2022 Annual Report for Puget Sound Energy

INTRODUCTION

The Northwest Energy Efficiency Alliance (NEEA or "the alliance") is a nonprofit organization working in collaboration with Puget Sound Energy and more than 140 other Northwest utilities and energy efficiency organizations to accelerate the innovation and adoption of efficient products, services and practices throughout the region. With funding and engagement from Puget Sound Energy and these other entities, the alliance intervenes in the market to create lasting change by removing barriers and leveraging opportunities to accelerate the adoption of cost-effective energy efficiency.

For additional information about alliance programs and activities, the 2022 Operations Plan is available on neea.org.

Alliance Support of Clean Energy Implementation Plan (CEIP) PSE Indicators

Puget Sound Energy's participation in the alliance supports the achievement of its CEIP goals. In 2022, alliance activities contributed to several CETA Category Indicator Metric Baseline data (2020) Energy Benefits, including:

Non-energy Benefits Burden Reduction – *Improved 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 consumer. In 2022, the alliance targeted rural communities with its Boring But Efficient Heat Pump Water Heater (HPWH) campaign. The campaign was designed to reach rural consumers in Washington and 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 a post-campaign survey concluded that rural awareness of HPWHs in the Northwest grew by 20% following the 2022 campaign. Finally, through the alliance's codes and standards activities, the alliance raises the bar for efficient products, services and practices 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.

Non-energy Benefits – *Increase in 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 Luminaire

Level Lighting Controls (LLLC), while educating lighting decisionmakers 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. Finally, the alliance supports clean energy jobs for energy efficiency professionals through its research and data efforts by working with contractors throughout the region to support its large-scale research studies, such as the Residential Building Stock Assessment (RBSA).

Non-energy Benefits – *Improved 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.

Reduction of Burdens – *Increase in culturally- and linguistically accessible program communications for named communities*
In 2022, the alliance translated its HPWH DIY Installation Guide into Spanish, with an emphasis on ensuring cultural considerations were incorporated into the translation. Additionally, participant accessibility was enhanced for the upcoming 2022 RBSA. More specifically, the 2022 RBSA includes an urban vs rural split to ensure more equal participation throughout the region. These areas are defined by the U.S. Census. All RBSA communications are bilingual, in both Spanish and English, to increase study accessibility and to include a more representative sample of study participants.

Cost Reduction Burden Reduction – *Improved affordability of clean energy*
NEEA supports Puget Sound Energy's Cost Reduction Burden Reduction goal by contributing to PSE's energy efficiency targets. Energy efficiency reduces energy bills and can help alleviate energy burden for vulnerable and highly-impacted communities.

Environment – *Reduced 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 2021, NEEA's electric and natural gas Market Transformation efforts resulted in an estimated 185,000 tons of avoided CO_2 emissions. 2022 results will be published with the alliance's 2022 Annual Report in June 2023.

Resilience – *Reduction in peak demand through demand response programs*
Energy efficiency programs help to lower peak loads and increase capacity. Puget Sound Energy's participation in the alliance supports its CEIP Resilience metric by providing multiple programs that reduce peak loads in both summer and winter. These programs include Window Attachments, Efficient Rooftop Units, High-Performance HVAC, Luminaire Level Lighting Controls, Manufactured Homes, Retail Product Portfolio, Extended Motor Products, Efficient Gas Water Heaters, and Heat Pump Water Heaters. Additionally, the alliance's Advanced Water Heating Specification (AWHS) indicates the

required inclusion of the demand response enabled CTA-2045 port in Tier 3 and above HPWHs. This inclusion in the AWHS supports the Washington state requirement that all water heaters must be CTA-2045 enabled. In addition, the alliance provided technical data and market information that informed the recently adopted AHRI-1430 standard, which also requires the inclusion of the CTA-2045 port. CTA-2045 allows the connection of an otherwise disconnected device to the electric grid. The new AHRI-1430 HPWH standard and updated AWHS signal 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.

Public Health – *Improved air quality and community health*
Energy efficiency contributes to reductions in emissions from coal-fired power plants, including Sulphur dioxide, nitrogen dioxide and particulate matter, which are closely associated with adverse health outcomes from poor air quality. Alliance Market Transformation programs deliver energy efficiency savings to Puget Sound Energy, which supports Puget Sound Energy's CEIP Public Health goal.

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. Scanning activities uncover and vet technologies and practices that can meet the Northwest's efficiency needs and feed into alliance program work. Work via lab and field testing, or small-scale pilots ensure that these products save energy and meet the needs of Northwest consumers, including those in Washington. 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. Scanning activities fall into two primary categories, those that are pre-program, and those that directly support an alliance program. These efforts are coordinated through the Regional Emerging Technology Advisory Committee (RETAC). The committee is facilitated by NEEA staff and Puget Sound Energy serves as a member.

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 Bonneville Power Administration, and one with New Buildings Institute and the California Energy Commission. These projects benefit consumers in Washington by aiding the alliance in establishing possible 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 2022, 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 to follow in 2023.

