



2021 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 2021 Operations Plan is available on neea.org.

PRIMARY BUSINESS PLAN STRATEGY: 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. These efforts are coordinated through the Regional Emerging Technology Advisory Committee (RETAC), which is facilitated by NEEA staff. Puget Sound Energy is a member of RETAC.

In 2021, the alliance continued to maintain the region's only shared energy efficiency emerging technology database. The database, which is housed on ConduitNW.org, increases regional visibility into emerging technology activities across organizations and reduces development costs by avoiding redundancies. In 2021, more than 25 regional emerging technology projects and products were added to the database.

In addition, NEEA staff scanned the market in 2021 to identify promising new energy-efficient products, services and practices, which included windows, HVAC, water heating, motor-driven products, and consumer products. NEEA staff conducted research, testing and vetting of these promising opportunities in 2021:

1. **Fan Motor Systems:** These products are 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 via the new Fan Energy Index (FEI) label. In 2021, NEEA staff conducted research to support further market characterization work and understand the overlap between fans and pump systems. This research will guide recommendations on including fans in the alliance's Extended Motor Products (XMP) program.
2. **High-Performance Windows:** This product is a primary window with three panes of glass (or film or rigid plastic), two of which are standard thickness and the third of which is a center thin pane of glass (or film). The overall thickness and weight are similar to standard double pane

windows so they can be hung in a standard window frame. In 2021, NEEA staff developed a dual-fuel¹ Market Transformation program concept for High-Performance Windows, positioning the product as an accessible strategy for new homes by working with leading production builders and window manufacturers to increase production and product availability. The program concept was approved for advancement in Q3 2021.

3. **Combination Hot Water and Space Heat:** This product is an integrated system that provides both space and water heating. It can be used in both electric and natural gas applications. In 2021, the alliance published testing results from its Combi System Field Study. The study sought to demonstrate the performance of combi systems in cold Northwest climates and identify barriers to market adoption of the product. Findings from the study showed increased savings and participant satisfaction with the units over the course of the field trial. The full study can be found [on neea.org](https://www.neea.org).
4. **Ultra-High Definition TVs:** In 2021, NEEA staff continued to work closely with the U.S. Environmental Protection Agency (U.S. EPA) on the development of the new Version 9 television specification through the development of improved testing procedures and collaboration with industry organizations and manufacturers to ensure support of the new specification. These efforts culminated in the release of ENERGY STAR®'s finalized Version 9 television specification in Q4 2021. This updated specification more accurately reflects actual energy use by TVs and will improve the efficiency of televisions.
5. **Machine Learning Systems for Building Control:** NEEA staff are investigating a new group of products that use machine learning and controls to optimize interactions between building systems that typically operate autonomously. These products track everything that's happening in a building, and the systems operate and then optimize the interactions in a way that humans can't. In 2021, NEEA staff coordinated with the Lawrence Berkeley National Lab to select two field test site locations in Seattle. The field testing will provide product performance data and insights on real-world functionality of the technology.
6. **Paired Washer-Dryer:** In 2021, NEEA staff conducted testing to measure the total energy required to wash and dry the same "real-world" load of laundry in matched washers and dryers, including compact washers with heat pump dryers, and front- and top-load washers with electric and natural gas heated dryers. This testing leveraged previous NEEA work on both clothes washers and dryers. Findings revealed that the manufacturer-reported U.S. Department of Energy (U.S. DOE) ratings generally underestimate the energy use of the washer and dryer pairs when tested under more realistic conditions and that the pairings use significantly more electricity and natural gas than estimated. In addition, the current U.S. DOE test procedures for dryers greatly underestimate the energy consumption under realistic conditions. Finally, there are significant cycle and energy-use differences between washer and dryer technologies, suggesting an opportunity for an ENERGY STAR matched pair specification to support the most efficient matched washer-dryer sets. The final report can be found [on neea.org](https://www.neea.org).
7. **Luminaire Level Lighting Controls (LLLC) with HVAC Control:** These are LLLC lighting systems with additional sensors and supports for HVAC control. NEEA staff are analyzing how these integrated systems can provide greater granularity of control and real-time data. In 2020, NEEA staff coordinated with University of Oregon Integrated Design Lab to field test a

¹ As a dual-fuel organization, the alliance manages a portfolio of natural gas and electric Market Transformation initiatives.

