2022 Annual Report

INTRODUCTION – EXECUTIVE LETTER TO THE REGION

2022 marked an exciting and dynamic time for the alliance. The energy industry is undergoing a period of rapid and, in some areas, evolutionary change. At its core, energy efficiency enables the region to meet its energy needs and do so in low cost and affordable ways that benefit consumers and businesses. And today, more than ever, energy efficiency is a uniting force that delivers multiple dimensions of value across the region: It reduces peak demand, supports grid resilience and reliability, contributes to emissions reductions, improves health outcomes, supports workforce development, helps the region withstand increasing unpredictability from extreme weather events, and more.

Becca Yates
Executive Director

Michael Colgrove
Board Chair

This diversity of value brings us together and serves to strengthen the alliance to keep pace with this rapid evolution of the energy industry. While individual communities may face unique challenges, it is through a commitment to innovation and collaboration that the alliance finds common solutions that benefit not only these communities, but the entire region.

Through this year's collective efforts, the alliance:

- Collaborated to improve the efficiency of televisions by partnering with TV manufacturers to develop a new test method for assessing TV energy use. The new test method more accurately reflects actual energy use and was adopted into the ENERGY STAR® Version 9 TV specification, which took effect in late 2022.
- Provided data and market knowledge from the Northwest Energy-Efficient Manufactured Housing Program – a long-term collaboration between the Bonneville Power Administration (BPA), Energy Trust of Oregon, NEEA, Northwest electric utilities, Northwest-based manufactured home builders, and other partners – to the U.S. Department of Energy (U.S. DOE) resulting in an announcement by the U.S. DOE and the Department of Housing and Urban Development (HUD) of the first new energy efficiency standard for manufactured homes in 25 years.
- Concluded an efficient gas rooftop unit field trial in collaboration with Montana State University's Integrated Design Lab that demonstrated a 40% reduction in small-to-medium-sized commercial building HVAC energy use.
- Recruited 1,000+ homes to participate in the Residential Building Stock Assessment, a regional research study conducted by the alliance roughly every five years that is designed to collect

information on home characteristics in the Northwest. Each participant home provides detailed data on hundreds of building and equipment characteristics, enabling the identification of energy efficiency opportunities and providing data for utility planning purposes.

- Participated in the development of a joint recommendation with industry partners to the U.S. DOE as input to the Federal standards public process for heat pump water heaters. As part of these conversations, NEEA brought data, research and real-world validation of the technology across the Northwest, including those from cold-climate and rural markets. This work builds on the first Northern Climate Water Heater specification that NEEA created in 2009 to ensure cold-climate performance. Since then, NEEA has worked with both the region and market to iterate on it, based on real-world performance as product improvements were made over the last 13-14 years through voluntary programs. Incorporating the Advanced Water Heating Specification (AWHS) as the industry standard is an important step to ensure that future Federal standards for water heaters recognize Northwest climates and consumer needs.
- Co-created 38.7 aMW of electric energy savings and 827,379 Therms of natural gas savings in 2022, equivalent to the amount of energy needed to power more than 26,000 homes per year.

“NEEA’s accomplishments in 2022 helped to bolster the region’s efforts in the face of some of the most challenging economic conditions our customers have seen. Inflation, labor shortages and supply chain issues contributed to a challenging environment in which to promote and realize energy savings. NEEA helped achieve savings and support future technologies despite these challenges,” said Michael Colgrove, NEEA Board Chair and Energy Trust of Oregon Executive Director. “As we look towards the future and the demands of decarbonization faced by Oregon’s electric and gas utilities, NEEA’s work only grows in importance.”

2022 also marked a transition in leadership for NEEA. After 11 years of serving as Executive Director, Susan E. Stratton wrapped up her tenure at NEEA and embarked on a well-deserved retirement. Through her leadership, Stratton led the alliance through two five-year funding cycles and helped NEEA to establish Market Transformation as a nationwide practice for energy efficiency.

In addition, NEEA began its 5-year Business Planning process for its Cycle 7 (2025 – 2029) Business Plan in 2022. NEEA’s 2025-2029 Strategic and Business Plans build on the alliance’s more than 25-year history of success. These plans outline how the alliance will continue to deliver energy efficiency solutions and transform the market to the benefit of all Northwest customers.

“Energy efficiency plays a pivotal role in both the challenges and opportunities facing today’s energy system. It is a tool for businesses to be competitive in the market, helps consumers lower their energy bills, and prepares the Northwest for a resilient future,” said Becca Yates, executive director of the Northwest Energy Efficiency Alliance. “The alliance unites the diverse voices and needs of the region to enact long-lasting, meaningful change.”