2. **Combination Hot Water and Space Heat***: An integrated system that provides both space and water heating. It can be used in both electric and natural gas applications. In 2022, the alliance shifted its focus on the product to identify applications where the technology may be used for water heating or space heating as the primary use. This included working with a major manufacturer to field test combi units with boiler systems to demonstrate the performance and adaptability of these systems in existing homes and small commercial applications. Additionally, performance testing of natural gas 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 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 Emerging Technology team 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 Washington 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. With

* 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.

strong support from NEEA, the ENERGY STAR® v7.0 Program Requirements for Residential Windows, Doors, and Skylights was finalized in Q4 2022 and 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***: An integrated modulating gas heat pump and electric air conditioner (GHPAC) that uses natural refrigerants. The technology can provide heating and cooling with natural gas as the primary fuel source. In 2022, NEEA staff began evaluating the performance of this integrated system in a laboratory setting to validate the product's efficiency and performance. The technology is currently in the protoyping stage, and findings will determine the viability of a hybrid HPWH product in a real world application. Initial testing results indicated enhanced energy efficiency, with the product generating a COP greater than 1. Product development is anticipated to continue for the next several years.
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 LLLCs 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 in Seattle, Wash. 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, CTA/ANSI-2037C, into its newest voluntary TV specification (i.e., Version 9). This new test method will improve the efficiency of TVs by more accurately reflecting actual energy use. Following the ENERGY STAR update, the U.S. Department of Energy (U.S. DOE) opened its latest Notice of Proposed Rulemaking (NOPR) in March 2022 that proposed the amendment of test procedures for television sets. NEEA responded to the NOPR with the updated CTA-2037C test method, and adoption by DOE is anticipated in 2023. DOE's adoption of the specification would require all TV manufacturers use this method for product testing,

which would ensure all consumers in Washington and the Northwest have access to the most efficient TVs. Finally, additional improvements to the CTA-2037C test method were made based on industry feedback resulting in minor revisions. The latest test method, CTA 2037D will be included in ENERGY STAR's voluntary specification once DOE's NOPR 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 (DESC), a low-income multifamily building in Seattle, Wash. The DESC project is demonstrating positive preliminary results for real-world performance, and a full report is anticipated in Q2 2023.

PRIMARY BUSINESS PLAN STRATEGY: 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.

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 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 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 spread awareness of high-performance window solutions in the Northwest, the alliance conducted a builder pilot that engaged with a small green builder in the Seattle area who had only on occasion installed standard triple-pane windows. By the pilot's end, the builder committed to installing thin triple-pane, high-performance windows as their standard offering in new homes. Additionally, to support the proliferation of 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 accelerates 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, two of which were located in Washington, 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. Additionally, NEEA will continue key market relationships and activities under the Building Envelope Product Group work.

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 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 large retailers around the country to offer sales incentives for a portfolio of consumer products. 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 in Washington and 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 Washington consumers for years to come.

HVAC PRODUCT GROUP

This Product Group engages 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 – 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. 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, including an office in Seattle, Wash. 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 works to improve best practices and efficiency for electric residential heating system replacements. The program focuses on the replacement of electric forced-air furnaces (EFAFs) and air-source heat pumps (ASHPs), which collectively account for 20% of Northwest homes. In 2022, NEEA staff continued working with partners in the U.S. and Canada to validate the CSA-EXP07 load-based test procedure, which is better calibrated to test the ability of heat pumps to operate efficiently in various climates, including all Washington climate zones. In addition, NEEA staff continued developing a Market Transformation program concept for VSHPs to increase the efficiency of all VSHP sales and ensure increased electric savings in the regional transition to heat pumps. Program development work in 2022 included continued research into a set of identified heat pump features and capabilities that can contribute additional incremental savings to installed system performance. Two of these improvements—low load efficiency and cold climate capability—can serve various utility needs and climate zones across the state of Washington.

Efficient Rooftop Units (ERTU) – The ERTU 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 ERTU 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, with a final report completed in Q3 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 ERTUs.

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 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

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 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 accelerate the adoption of more 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 exchange, distributors provide NEEA with full-category sales data, which informs program strategy and enables the measurement of market progress. In 2022 the program continued its partnership with Northwest pump distributors. These distributors share full category pump sales data with the alliance each month on an ongoing basis that 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, including those in Washington, 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 that Efficient Fans offered a big savings opportunity for the region, 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

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

Manufactured Homes – This program works to increase voluntary adoption of NEEM+ manufactured homes, an advanced tier of energy-efficient manufactured homes that leverage the ENERGY STAR Northwest Energy Efficient Manufactured Housing (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. Department of Energy (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, with compliance required by May 31, 2023. While this updated standard represents some progress, uncertainty remains regarding enforcement, since the U.S. DOE and HUD share responsibility for manufactured home codes and standards. Lastly, as of 2022, four manufacturers are building and selling NEEM+ manufactured homes. In total, more than 140 NEEM+ homes were completed in 2022, with approximately 40+ located in Washington state.

