAC, and motors.

Strategic Energy Management (SEM) – SEM is a specially funded program, which develops, maintains and delivers a holistic set of tools that support funders to deliver strategic energy management to their customers. These tools include the SEMHub.com website and its contents, the Energy Talk Cards, online learning modules through a learning management system platform, and support of the Northwest SEM Collaborative (NWSEMC). Throughout 2023, the alliance developed and deployed improvements to the SEMHub website including: developing new Collections and improving the Collections function, a redesigned Case Study layout, updated images, and improved navigation. Additionally, improvements to the Energy Management Assessment were made to enable greater customization of the reports including adding an Executive Summary and the ability to reorder recommendations and curate final report content. Also in 2023, five NWSEMC working groups met actively throughout the year, supported by the NEEA and the SEM Leadership Team. Working group topics in 2023 included an exploration into integrating diversity equity and inclusion, and lean principles into SEM delivery. NEEA and the NWSEMC leadership team also supported delivery of the annual SEM workshop, which took place in October 2023 with a record turnout of almost 100 attendees. Funding for the alliance's SEM program concludes at the end of Cycle 6 in 2024. To successfully transition the program, NEEA conducted outreach to potential future partners who might take on future ownership and management of the region's SEM tools. NEEA staff reviewed the results of this outreach with alliance SEM funders and began contracting discussions with identified partners. As a result, the NWSEMC Leadership Team worked with the North American SEM Collaborative board members to move forward with forming a partnership between the two Collaboratives where the NWSEMC will be supported in a new chapter model under the North American SEM Collaborative and the American Council for an Energy-Efficient Economy (ACEEE).

PRIMARY BUSINESS PLAN STRATEGY: CODES AND STANDARDS

In 2023, NEEA continued to influence the development and successful implementation of energy codes, appliance and equipment standards, and test procedures to materially improve efficiency outcomes. The Codes and Standards program relies on and closely coordinates with the strategies and activities of the alliance's Market Transformation programs.

Codes – The Codes program provides ongoing training and technical assistance on current and upcoming commercial and residential energy codes. Code activities include code development, training and education, code interpretation support and above-code tool development. NEEA's continued

involvement in code support activities ensures new construction stakeholders, including builders, trades, and code officials have the information they need to comply with code requirements for both natural gas and electric options. In 2023, the alliance delivered over 75 trainings on topics related to energy codes in all four Northwest states, serving more than 4,900 attendees. Additionally, NEEA supported code activities in all four Northwest states. Activities included:

- **Idaho:** NEEA staff were heavily involved in the development of the 2024 IECC through the development and submittal of multiple proposals and participation on sub-committees. Because Idaho adopts the IECC as its energy code, any development work or influence NEEA staff have on the national model code, later impacts Idaho's code once that code version gets adopted. Additionally, NEEA staff and partners provided input regarding the changes to energy code rules under the Executive Order – Zero Based Regulation. This included providing data analysis of impacts to the state, acting as technical consultants and subject matter experts to the Building Code Board and heavily participating in the public hearing process. Finally, NEEA kicked off a code compliance evaluation of the Idaho 2018 residential energy code. The final report is expected in 2024.
- **Montana:** NEEA staff were heavily involved in the development of the 2024 IECC through the development and submittal of multiple proposals and participation on sub-committees. Because Montana adopts the IECC as its energy code, any development work or influence NEEA staff have on the national model code, later impacts Montana's code once that code version gets adopted. In addition, NEEA staff participated and helped facilitate a Montana Homes Collaborative, a group of residential new construction stakeholders that meets to discuss building science and best practices. NEEA also conducted data collection for the Montana commercial energy code compliance evaluation. The final report is expected in 2024.
- **Oregon:** In 2023, the 2023 Oregon Residential Specialty Code (ORSC) adoption process was completed. The 2023 ORSC was adopted on October 1, 2023 and is expected to go into full effect in 2024. NEEA staff participated in the measure development and the public adoption process for the Oregon ORSC. Also in 2023, NEEA began conducting an Oregon Residential Code Compliance Evaluation. Through this study, NEEA will gather market data about homes built under the 2021 ORSC. A final report is expected by the end of 2024.
- **Washington:** The alliance worked on development of the 2021 WSEC commercial code compliance tool edition, which will help builders and engineers verify their building design's compliance with the upcoming 2021 WSEC commercial code, which became effective March 15, 2024. Additionally, the program continued to support offering technical assistance for the Total System Performance Ratio (TSPR) analysis tool used to calculate the TSPR for Washington State's performance-based energy code compliance path for HVAC systems. Finally, the alliance completed a residential code evaluation in Washington, examining new construction single family homes built under WSEC 2018. The evaluation estimated compliance with the code and analyzed primary space and water heating fuel selection of homes built under the 2018 code. The final report can be found on neea.org.