Luminaire Level Lighting product that has an HVAC control system. Several sites have been identified and a test plan developed, but actual testing was delayed until 2022 due to COVID-19.

8. **Central Commercial Heat Pump Water Heaters** – In 2021, NEEA staff coordinated with the Bonneville Power Administration to develop a qualified products list and expand NEEA’s Advanced Water Heating Specification (AWHS) to include commercial water heating systems. These electric heat pumps with a central water heating and distribution system provide domestic hot water in a multifamily building. The AWHS provides guidance to manufacturers and market actors who are interested in developing products that not only meet ENERGY STAR criteria but also provide high levels of consumer satisfaction and energy performance in a range of climates. In addition, in 2021 the alliance worked with the New Buildings Institute and the California Energy Commission to conduct further testing and develop design guidance and technical product requirements for new large electric air-to-water heat pumps in a commercial water heating application.
9. **Smart Thermostats** – In 2021, the alliance managed the Northwest Smart Thermostat Research Study, a collaboration among utility, manufacturer, and energy efficiency organization partners, including Puget Sound Energy. The study sought to develop a method to estimate energy savings for smart thermostats based on thermostat performance metrics. Findings showed significant savings opportunities for consumers. A final report is [available on neea.org](https://www.neea.org).
10. **Very High Efficiency Dedicated Outside Air Systems** – In 2021, the alliance published system requirements for Very High Efficiency Dedicated Outside Air Systems (VHE DOAS), available on [BetterBricks.com](https://www.betterbricks.com), which provides guidance to manufacturers, designers, and specifiers regarding the components and design principles of VHE DOAS. To further test the real-world performance of a 100% specification compliant system, the alliance partnered with Energy 350 to install a VHE DOAS in its offices. The newly installed system measures energy savings in a real-world application when measured against the system it replaced and provides an opportunity to showcase and accommodate in-depth system tours to NEEA staff, funders and VHE DOAS market actors. Detailed data monitoring collected from the install will help inform future market opportunities.

PRIMARY BUSINESS PLAN STRATEGY: EFFECTIVE PORTFOLIO EXECUTION

In 2021, 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 multiple programs and emerging technologies that share supply chain opportunities. This product group approach allows the alliance to leverage shared relationships and market channels among programs and to deliver efficiencies for both NEEA and its supply chain partners.

BUILDING ENVELOPE PRODUCT GROUP

NEEA’s Building Envelope Product Group includes the supply chain that manufactures, distributes and sells the physical separators between the interior and exterior of a building, as well as the end consumers who purchase them. These physical separators include walls, fenestration and roofs. In 2021, Window Attachments was the sole electric program in the Building Envelope Product Group,

however, NEEA staff developed a dual-fuel Market Transformation program concept for High-Performance Windows that was added to the portfolio in Q3 2021.

Window Attachments – The Window Attachments program seeks to accelerate the adoption of commercial secondary windows, defined as one or more transparent panes and a frame that attaches to an existing window, either on the inside or outside. To increase understanding of existing barriers to adoption, NEEA staff conducted market research to establish baseline awareness and intervention strategies for the product. And, to drive product availability and accelerate adoption, the alliance continued its partnership with manufacturers and industry partners such as the Attachments Energy Rating Council. Also in 2021, the alliance recruited six sites for its commercial secondary windows field test. This field test will provide product performance data and business case information to inform future program strategy. Finally, NEEA staff presented at four educational events in 2021 to increase awareness of commercial secondary window technology and applications amongst building owners and operators, building engineers and other industry professionals.

CONSUMER PRODUCTS PRODUCT GROUP

NEEA's Consumer Products Product Group focuses on the entire supply chain that delivers consumer goods and services in high volume. This includes manufacturers, distributors, physical and online retailers, contractors, installers, as well as end consumers. In 2021, ENERGY STAR Retail Products Platform was the sole electric program in the Consumer Products Product Group.