On the horizon the alliance will continue to seek excellence in driving market change leading to the faster and greater adoption of energy-efficient products and services and will work to meet the growing demands for a sustainable Northwest.

With gratitude for the alliance,

Becca Yates	Michael Colgrove, Energy Trust of Oregon
NEEA Executive Director	NEEA Board Chair

ALLIANCE RESULTS BY FIVE PRIMARY BUSINESS PLAN STRATEGIES

1. EMERGING TECHNOLOGY

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. Scanning activities uncover and vet technologies and practices that can meet the Northwest's efficiency needs and feed into alliance program work. Continued investigation in the form of lab and field testing, or small-scale pilots help the alliance to ensure that these products save energy and meet the needs of Northwest consumers. Once a technology is added to program work, emerging technology efforts continue to monitor and test products as they naturally evolve in the market to identify market barriers and inform opportunities for program enhancement. These efforts are coordinated through the Regional Emerging Technology Advisory Committee (RETAC), which is facilitated by NEEA staff.

In 2022, after scanning the market to identify promising energy-efficient products, services and practices, NEEA staff conducted research, testing and vetting of a variety of opportunities. Key opportunities included:

1. **Central Commercial Heat Pump Water Heaters (HPWHs)**: These products are used in multifamily buildings with central water heating and a distribution system. In addition to several currently available models, new products from major manufacturers are expected soon. In 2022, NEEA continued its ongoing support of two pilot projects: one with the BPA, and one with New Buildings Institute and the California Energy Commission. These projects help to validate the performance and savings produced by the equipment and from design and installation practices, in turn enabling the alliance to develop documentation that informs consistent, efficient design and installation solutions. As a result of the findings from the pilots, the alliance posted the first version of the Commercial HPWH Qualified Products List (QPL), which contains information on Residential Multifamily Commercial products that meet the alliance's AWHS requirements. Four Commercial HPWH products are now listed in the QPL, with eight more expected by the end of 2023.

2. **Combination Hot Water and Space Heat***: An integrated system that provides both space and water heating. The alliance is exploring both electric and natural gas versions of the technology. In 2022, the alliance worked with a major manufacturer to field test combi units to demonstrate the performance and adaptability of these systems in existing homes and small commercial applications. Additionally, performance testing of natural gas heat pump-driven combi units continued in 2022 with the goal of demonstrating that the product generates a coefficient of performance (COP) greater than 1. Reaching this goal would ensure product efficiency, in turn helping utilities reach efficiency and carbon reduction goals. Results from the testing were promising and indicated a heating COP of approximately 1.30 in Northwest climate zones.

3. **Fan Motor Systems**: An integrated fan/blower with a motor and control system. 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

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

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 2022, the alliance conducted a study to understand the barriers to using FEI as a design consideration. Findings will inform targeted intervention opportunities to shift the Northwest market to use higher efficiency products. A final report is anticipated in 2023.

4. **Heat Pump Water Heater (HPWH)**: Electric HPWHs move heat rather than generate it and use 2-to-3 times less energy than standard electric resistance water heaters, in turn saving consumers more money. In November 2022, NEEA convened regional architects, engineers, installers and raters to develop solutions that can be tested and verified for the proper integration of HPWHs into new construction low-rise multifamily structures. Recommendations from the group are currently being tested in the lab with results expected in 2023. Also in 2022, the alliance conducted a laboratory assessment of space requirements and venting strategies for standard residential HPWHs. The laboratory testing provided detailed information about known but previously unquantified challenges for HPWH efficiency in enclosed rooms. *The Amazing Shrinking Room* final report is available on neea.org. Finally, the alliance provided technical data and market information that informed the recently adopted AHRI-1430 standard, which requires the inclusion of the demand response enabled CTA-2045 port that allows the connection of an otherwise disconnected device to the electric grid. The new AHRI-1430 HPWH standard signals demand to manufacturers and will ensure consistent development of these grid-flexible products across brands. Increasing product availability will provide utilities the ability to shift water heater loads, reduce peak load and integrate renewable energy.
5. **High-Performance Windows***: Primary windows with three panes of glass, film or rigid plastic. There are two outside panes of standard thickness and one thinner pane in the middle. In 2022 the alliance continued its work to 1) understand the product's technical needs, 2) determine motivating factors for increasing production of the product, 3) identify barriers to adoption within the supply chain and, 4) investigate enhancements to the technology. Also in 2022, the ENERGY STAR® v7.0 Program Requirements for Residential Windows, Doors, and Skylights was finalized with strong support from NEEA. It will go 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 manfacturers with the criteria to produce the most efficient products to put on the market.
6. **Hybrid Gas-Electric Heat Pump***: This emerging technology pairs an efficient gas heat pump with an electric air conditioner to provide space heating and cooling with natural gas as the primary fuel source for heating. In 2022, NEEA staff began evaluating this integrated system in a laboratory setting to validate efficiency and performance. Initial prototype test results indicate enhanced energy efficiency, with the system operating at efficiencies over 100%. Product development is anticipated to continue for several years prior to possible commercialization.
7. **Luminaire Level Lighting Controls (LLLC) with HVAC Control***: LLLC lighting systems with additional sensors and supports for HVAC control to provide greater granularity of control and real-time data. In 2020, NEEA staff began coordinating with University of Oregon (U of O)