Standards – In 2023, NEEA staff collaborated with partners to submit more than 27 comment letters in strategic response to the U.S. DOE's issuing multiple Requests for Information (RFI) and Notices of Proposed Rulemaking (NOPR), initiating standard rulemaking for appliance and equipment products. These comment letters covered more than 25 products including consumer furnaces, water heaters, circulating pumps, and clothes dryers. Four of these letters specifically addressed recommendations

related to natural gas products, while the other 24 focused on dual-fuel appliances and equipment. NEEA's comments provided regional sales data, lab testing results, field validation data and other technical data to support recommendations for enhanced test procedures and improved efficiency levels that have the potential to provide energy efficiency benefits to consumers in the Northwest.

PRIMARY BUSINESS PLAN STRATEGY: MARKET INTELLIGENCE

NEEA's Market Intelligence strategy is delivered by the Analytics, Research and Evaluation Division, which is composed of three distinct functions: Market Research and Evaluation; Data, Planning and Analytics; and Energy-use Studies. In 2023, NEEA's Market Intelligence activities are focused on continuing to: 1) accurately assess results from alliance Market Transformation efforts; 2) provide research and market intelligence to support program and business planning needs of internal and external stakeholders; 3) bring more visibility to alliance Market Transformation outcomes and market progress indicators in addition to energy savings; and 4) build capacity for in-house data management and analysis.

Market Research and Evaluation (MRE) – MRE provides actionable insights for alliance Market Transformation programs throughout their lifecycles and conducts formal evaluations of programs in market development. These research and evaluation efforts provide data and analytical services for the benefit of Northwest customers. In 2023, the alliance delivered more than 19 market research or evaluation reports to support both electric and natural gas opportunities for energy efficiency, all of which are publicly available on neea.org.

Stock Assessments – In 2023, the alliance's efforts included the completion of recruitment and data collection for the ongoing 2022 RBSA, a comprehensive study of single-family and multi-family building characteristics and energy use. NEEA staff held monthly workgroup meetings throughout the year to collect input from stakeholders on topics critical to the study's success, including revised multi-family recruiting and data collection approaches needed to adapt to low response rates due, in part, to the lingering effects of the COVID-19 pandemic. These discussions resulted in a decision to focus on tenant units and de-emphasize building-level data collection, such as central HVAC systems. NEEA completed building characteristic and energy use data collection for the 2022 RBSA in 2023. The final report and accompanying data is available on neea.org as of Q2 2024.

Also in 2023, NEEA staff kicked off planning for the 2025 CBSA. Similar to the RBSA, the 2025 CBSA is a regional study that collects building characteristic and energy use data on commercial and multi-family buildings. The 2025 CBSA will be the first CBSA to include multi-family buildings.

Northwest End-Use Load Research (EULR) – The project continued collecting data for its Home Energy Metering Study (HEMS) and Commercial Energy Metering Study (CEMS) on select residential and commercial electric end-uses. The end-uses metered for the study include ductless heat pumps, ducted heat pumps, heat pump water heaters, central air conditioning, forced-air furnaces and baseboard heaters. One-minute-interval data are being collected by circuit for each participating residential and commercial building. As the largest end-use load research project in the Northwest since the 1980s, this work will greatly support regional planning and program design. In 2023, NEEA completed installations for 400 residential homes and 70 commercial office/retail buildings. Using the data, the Regional Technical Forum used the information from previous years to calibrate its new Energy Efficiency and Demand Response tool, which analyzes residential building energy models in EnergyPlus. Additionally, 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.

PRIMARY BUSINESS PLAN STRATEGY: CONVENE AND COLLABORATE

NEEA regularly creates and communicates opportunities for regional energy efficiency stakeholders by convening the region to share information and best practices and align on regional priorities. These opportunities enable the region to move the market faster and more efficiently than any one organization could do alone. In 2023, NEEA's efforts to convene the region included:

- **Efficiency Exchange (EFX) –** EFX is an annual conference hosted in collaboration with Bonneville Power Administration and the Northwest Power and Conservation Council. In May 2023, the first hybrid conference was held in Portland with regional attendees meeting in person for the first time since 2019. The event included 430 in-person attendees and 116 virtual attendees with 24 sessions and two keynotes. The conference covered a range of topics including: the Inflation Reduction Act, demand flexibility, equity in energy efficiency, and advanced heat pump technologies. More information on the conference, including details from Efficiency Exchange 2024 held on May 14-15, 2024 in Spokane, Washington, can be found on neea.org.
- **Federal Funding Regional Coordination Work Group:** Co-chaired by NEEA and BPA, the Federal Funding Regional Coordination Work Group shares information regarding upcoming federal opportunities flowing from the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA). The Work Group coordinates activities where possible to enhance energy efficiency outcomes for Northwest consumers and market transformation efforts.
- **Natural Gas Advisory Committee Dual-Fuel Work Group**: This group is focused on coordination around research, pilots, and demonstrations. In 2023, NEEA shared its dual-fuel synthesis findings and the group discussed areas for further study, including sharing findings from the installations of dual-fuel systems in 2023 and discussing plans for 2024.
  Cost Effectiveness Advisory Committee Dual-Fuel Measurement Work Group: This group is collaborating on a document outlining methodological guidelines for NEEA to use when measuring and reporting benefits from hybrid heating systems (dual-fuel—gas & electric) and other potential dual-fuel opportunities.

REGIONAL COORDINATION

Alliance programs are coordinated through regional committees and working groups, whose membership includes representatives from NEEA's funders. NEEA staff formally solicits input from the Natural Gas Advisory Committee (NGAC) and Regional Portfolio Advisory Committee (RPAC), the bodies responsible for overseeing the alliance's natural gas and electric Market Transformation portfolios respectively at critical program decision points. In addition to committee support, NEEA creates workgroups on an as-needed basis via NGAC and RPAC. These work groups are staffed with alliance stakeholders to ensure the availability of as-needed expertise for limited-term and specific purposes that are distinct from that of NGAC and RPAC, the ongoing Coordinating Committees, or other NEEA forums.




BOARD OF DIRECTORS:

In addition to committees, the members of NEEA's Board of Directors span Northwest utilities, public interest groups, energy service professionals and industry associations. NEEA staff are grateful for the time and energy its funding staff and stakeholders dedicate to participating in these forums and on NEEA's Board of Directors.

Gilbert Archuleta
Puget Sound Energy
Director, Customer Energy Management

Dan Bedbury
(left Board in 2023)
Clark PUD
Director of Energy Resources

Stephen Bicker
(left Board in 2023)
Tacoma Power
Sr. Conservation Resources Manager

Holly Braun
NEEA Board Vice Chair
NW Natural
Manager of Energy Efficiency and Innovation

Brittney Broyles
Tacoma Power
Manager, Customer Energy Programs Operations Team

Michael Colgrove
NEEA Board Chair
Energy Trust of Oregon
Executive Director

Monica Cowlishaw
(left Board in 2023)
Cascade Natural Gas
Manager, Energy Efficiency and Community Outreach

Debbie DePetris
Clark Public Utilities
Energy Services Manager

Theresa Drake
(retired in 2023)
Idaho Power
Senior Manager, Customer Relations and Energy Efficiency

Joseph Fernandi
Seattle City Light
Director of Customer Energy Solutions

Suzanne Frew
NEEA Board Treasurer
Snohomish County PUD
Assistant General Manager

Andrew Grassell
Chelan PUD
Manager - Energy Development and Conservation

Jamae Hilliard Creecy
Bonneville Power Administration
Vice President of Energy Efficiency

Nicole Hydzik
Avista Utilities
Director of Energy Efficiency

Anna Lising
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Washington Governor's Representative
Senior Energy Policy Advisor

Quentin Nesbitt
Idaho Power
Manager, Commercial & Industrial Energy Efficiency Group

Elizabeth Osborne
Washington Governor's Office
Senior Energy Policy Analyst

Eileen Quigley
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Founding Executive Director

Caleb Reimer
(joined Board in 2024)
Cascade Natural Gas
Manager, Energy Efficiency Programs

Kyle Roadman
Emerald PUD
General Manager

Bonnie Rouse
Montana Energy Office
Section Supervisor, Energy Efficiency and Compliance Assistance

Ruchi Sadhir
Oregon Department of Energy
Associate Director, Strategic Engagement & Development

Cory Scott
Pacific Power
Director, Customer Solutions

Richard Stover
Idaho Office of Energy and Mineral Resources
Administrator

Marissa Warren
(left Board in 2023)
Idaho Office of Energy and Mineral Resources
Energy Program Manager

Danie Williams
NEEA Board Secretary
NorthWestern Energy
Manager of Energy Efficiency/DSM Services

Kathy Wold
(left Board in 2024)
Cascade Natural Gas
Manager, Energy Efficiency

*See a full list of **NEEA's committee members on neea.org**.*

ADDITIONAL INFORMATION

For additional information, NEEA's 2023 Quarterly Performance Reports, newsletters and the 2022 Annual Report are available online at neea.org.

NEEA staff encourage stakeholder participation and appreciate input at all NEEA board meetings, committee meetings and energy efficiency events around the region. Meeting details are posted on neea.org in advance.

Please direct questions or comments about this report to info@neea.org.