Retail Product Portfolio – The alliance's ENERGY STAR Retail Products Platform (ESRPP) program provides mid-stream incentives on a portfolio of qualified energy-efficient products. These incentives influence retail buying and stocking practices and send a signal to manufacturers to develop more energy-efficient products, in turn ensuring that a greater number of these products are available to Washington consumers. In 2021, NEEA staff continued to work closely with the U.S. EPA on the development of the new Version 9 television specification through the development of improved testing procedures and collaboration with industry organizations and manufacturers to ensure support of the new specification. These efforts culminated in the release of ENERGY STAR's finalized Version 9 television specification in Q4 2021. This updated specification is 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. Also in 2021, NEEA staff responded to U.S. DOE proposed rulemakings for a new air cleaner standard, revised clothes washer test procedure and standard, and a revised refrigerator standard. Improvement of these rulemakings result in permanent changes to the manufacturing processes across entire product categories, resulting in energy savings for Washington consumers for years to come.

HVAC PRODUCT GROUP

NEEA's HVAC Product Group works with the supply chain that manufactures, distributes, specifies, designs and installs commercial and residential HVAC products, as well as the end consumers who purchase them. In 2021, there were two electric programs in the HVAC Product Group: High-Performance HVAC and Variable Speed Heat Pumps. Efficient Rooftop Units is the sole natural gas program in the HVAC Product Group.

High-Performance HVAC – The High-Performance HVAC program aims to transform the commercial HVAC market in the Northwest by accelerating the adoption of high-efficiency HVAC systems and components, focusing initially on Very High Efficiency Dedicated Outside Air Systems (VHE DOAS) in

the commercial sector. To build interest and market capability, in 2021 the program presented virtually at six events in Washington and throughout the Northwest. These events included attendance from market actors across the supply chain in addition to end users interested in the product. Also in 2021, the alliance worked with other energy efficiency organizations and manufacturers to support effective codes and equipment test procedures related to VHE DOAS. As part of this effort, NEEA staff provided analysis to help refine the language around DOAS systems as well as added a high-performance path system more closely aligned with VHE DOAS in the 2018 Washington State Energy Code-Commercial (WSEC-C). Inclusion of language around DOAS in the WSEC-C helps to align the market on system requirements and installation approaches, resulting in increased market capability.

Variable Speed Heat Pumps – The Variable Speed Heat Pump (VSHP) program aims to improve best practices and efficiency for electric residential heating system replacements. The program focuses on replacement of electric forced air furnaces (EFAFs) and air source heat pumps (ASHPs), which account for roughly one in five homes in the Northwest. In 2021, the program entered NEEA’s portfolio and began critical program development activities, including continued field and lab testing, and product and market research to expand understanding of the VSHP market. Also in 2021, to identify barriers to market adoption and address knowledge gaps in the supply chain, the alliance conducted research to understand the sales, design and installation processes used by residential HVAC installers, including for VSHPs. The results of the research will inform program development to help ensure effective market adoption. Lastly, NEEA staff and colleagues at the U.S. EPA organized and conducted meetings with VSHP manufacturers to drive awareness and engagement for the VSHP product at the supply chain level. Puget Sound Energy staff were active participants in these meetings, which focused on utility interest in the development of heat pump products and capabilities that would be compatible with and beneficial to utility efficiency program goals.

Efficient Rooftop Units – The Efficient Rooftop Unit (RTU) program aims to increase the efficiency of RTUs through product differentiation and ultimately Federal Standards. In 2021, the alliance continued its work as part of a bi-national, cross-industry committee to revise the CSA Group’s P.8 standard for Thermal Efficiencies of Industrial and Commercial Gas-Fired Package Furnaces. The revision sought to represent a more accurate, holistic view of the overall energy consumption of an entire commercial gas-fired packaged unit and was informed by field and lab testing conducted by the alliance. The updated standard is in the final stages of publishing. And, based on the extensive research conducted for P.8, the alliance developed and [published a specification](#) that enable tiers of efficiency performance in a variety of applications. The specification outlines the best practices and approach to delivering efficient gas RTUs that reliably deliver heating energy savings in Northern climates and are easy to install as a direct replacement for existing RTUs. Finally, the program continued to conduct research to understand how market actors in the supply chain value the efficient RTU technology to identify barriers to product adoption.