Integrated Design Lab (IDL) to field test this product. After the installation of LLLC in NEEA's office in 2021, the U of O IDL began monitoring the space as an initial testing site. Preliminary findings were presented at NEEA's Product Council, and a final report with the data is anticipated in 2023. Lastly, several additional sites have been identified and a test plan was developed, though actual testing was delayed in 2022 due to COVID-19. Field site testing is expected to resume in summer 2023.

8. **Machine Learning Systems for Building Controls***: A new group of products that apply artificial intelligence (AI) systems to track and optimize all building-system interactions that typically operate autonomously. This product automatically and continually controls equipment by adjusting, improving and optimizing a building's energy management without manual intervention. Machine Learning Systems analyze the changing conditions within a building such as use, occupancy, comfort, air quality, time of use rates and demand response to ensure efficiency over time. In 2022, NEEA staff planned two field tests on this product. Early data collection demonstrates positive initial results.
9. **Paired Washer-Dryers***: These include compact washers with heat pump dryers, and front and top-load washers with electric- and natural-gas heated dryers. In 2022, NEEA staff developed a testing procedure to measure the total energy required by these products to wash and dry the same load of laundry. The final NEEA Dryer Test Procedure and accompanying Analysis and Rationale report became available on neea.org in 2023.
10. **Ultra-High-Definition TVs**: In January 2022, ENERGY STAR adopted the NEEA-led method of testing TV energy that better estimates energy usage. It is anticipated that with the ENERGY STAR update, the U.S. DOE will also move forward with adopting the specification. The U.S. DOE's adoption of the specification would require that all TV manufacturers use this method for product testing, which would ensure all consumers in the Northwest and beyond have access to the most efficient TVs. Finally, additional improvements to the test method were made based on industry feedback resulting in minor revisions. The most up-do-date version will be included in ENERGY STAR's voluntary specification once the U.S. DOE's adoption process is complete, allowing the availability of an even higher tier of efficient TVs for consumers.
11. **Very High Efficiency Dedicated Outside Air System (very high efficiency DOAS)**: A high-performance approach to commercial HVAC that pairs high-performance equipment with key design principles to provide cleaner and safer indoor air, enhance indoor comfort and reduce commercial building HVAC energy use. In 2022, NEEA staff concluded field testing of the first fully compliant very high efficiency DOAS, demonstrating 84% HVAC energy savings and 66% whole-building energy savings. NEEA staff is continuing to test very high efficiency DOAS approaches at a variety of sites, including at the Downtown Emergency Service Center, a low-income multifamily building in Seattle, Wash. The project is demonstrating positive preliminary results for real-world performance, and a full report is anticipated in Q2 2023.

For a full look at investigated technologies, view NEEA's Emerging Technology Newsletters.

2. EFFECTIVE PORTFOLIO EXECUTION

In 2022, 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. This approach allows the alliance to leverage shared relationships and market channels among programs, which delivers efficiencies for NEEA and its supply-chain partners.

As part of its portfolio management, the alliance's Market Transformation programs advance through the Initiative Lifecycle (ILC) process. Each phase of the ILC has a distinct purpose and associated objectives. As programs move through the ILC, goals, objectives and strategies evolve. For the purposes of this annual report, the following ILC phases are relevant:

- **Program Development:** The purpose of this phase is to validate confidence in the product or practice attributes, market opportunity, savings potential and mechanism for diffusion. Programs outlined below in the program development phase are identified as such.
- **Market Development:** 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.

Detailed information about the ILC process is outlined in the alliance's annual Operations Plans, which are available on neea.org.

BUILDING ENVELOPE PRODUCT GROUP

The alliance engages with 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 2022, there were two programs in this Product Group: High-Performance Windows and Window Attachments.

High-Performance Windows – The alliance's High-Performance Windows program, which is in the program development phase, 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. To test opportunities and barriers for increasing awareness of high-performance window solutions in the Northwest, the alliance conducted a builder pilot that engaged with four builders last year ranging from small, above-code builders, to medium – large production builders. By the pilot's end, two of the four builders committed to grow their use of high-performance windows as their standard offering in new homes. Additionally, to better understand the market for high-performance windows in the Northwest, the alliance participates in 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.