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 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 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 40 gallons or larger. 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 cold, Northwest climate. NEEA's input into this recommendation was based on more than a decade of HPWH data from the lab, field, market and sales. The HPWH team also supported the Puget Sound market collaborative event in 2022 by participating in the recruitment of installers, providing technical training at the event, and handling the tracking and distribution of CEUs for the more than 70 attendees. 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, including those in Washington, clicked the campaign ads at a rate close to urban consumers, confirming rural interest and engagement across the four Northwest states. And, a post-campaign survey concluded that rural awareness of HPWH in the Northwest grew by 20% following the 2022 campaign.

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 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, including Puget Sound Energy.

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. In Washington, this included creating an online educational resource to support market actors responding to requirements established by HB 1257, participating in the AIA Seattle Honor Awards, and coordinating with Seattle 2030 and Northwest Energy Efficiency Council (NEEC). 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 technolgoies 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. The IDL in Northwest Washington exists at the University of Washington in Seattle and provides 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, including Puget Sound Energy, 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 (which included Puget Sound Energy staff from January to May 2022), 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, including three Puget Sound Energy staff members. 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.

PRIMARY BUSINESS PLAN STRATEGY: CODES AND STANDARDS

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. 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 Washington energy codes. In 2022, the alliance delivered nearly 40 live trainings on topics related to the 2018 Washington State Energy Codes (WSEC), serving more than 2,700 attendees. The program additionally offered 23 on-demand trainings and videos, 10 of which were specific to the 2018 WSEC codes, which accrued more than 2,600 views throughout the year. Additionally, NEEA staff convened a working group with code experts to develop and submit more than 25 proposals to the State Building Code Council. NEEA staff further participated in the energy code Technical Advisory Group (TAG), which was tasked with reviewing all proposals submitted. Throughout the year, the alliance continued to maintain and improve the WSEC commercial code compliance tool, which helps builders and engineers verify their building design's compliance with the current commercial code, including by offering technical support 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, NEEA staff gathered market data about the impacts of the first year of WSEC-R on new-construction single-family homes. The final report can be found on neea.org.

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.

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 2022, NEEA's Market Intelligence activities were 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 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 Puget Sound Energy customers. In 2022, the alliance 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.

Stock Assessments – In 2022, the alliance's efforts included the completion of recruitment for the upcoming 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, including Puget Sound Energy, that included the study's revised recruiting approach to adapt to the continuation of the COVID-19 pandemic. Data collection for the RBSA is complete as of 2022, with accompanying data and reports anticipated to publish in Q3 2023. Multifamily recruitment and site visits took place in 2022, but the study required rescoping due to low recruitment rates, partially because of COVID-19. As a result, the multifamily workgroup decided to de-emphasize the collection of data for central systems in multifamily buildings. Multifamily data collection began in Q4 2022 with additional recruiting in Q1 2023. Also in 2022, NEEA staff kicked off planning for the upcoming Commercial Building Stock Assessment (CBSA). Similar to RBSA, the CBSA is a regional study that collects detailed information to understand the drivers of energy consumption in commercial 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. Puget Sound Energy is a contributing funder and collaborator for the research, with its staff participating in technical advisory and oversight roles. In 2022, more than 370 homes were metered across the region for HEMS, with a goal of 400 by the end of 2023. 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 to contribute to a goal of 70 commercial buildings by Q2 2023. CEMS data will become available in 2023.

PRIMARY BUSINESS PLAN STRATEGY: 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 (EFX) – EFX is an annual conference hosted in collaboration with Bonneville Power Administration 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 for the upcoming first-ever hybrid conference on May 2 – 3, 2023, can be found on neea.org.

ConduitNW.org – In September 2022, the Conduit website was sunsetted by NEEA and Bonneville Power Administration 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.

REGIONAL COORDINATION

Alliance programs are coordinated through regional working groups and committees, whose membership includes representatives from Puget Sound Energy. NEEA staff formally solicits input from the Regional Portfolio Advisory Committee (RPAC) and Natural Gas Advisory Committee (NGAC), the bodies responsible for overseeing the alliance's Market Transformation portfolio at critical program decision points. NEEA staff is grateful for the time and energy Puget Sound Energy staff dedicates to participating in these forums and on NEEA's Board of Directors, with members including:

Board of Directors: Gilbert Archuleta

Regional Portfolio Advisory Committee: Jeff Tripp

Integrated Systems Coordinating Committee: Mark Lenssen, Michael Lane

Products Coordinating Committee: Chris Boroughs, Amit Singh, Patrick Weaver

Regional Emerging Technology Advisory Committee: Corey Corbett

Natural Gas Advisory Committee: Corey Corbett

Natural Gas Board Committee*:* Gilbert Archuleta

Cost Effectiveness Advisory Committee: Kasey Curtis

Northwest End Use Load Research Steering Committee: Mark Lenssen

Northwest End Use Load Research Working Group: Nick Gemperle

Residential Building Stock Assessment Working Group: Jesse Durst, Michelle Wildie

Commercial Building Stock Assessment Working Group: Corey Corbett, Kasey Curtis

ADDITIONAL INFORMATION

For additional information, NEEA's 2022 Quarterly Performance Reports, newsletters and the 2021 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. The next NEEA Board of Directors meeting will be held in Seattle on March 13 – 14, 2023. Meeting details will be posted on neea.org in advance.

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