LIGHTING PRODUCT GROUP

NEEA’s Lighting Product Group works with the supply chain that manufactures, distributes, specifies, designs and installs lighting products, as well as the end consumers who purchase them. Specific lighting products include lamps, ballasts, controls and fixtures. In 2021, Luminaire Level Lighting Controls was the sole electric program in the Lighting Products Group. In addition, this Product Group is supported by two enabling infrastructure programs: Top Tier Trade Ally and the Distributor Platform.

Luminaire Level Lighting Controls – Luminaire Level Lighting Controls (LLLC) combine LEDs with

integrated controls and sensors to offer improved building performance and occupant comfort while increasing energy savings. In 2021, NEEA partnered with Northwest utilities, professional associations, NXT Level and Lighting Design Lab to offer educational opportunities that further develop trade ally capabilities to LLLC and other networked lighting controls. In addition to the trainings, the program completed a case study in collaboration with Puget Sound Energy on the Enumclaw High School LLLC installation. The case study sought to drive awareness of the benefits to LLLC technology and was shared in a media campaign that targeted professionals who design, construct, operate and maintain electrical systems. The alliance also completed a second earned media campaign in 2021, focused on the topic of LLLC's role in smart and healthy buildings. Lastly, to drive sales and market uptake of LLLC, the program engaged with manufacturers in 2021 to increase focus on LLLC in their sales channels throughout the Northwest. By the end of 2021, seven total manufacturers partnered with the program. NEEA staff are collaborating with these manufacturers regional representatives to create more effective LLLC education and messaging targeting specifiers on the benefits of LLLC.

MOTOR-DRIVEN PRODUCTS PRODUCT GROUP

NEEA's Motor-Driven Products Product Group works with the supply chain that manufactures, distributes, specifies, designs and installs a variety of motor-driven products, as well as the decision-makers who influence the purchase of these products. Specific motor products include pumps, fans, compressed air systems and high-performance motors. In 2021, Extended Motor Products was the sole electric program in this Product Group.

Extended Motor Products – The Extended Motor Products (XMP) program works to accelerate the adoption of more efficient pumps. In 2021, to better understand the market and continue to shift the sales mix toward more efficient options, the program partnered with eight Northwest pump distributors. These distributors have agreed to share full category pump sales data with the alliance each month on an ongoing basis. This data helps the program understand pump purchasing trends, resulting in more effective, targeted activities to further market adoption. 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 understand the relative energy performance differences between pump models. Lastly, to motivate distributors to preferentially stock and sell efficient products, the alliance provided midstream incentives and other support. As a result, sales of smart pumps comprised 17% of total commercial pump sales for the full year in 2021, up from 16% smart pump penetration in 2020. And, sales of smart circulators comprised 17% of total circulator sales for the full year in 2021, up from 13% smart circulator penetration in 2020.

NEW CONSTRUCTION PRODUCT GROUP

Working closely with the alliance's Codes and Standards team, the New Construction 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 2021, there were two electric programs in the New Construction Product Group: Commercial Code Enhancement, Manufactured Homes, and one dual-fuel program, Residential New Construction.

Commercial Code Enhancement – The Commercial Code Enhancement (CCE) program supports commercial code advancement in the Northwest by influencing commercial code proposals and preparing the market and utilities for future code requirements. In 2021, the alliance updated the [Washington State Energy Code](#) (WSEC) portal with a 2018 Washington State Energy Code compliance tool that helps builders and engineers verify their building design's compliance with the current

commercial code. In 2021, more than 6,400 users registered and submitted data on more than 5,000 building projects that are being built to the 2018 Washington Commercial building code. The projects submitted include new construction, alterations, additions, and tenant buildouts. In addition, the program continued to provide technical support for the Total System Performance Ratio (TSPR) analysis tool which is used to calculate the TSPR for Washington State's performance-based energy code compliance path for HVAC systems. TSPR is a methodology to establish relative whole-system efficiency for commercial HVAC systems, rather than their individual components, which intends to level the playing field for efficient technologies, promote more efficient design approaches and help buildings save more energy. Please note: the CCE program will no longer be a stand-alone Market Transformation program and has been incorporated into the alliance's codes and standards program as of Q4 2021. This consolidation allows streamlined market engagement since there is significant overlap between above-code and at-code market activities. This change also leverages NEEA's state- by-state code training and market engagement approaches. Activities from the CCE program will continue in 2022, which includes maintenance of the WSEC portal and its linkage to Total System TSPR for HVAC code compliance, as well as the maintenance of data collection to measure above-code adoption throughout the region.