Window Attachments – The Window Attachments program, which is in the program development phase, seeks opportunities to accelerate the adoption of high-performance commercial secondary windows. Capable of achieving 5–20% energy savings at half the cost of a full window replacement, secondary windows are composed of a frame and one or more transparent panes that are installed on the interior or exterior of an existing window. In 2022, the alliance continued to support six Northwest-based field tests to validate the performance and savings of commercial secondary windows. The last of the field tests completed in Q3 2022, with the team finishing gathering energy metering data and calibration results in Q4. The final report is available on neea.org. Additionally, four case studies and supplementary educational materials based on the field tests were released in 2022 through the alliance's BetterBricks website. In 2023, Window Attachments is discontinuing as a standalone Market Transformation program. The primary reasons for this include: program challenges with replicable measurability, the longer ramp of the market opportunity and inherent complexity of integration of envelope retrofits with other building upgrades, and portfolio prioritization and resourcing for the remainder of NEEA's current business cycle (2020 – 2024). 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. NEEA will continue key market relationships and activities under the Building Envelope Product Group work.

CONSUMER PRODUCTS PRODUCT GROUP

The alliance engages with 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 2022, 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 both local, independent merchants and large retailers around the country to offer sales incentives for a portfolio of consumer products. The incentives encourage retailers to purchase, stock and promote higher-efficiency products, thereby increasing access to these more energy-efficient products for consumers. In exchange for these incentives, participating retailers provide full-category sales data for each product in the portfolio, which NEEA and partners use to support more stringent ENERGY STAR specifications and Federal Standards. In 2022, ENERGY STAR released its final version 9 specification for Televisions. This voluntary specification introduces a new method for assessing TV energy use, which was developed by the alliance and its partners. This new specification 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. The new Version 9 specification took effect in October 2022, with the first group of products on the market shortly after. Also in 2022, the alliance provided feedback to the EPA on its Most Efficient performance levels for clothes washers and dryers, refrigerators, freezers, and room air conditioners, and provided comments in support of the revised and updated ENERGY STAR room AC. Improvement of these rulemakings result in permanent changes to the manufacturing processes across entire product categories, in turn providing in energy savings for Northwest consumers for years to come.

HVAC PRODUCT GROUP

The alliance engages with the manufacturers, distributors, specifiers, designers, installers and consumers of commercial and residential HVAC products. In 2022, there were two electric programs in this Product Group (High-Performance HVAC and Variable Speed Heat Pumps), and one natural gas program (Efficient Rooftop Units).

High-Performance HVAC – In 2022, the High-Performance HVAC program advanced from program development into market development. It aims to transform the commercial HVAC market in the Northwest by removing awareness and availability barriers for high-efficiency HVAC systems and components, resulting in substantial energy and non-energy benefits throughout the region. In 2022, the alliance continued to refine and socialize the very high efficiency DOAS approach. As noted above, this approach uses the most efficient HVAC equipment and key design principles to provide cleaner and safer indoor air, enhance indoor comfort and reduce commercial building HVAC energy use by an average of 69% (when compared to a code-minimum system). The alliance has demonstrated this approach in more than a dozen buildings throughout the Northwest. Detailed data monitoring collected from this and other installations throughout the region will help inform future market opportunities.

Variable Speed Heat Pumps (VSHPs) – The VSHP program, which is currently in program development, focuses on improving the efficiency of residential heat pumps sold and installed in the Northwest. In 2022, NEEA staff continued working with partners in the U.S. and Canada to validate the CSA-EXP07 load-based and climate-specific testing and rating procedure, which is better calibrated to test the ability of heat pumps and air conditioners to operate efficiently using their multi- and variable-speed controls. In addition, NEEA staff continued developing a Market Transformation program concept which was informed by continued research into a set of identified heat pump features and capabilities ("improvements") that can contribute additional incremental savings to installed system performance. Two of these improvements—low load efficiency and cold climate capability—are examples of how these can serve various utility needs and climate zones across the Northwest.

Efficient Rooftop Units (RTU) – In 2022 the Efficient RTU program advanced from program development into market development. The program works to increase the efficiency of RTUs through product differentiation, which can ultimately assist in elevating Federal standards. After the publication of the efficient RTU specification in 2021, the alliance worked with manufacturers in 2022 to support development and promotion of efficient RTUs with the goal of increased product availability. Also in 2022 the alliance evaluated the performance of efficient RTU products by concluding a field trial in Montana and beginning one in Portland, Ore. Managed by Montana State University's Integrated Design Lab, the first trial (located in Winifred, Mont.) evaluated an AAON-manufactured unit over nine months, concluding in June 2022. The second nine-month trial is anticipated to begin in 2023 in Portland, Ore. This trial is testing two models: a high-efficiency Daikin and a standard-efficiency Trane. The results from both test sites will influence plans to promote and accelerate the adoption of high-performing efficient RTUs.

LIGHTING PRODUCT GROUP

The alliance works to increase promotion of energy-efficient lighting by engaging manufacturers, distributors, specifiers, designers and installers, and by educating decisionmakers. In 2022, 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 2022, NEEA partnered with Northwest utilities and a variety of industry and professional associations to offer educational opportunities that advance the capabilities of trade allies to sell and deliver LLLC, while educating lighting decisionmakers on the value of choosing LLLC. Throughout the year, NEEA staff continued to offer utilities, utility customers and trade allies a variety of LLLC

educational resources on BetterBricks.com. These resources are also leveraged for use in earned media campaigns. In addition, NEEA staff are working with utilities in the region to develop additional LLLC success story articles. Lastly, to drive sales and market uptake of LLLC, the program engaged manufacturers and their sales channels to increase their focus on LLLC in the Northwest and to collaborate on educating the lighting specifier community on the many benefits of this technology.

MOTOR-DRIVEN PRODUCTS PRODUCT GROUP

The alliance 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 most of 2022, Extended Motor Products – Pumps was the sole electric program in this Product Group; however, NEEA staff developed a Market Transformation program concept for Efficient Fans that was added to the portfolio in Q3 2022.

Extended Motor Products – Pumps (XMP) – The XMP – Pumps program works to increase familiarity with and confidence in efficient pumps and circulators. XMP provides midstream incentives and other support to motivate pump and circulator distributors to preferentially stock and sell efficient pump products. In 2022 the program continued its partnership with Northwest pump distributors that promote efficient pump products and share full category pump sales data with the alliance each month on an ongoing basis. This data helps the alliance understand pump purchasing trends, resulting in more effective, targeted activities to further market adoption. Lastly, to raise market awareness and enable product differentiation, the program continued to partner with industry groups to develop and promote the Hydraulic Institute Energy Rating label, which helps customers across the Northwest understand the relative energy performance differences between pump models.

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). After research conducted in 2021–2022 determined there is an opportunity for significant energy efficiency improvements to be made in the fans market, the technology was added to the alliance's Motor-Driven Products Product Group in Q3 2022. The program's first full year of program development will be in 2023, which will see the program pilot a manufacturer-targeted approach that tests whether they can be motivated to produce more efficient fans and promote those efficient models using their fan selection software.

NEW CONSTRUCTION PRODUCT GROUP

The alliance 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 2022, Manufactured Homes remained the sole program in this Product Group.

Manufactured Homes – This program works to influence Federal standards by demonstrating voluntary adoption of NEEM+ manufactured homes, an advanced tier of energy-efficient manufactured homes. In 2022, the U.S. DOE published a final rule on the manufactured housing Energy Conservation Standards. The U.S. DOE decided on a two-tier structure with slight improvements for single-wide homes and significant improvements to double-wide and larger manufactured homes and went into effect August 1, 2022. Originally, compliance was to be required by May 31, 2023, however, due to uncertainty regarding enforcement responsibilities between the U.S. DOE and HUD, the compliance

date has been delayed until July 2025. The alliance will continue to participate with U.S. DOE, ENERGY STAR and regionally at the program level during this phase. Lastly, as of 2022, four manufacturers are building and selling NEEM+ manufactured homes. In total, more than 140 NEEM+ homes in the Northwest were completed in 2022.

WATER HEATING PRODUCT GROUP

The alliance engages with the manufacturers, distributors (wholesale and retail), specifiers, designers, installers and consumers of natural gas and electric commercial and residential water heaters. In 2022, the Heat Pump Water Heater program was the sole electric program in this Product Group, while Efficient Gas Water Heaters was the sole natural gas program.