Manufactured Homes – The Manufactured Homes program works to increase voluntary adoption of NEEM+ manufactured homes, an advanced tier of energy-efficient manufactured homes that leverages 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 a future Housing for Urban Development code (HUD) Federal Standard. The current standard has not been updated for 25 years. In 2021, the U.S. DOE requested comments for its Supplemental Notice of Proposed Rulemaking (SNOPR) which provides an opportunity for the Northwest to influence future baseline requirements while introducing the higher tiered NEEM+ specification into the market. To help gain national alignment, NEEA staff, in cooperation with many national and regional organizations, developed comments to help U.S. DOE answer questions surrounding performance levels of manufactured homes. The submitted comments included data and market intelligence from the significant market engagement activities that the alliance has supported in the Northwest since 2016. Lastly, as of 2021 four manufacturers are building and selling NEEM+ manufactured homes. In total, more than 130 NEEM+ homes were completed in 2021, with 28 of the homes located in Washington state.

Residential New Construction – As NEEA's only dual-fuel program in 2021, the Residential New Construction (RNC) program focuses on removing barriers to the adoption of above-code efficiency measures in new construction and collecting market evidence that supports future code advancement. To accelerate market adoption, the RNC program influences builders and key subcontractors to adopt above-code technologies and best practices. In 2021, nearly 6,500 above-code homes were green label certified, or in the process of being certified, throughout the Northwest. Green label certifications indicate the homes were designed to be at least 10% more efficient than homes built to code, resulting in increased savings for homeowners in Washington and throughout the region. Also in 2021, the BetterBuiltNW website – a regional resource designed to support and promote energy-efficient home building in the Northwest – published 12 newsletters and seven new fact sheets and case studies to provide builders with information about more energy-efficient measures. In addition, 15 on-demand trainings were posted on the website and 14 live webinars were delivered throughout the year reaching more than 1,200 attendees throughout the Northwest, including participants from Washington. Please

note: As with CCE, the RNC program will no longer be a stand-alone Market Transformation program and has been incorporated into the alliance's codes and standards program as of Q4 2021. This consolidation allows streamlined market engagement since there is significant overlap between above-code and at-code market activities. This change also leverages NEEA's state-by-state code training and market engagement approaches. Activities from the RNC program will continue in 2022, which includes maintenance and extension of the BetterBuiltNW website to use for residential code materials and training.

WATER HEATING PRODUCT GROUP

NEEA's Water Heating Product Group engages the supply chain that manufactures, distributes (wholesale and retail), specifies, designs and installs electric commercial and residential water heaters, as well as the end consumers who purchase them. In 2021, Heat Pump Water Heaters was the sole electric program while Efficient Gas Water Heaters was the sole natural gas program in the Water Heating Product Group.

Heat Pump Water Heaters – The electric Heat Pump Water Heater (HPWH) program seeks to increase adoption of HPWHs for emergency and planned replacements in single family homes and to influence the Federal Standard to require HP level efficiency for all electric storage tanks 40 gallons or larger. In 2021, the HPWH program focused on ensuring retrofit electric water heater installations, whether planned or emergency replacement, were HPWH installations. To do this, the program focused on deepening its engagement with the retail channel, where many emergency replacement purchases are made. Market activities included continued partnership with Puget Sound Energy and other Washington-based utilities through a midstream retail HPWH incentive program. In total, more than 1,800 HPWHs were purchased through the midstream retail program in 2021, with over 1,000 of those sales allocated to Puget Sound Energy territory. Also in 2021, to enhance market knowledge on the benefits of HPWHs, the program conducted more than 20 webinars and trainings. The trainings consisted of a range of topics, including a focus on building trust and familiarity amongst trade allies in the region with the product. More than 70 attendees affiliated with Washington plumbing companies participated in the trainings. In addition, the alliance conducted research activities in 2021, including publishing the 6th Market Progress Evaluation Report (MPER) for the HPWH program. MPERs are formal evaluations that provide actionable insights for alliance programs throughout their lifecycles and help measure progress and inform how the market is responding to the technology and alliance interventions. The final report can be [found on neea.org](#). Also, the alliance conducted a trade ally focused research project that sought to uncover true costs and challenges with HPWH installs across a range of interior locations. Finally, the program continued to influence product advancement through NEEA's Advanced Water Heating Specification (AWHS), a resource that provides guidance to manufacturers for developing products that provide high levels of consumer satisfaction and energy performance. The AWHS outlines different tiers of product performance, including forward-looking tiers that serve as a guide for how the specification and product will evolve. In 2021, the alliance drafted Version 8.0 of the AWHS, which includes a specification tier for commercial HPWHs. The final Version 8.0 is anticipated in 2022.