Heat Pump Water Heater (HPWH) – The HPWH program seeks to influence the Federal standard and reduce barriers to adoption related to awareness, product features and market capabilities. In 2022, NEEA staff participated in a joint recommendation to the U.S. DOE for the consumer water heating standard. Participation in this process ensured that the alliance had the opportunity to share its unique market experience while joining an influential group of stakeholders to express the needs of the region, including those in cold climates or those that face hard to install space conditions for water heaters. NEEA's input into this recommendation was based on more than a decade of HPWH data from the lab, field, market and sales. Also in 2022, the program rolled out two new initiatives to make trainings more accessibile for installers in the region. As part of this effort, the program converted its training materials to an on-demand format, enabling plumbers to complete the training at their convenience while still earning continuing education units (CEUs). Finally, the alliance reran its Boring But Efficient HPWH campaign, which was optimized from the prior campaign that ran in 2021 and was designed to reach consumers throughout the Northwest to increase their awareness of HPWHs. The 2022 campaign prioritized rural audiences, based on NEEA research that showed HPWH awareness and adoption is historically lower in these areas. In total, the campaign drove more than 20 million total impressions and nearly 100,000 ad clicks throughout the region. Notably, rural consumers throughout the region clicked the campaign ads at a rate close to urban consumers, confirming rural interest and engagement across the four Northwest states. Finally, NEEA's Market Research & Evaluation team conducted a pre- and post-campaign survey to measure ad recall of the 2022 Boring But Efficient campaign. Early findings from that survey indicate the campaign increased rural awareness of HPWHs in the targeted areas by approximately 20%.

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 the region. In 2022, the alliance completed the Water Heater Pricing Research study, a two-phase study that sought to better understand price sensitivity of Northwest homeowners regarding efficient water heaters. Findings from the report, which is available on neea.org, will help the program team mitigate delays in the product's commercialization. In addition, the program led the North American Gas Heat Pump Collaborative's GHPWH Committee to co-fund multiple projects that will prime the market and help understand utility commitment (inside and outside the region) for the technology. Finally, in 2022 the program worked to influence a major North American water heater manufacturer to begin commercialization of a GHPWH product that meets the needs of the colder Northwest climate.

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. Infrastructure programs in 2022 included BetterBricks, Integrated Design Labs and Strategic Energy Management, the last of which is specially funded by eight alliance funders: Chelan County PUD, Clark Public Utilities, Energy Trust of Oregon, Pacific Power, Puget Sound Energy, Seattle City Light, and Tacoma Power.

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 2022, BetterBricks continued supporting its long-standing partners by providing their constituents with ample educational opportunities and resources. BetterBricks also formalized a partnership with the U.S. DOE's Better Buildings Initiative by becoming a Better Buildings Affiliate. As a Better Buildings Afiiliate, the alliance is able to partner with a leading energy organization to increase awareness of the BetterBricks program's suite of energy efficiency tools, resources and information both within the Northwest and more broadly. This partnership also opens the door to inform the educational efforts of the Better Buildings program and build additional awareness around technolgies supported by the alliance, as well as to bring national recognition to the thought leaders and industry-leading projects in the Northwest.

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 2022, the IDLs supported training, awareness and adoption in the building professional community for LLLC, high-performance HVAC, and commercial secondary windows.

Strategic Energy Management (SEM) – Through the SEM program, the alliance develops, maintains and delivers a holistic set of tools that support Northwest utilities in providing SEM resources to customers. In 2022, the alliance continued to manage and maintain the SEMHub.com website, driving a year-over-year increase in new users, page views and resource downloads. During 2022, more than 20 new resources were added to SEMHub to fill identified gaps in regional SEM delivery, including a new guide to energy policies and energy plans, an open-source library of SEM-related trainings, energy planning templates and worksheets, and an SEM 101 primer with accompanying resource collection. In addition, NEEA staff delivered new and refreshed online SEM courses and updated the Commercial Energy Talk Cards with new content, graphics, up-to-date best practices and increased diversity and representation. In 2022, BetterBricks.com also added customer-facing SEM content to make these resources more searchable and discoverable to the region. Further, to deepen regional expertise on SEM practices, the alliance continued its support of the Northwest SEM Collaborative, its Leadership Team, and its four active working groups. Finally, the 2022 Annual Northwest SEM Collaborative Workshop returned to its first in-person format since the onset of COVID-19, attracting more than 70

attendees across the Northwest. At this event, utility and implementer SEM practitioners spent a day sharing innovative ideas, best practices and accomplishments to strengthen the region's SEM expertise.

3. CODES AND STANDARDS

Market transformation theory includes codes and standards as a key leverage opportunity to lock in energy efficiency potential for the Northwest. Codes and standards activities are also a strategic element of product and program development through interaction with testing, rating and labeling activities to ensure appropriate information on actual performance is provided to market decision makers. In 2022, NEEA continued to influence the development and successful implementation of energy codes, appliance and equipment standards, and test procedures to materially improve efficiency outcomes.