Efficient Gas Water Heaters – The Efficient Gas Water Heater (EGWH) program is working to develop the market for efficient gas water heating products, bring a natural gas heat pump water heater (GHPWH) to market and ultimately influence the passage of a Federal Standard by 2030. In 2021, the program continued to co-fund a North American GHPWH field demonstration in coordination with energy efficiency organizations, a major manufacturer and multiple utilities across North America. The

goals of this forthcoming demonstration project are to verify cold climate product performance of GHPWHs, inform utility program development, prepare for market entry of the first commercialized product and pave the way for near-term energy savings once the product is launched. GHPWH launch is now anticipated in 2025 due to impacts of the COVID-19 pandemic, which delayed technology developers and manufacturers product advancement and testing. The program also continued its leadership in the North American Gas Heat Pump Collaborative, which launched in 2020 and includes utilities representing over 35% of households in the U.S. and Canada. The Collaborative's mission is to develop and implement activities to accelerate the adoption of gas heat pump technologies in North America. Participation in the Collaborative enables the program to leverage the collective market reach in our work with market partners and more easily engage co-funding for projects in the GHPWH initiative. Lastly, to increase awareness of currently available and cost-effective measures for the GHPWH technology, the alliance worked with the Northwest Power and Conservation Council's Regional Technical Form to support and inform the development of Residential Gas Water Heater measures using research and data gathered through the alliance EGWH program activities.

INFRASTRUCTURE PROGRAMS

In addition to its Market Transformation programs, the alliance develops and implements enabling infrastructure that builds market capability, awareness and demand for energy-efficient products, services and practices or new customer engagement opportunities for funders. Infrastructure programs include: BetterBricks, Top Tier Trade Ally, the Distributor Platform, the Integrated Design Labs and one special funded project, Strategic Energy Management, of which Puget Sound Energy is a funder.

BetterBricks – BetterBricks is a long-standing, trusted regional resource that supports alliance and funder programs by raising market awareness and capability for energy-efficient technologies and decision making. It reaches a large commercial building audience, which includes building owners, property managers, building facilities staff, architects, designers, engineers, and contractors. In 2021, BetterBricks continued to support alliance programs with awareness-building, education and market engagements through its robust catalogue of online resources which saw a significant uptake in resources downloaded over the course of the year. In addition to the available online resources, the program participated in several educational and engagement opportunities with organizations across the Northwest, including five partners in Washington. These engagements sought to highlight how energy-efficient technologies and approaches contribute to healthier buildings, and to understand how BetterBricks can support the Washington commercial building audience and stakeholders with HB 1257 and the Clean Building Performance Standard.

Top Tier Trade Ally – The Top Tier Trade Ally (TTTA) infrastructure program builds the skills of lighting contractors in the Northwest through the NXT Level training and designation. NXT Level training encompasses two levels of comprehensive online and in-person curriculum that support the delivery and market differentiation of more advanced energy-efficient commercial and industrial lighting retrofit projects. The program provided a series of infographics and educational articles for Northwest utilities to leverage in 2021 to increase customer awareness of NXT Level and drive demand for designated companies. And, to provide continued education for trade allies in the Northwest, the program collaborated with the LLLC program to deliver a series of three new 30-minute webinars exclusively to NXT Level participants. More than 40 NXT Level designees across the Northwest attended. Finally, in Q4 2021 the alliance transitioned the NXT Level training and designation to the market. Although the program is no longer managed by NEEA, it will continue to support both alliance funder programs, including NEEA's LLLC program, in 2022 and beyond.