Codes – Through its building codes work, NEEA participates in the public code change processes for commercial and residential energy codes across all four Northwest states by engaging with the energy efficiency organizations and entities that develop national model codes. These include the International Energy Conservation Code (IECC), which are the base of both Idaho and Montana energy codes, the Washington State Energy Codes (WSEC) and the Oregon State Building Codes (OSBC). NEEA also participates in the code development process at the state level. In 2022, NEEA staff convened a working group with code experts to develop and submit proposals to the Washington State Building Code Council and participated in the Oregon code development committee. In addition to supporting code change processes, the alliance provides training and technical assistance on both current and upcoming commercial and residential Northwest energy codes to support code adoption. Attendees include design and construction professionals, building officials, plan examiners, home builders, contractors, field inspectors and fire marshals. The alliance delivered over 60 live trainings in 2022 on topics related to state energy codes, serving more than 3,400 attendees. The program additionally offered 23 on-demand trainings and videos, which accrued more than 3,100 views throughout the year.

Standards – In 2022, NEEA staff collaborated with partners to submit more than 70 comment letters in response to the U.S. DOE's issuing multiple Requests for Information (RFIs) and NOPRs, initiating appliance and equipment standard rulemaking for more than 50 products. These responses included regional sales data, lab testing results, field validation data and other technical data to support recommendations for enhanced test procedures and improved efficiency levels.

For more information on NEEA's Codes and Standards activities, view the newsletters on neea.org.

4. 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 2022, NEEA's Market Intelligence activities were focused on continuing to: 1) assess market progress and results from alliance Market Transformation efforts, and; 2) provide research and market intelligence to support program and resource planning needs of internal and external stakeholders.

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. NEEA utilizes independent contractors for its evaluations, and provides a status

of market progress and insights for adaptive management. In 2022, NEEA delivered more than 20 market research or evaluation reports to support both electric and natural gas programs, all of which are publicly available on neea.org.

Building Stock Assessments – In 2022, NEEA's efforts included the completion of recruitment for single-family homes in the Residential Building Stock Assessment (RBSA), a comprehensive study of single-family building equipment and characteristics, as well as multifamily units and buildings. NEEA staff held three webinars over the course of the year to present information to stakeholders that included the study's revised recruiting approach to adapt to the continuation of the COVID-19 pandemic. The data and reports are anticipated to publish in Q3 2023. Also in 2022, NEEA staff kicked off planning for the upcoming Commercial Building Stock Assessment (CBSA) with a working group of stakeholders. Similar to RBSA, the CBSA is a regional study that collects detailed information about the commercial building stock in the region.

Northwest End Use Load Research (EULR) – The Northwest End Use Load Research (EULR) project is a specially funded collaboration among partners including Avista Utilities, the Bonneville Power Administration, Clark PUD, Energy Trust of Oregon, Eugene Water & Electric Board, Northwest Power & Conservation Council, National Renewable Energy Laboratory, PacifiCorp, Portland General Electric, Puget Sound Energy, Seattle City Light, Snohomish PUD, and Tacoma Power. In 2022, 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 home and 15-minute data is being collected for participating commercial buildings. As the largest end-use load research project in the Northwest since the 1980s, this work will greatly support regional and utility planning and program design. More than 370 homes were metered for HEMS by the end of 2022, and in 2023 the project reached its goal of 400 homes metered across the region. The first four years of data collected for HEMS became available in 2022 and were posted on neea.org. HEMS data continue to be updated quarterly. Data collection efforts for CEMS continued in 2022 as well, with more than 60 commercial buildings (from small convenience stores to high-rise buildings) continually metered by the end of the year. As of 2023, the study has now reached its goal of metering 70 commercial buildings. CEMS data will become available in 2023.

5. CONVENE AND COLLABORATE

The alliance's Convene and Collaborate strategy is carried out by NEEA's Stakeholder Relations, Corporate Strategy and Communications Division.

Efficiency Exchange – Efficiency Exchange is an annual conference hosted in collaboration with BPA and the Northwest Power and Conservation Council. In April 2022, the event was held virtually due to the ongoing COVID-19 pandemic. With 14 breakout sessions and one keynote, the conference covered a range of topics, including equity in energy efficiency, dual-fuel opportunities, the 2021 Power Plan, energy storage and demand flexibility. More than 350 energy professionals from the Northwest and across the nation participated in the two-day conference to trade ideas and share best practices. More information on the conference, including details on the first-ever hybrid conference that took place on May 2 – 3, 2023, can be found on neea.org.

ConduitNW.org – In September 2022, the Conduit website was sunsetted by NEEA and BPA leadership. However, key site functionality, such as the RETAC Database, has been migrated from the site for continued use. More information is available on neea.org.

ALLIANCE SUPPORT OF CLEAN ENERGY GOALS

A growing number of utilities in the region are required to meet clean energy and decarbonization goals at varying rates. The alliance helps utilities to meet applicable state-sanctioned goals through of variety of activities, which include:

Improving participation in clean energy programs from highly impacted communities and vulnerable populations – The alliance provides electric and natural gas energy efficiency programs, which help make homes healthier and more energy efficient, reducing the energy burden for impacted communities and vulnerable populations. Through its Market Transformation programs the alliance works with the supply chain to remove barriers for efficient products, including first cost for the end-use consumers. For example, through its RPP program, NEEA works with big box retailers and local merchants to influence their stocking decisions and encourage them to sell the most efficient products available, so that efficient products become the default, and are available to a broader audience of consumers at a lower price.

In addition, the alliance's codes and standards activities help raise the bar for efficient products, services and practices by locking in energy savings for all consumers. By improving upon existing codes and standards, the baseline products and installation practices across the state become the most efficient options, which has positive impacts for all residents, including vulnerable populations and impacted communities. For example, the alliance collaborated with BPA, Energy Trust of Oregon, Northwest electric utilities, Northwest-based manufactured home builders, and other partners to provide data and market knowledge from the Northwest Energy-Efficient Manufactured Housing Program to the U.S. DOE. The collaboration gave Northwest manufacturers an opportunity to build high-performance manufactured homes, evaluate costs and best practices and validate modeled energy savings. This effort resulted in an announcement by the U.S. DOE and HUD of the first new energy efficiency standard for manufactured homes in 25 years. One important result of the new standard was that ENERGY STAR updated its voluntary specification above the Federal standard to include an option for heat pumps. This addition provides manufacturers the opportunity to build even more efficient manufactured homes and offers Northwest consumers access to homes that meet a higher tier of efficiency.

NEEA also helps raise consumer awareness of more efficient product options. In 2022 the alliance targeted rural communities with its Boring But Efficient HPWH campaign. The campaign was designed to reach rural consumers throughout the Northwest to increase their awareness of the HPWH product. In total, the campaign drove more than 20 million total impressions and nearly 100,000 ad clicks throughout the region. And, NEEA's Market Research & Evaluation team conducted a pre- and post-campaign survey to measure ad recall of the 2022 Boring But Efficient campaign. Early findings from that survey indicate the campaign increased rural awareness of HPWHs in the targeted areas by approximately 20%.

Increasing quality and quantity of clean energy jobs – The alliance provides energy efficiency trainings and webinar offerings for many of its programs. These training and education opportunities are offered to a broad range of clean energy professionals to help them differentiate from competitors and build market capacity for efficient products. For example, in 2022, NEEA partnered with Northwest utilities and a variety of industry and professional associations to offer educational opportunities that

advance the capabilities of trade allies to sell and deliver LLLC, while educating lighting decision-makers on the value of choosing LLLC. In addition, the alliance partners with organizations across the Northwest to provide technical assistance and training on the current and upcoming residential and commercial energy codes, ensuring that Northwest trade allies have equitable access to training and skills to meet evolving energy codes. In addition to providing trainings, the alliance directly supports clean energy jobs for energy efficiency professionals. For example, contractors throughout the region support the alliance's large-scale research studies, such as the RBSA, CBSA and EULR.

Improving home comfort – Alliance activities improve home comfort in a number of ways, including by improving indoor air quality, enhancing space heating and cooling year-round, and working with manufacturers to develop efficient and quiet products. Alliance programs that contribute to improved home comfort include Heat Pump Water Heaters, High-Performance Windows, Manufactured Homes, Retail Product Portfolio, Variable Speed Heat Pumps, and Codes and Standards.

Reducing greenhouse gas emissions – By contributing to regional energy savings and locking in efficiency through its codes and standards activities, alliance Market Transformation programs contribute to the reduction of greenhouse gas emissions by ensuring the most efficient products, technologies and best-practice applications become the baseline. NEEA's current 2020–2024 Business Plan seeks to deliver energy efficiency opportunities that support the region while providing an opportunity for funders to meet regulatory and potential carbon reduction requirements. The alliance's Cycle 6 carbon reduction goal is 419,000–554,000 tons of avoided CO_2. In 2022, NEEA's electric and natural gas Market Transformation efforts resulted in an estimated 176,847 tons of avoided CO_2 emissions.




REGIONAL COORDINATION

Alliance programs are coordinated through regional working groups, advisory and coordinating committees and the Board of Directors, whose members 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.

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Deb Young
(retired in 2022)
NorthWestern Energy
Program Consultant

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

ADDITIONAL INFORMATION

For additional information, NEEA's 2022 Quarterly Performance Reports, newsletters and the 2022 Annual Report metrics 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 will be posted on neea.org in advance.

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