Distributor Platform – The Distributor Platform supports multiple alliance programs with real-time sales data and market intelligence. It is comprised of more than 25 regional and national electrical distributors, representing more than 265 branches across all four Northwest states. The Platform collects full category lighting sales data for the region to gain additional insights about the lighting market, with a particular focus on the Puget Sound region. For example, in 2021, the alliance leveraged the Distributor Platform to track data and distributor responses to the pandemic and continued supply chain disruptions to stay ahead of a rapidly changing market.

Integrated Design Labs – The mission of the Integrated Design Labs (IDLs) is 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 Washington state exists at the University of Washington in Seattle and aims to provide regional design teams access to the best building-performance knowledge available, project-by-project support, and education and training on how to design, construct and operate the healthiest, most productive and energy efficient buildings. As a critical partner to alliance programs, the alliance provides annual base funding to support each IDL. In 2021, the IDLs supported training, awareness and adoption in the building professional community, particularly for LLCs.

Strategic Energy Management – The alliance develops, maintains and delivers a holistic set of tools that support Northwest utilities, including Puget Sound Energy, in providing strategic energy management (SEM) resources to customers. In 2021, the alliance continued to manage and maintain [SEMHub.com](https://www.semhub.com), which houses a library of tools and resources in SEM design, implementation and evaluation efforts for program administrators and stakeholders to use. In addition, NEEA staff delivered one new and one refreshed SEM online course and updated the Industrial Energy Talk Cards (aka Toolbox Talk Cards) with new content, graphics, and up-to-date best practices. And, to deepen regional expertise on SEM practices, the alliance continued its support of the Northwest SEM Collaborative Leadership Team and its five active working groups, which include staff from Puget Sound Energy. Finally, due to the COVID-19 pandemic, the program held its 2021 Annual Northwest SEM Collaborative Workshop as a virtual event, which attracted more than 80 attendees across the Northwest.

PRIMARY BUSINESS PLAN STRATEGY: CODES AND STANDARDS

In 2021, 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 – NEEA provides training and technical assistance on both current and upcoming commercial and residential Washington energy codes. In 2021, the alliance delivered more than 40 webinars on topics related to the 2018 WSEC-R with a total of 2,500 attendees and posted 15 different Washington specific on-demand trainings and videos that had more than 1,600 views over the course of the year. Also in 2021, the Washington State Energy Code Commercial (WSEC-C) proposal process opened, providing opportunity to comment on existing codes and support the inclusion of more energy-efficient codes. To leverage this opportunity, NEEA staff convened a working group with code experts to develop and submit more than 60 proposals to the State Building Code Council. NEEA staff also convened a working group of experts and conducted several rounds of brainstorming sessions in support of the 2021 WSEC residential code cycle. Finally, NEEA staff convened a working group and

submitted proposals for the 2021 International Energy Conservation Code (IECC) commercial and residential provisions. These combined efforts will help to lock in energy savings through progressively effective energy codes. Both the Washington and IECC code processes will continue in 2022.

Standards – In 2021, The U.S. DOE issued multiple Requests for Information (RFIs) and Notices of Proposed Rulemaking (NOPRs), initiating appliance and equipment standard rulemaking for over 60 products. NEEA staff collaborated with partners to submit more than 40 comment letters. 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

Market Intelligence activities are conducted by the Market Research and Evaluation, Data, Planning and Analytics and Energy-use Studies teams. Together, these teams comprise NEEA's Analytics, Research and Evaluation Division. In 2021, this division focused on building capacity for in-house data management and analysis, growing quality data sets and insights to share with regional partners, and increasing visibility to Market Transformation outcomes and market progress indicators in addition to energy savings.

Market Research and Evaluation – Market Research and Evaluation (MRE) provides actionable insights for 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 2021, 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 at neea.org.

Stock Assessments – In 2021, the alliance began recruitment for its upcoming Residential Building Stock Assessment (RBSA), a comprehensive study of equipment in and characteristics of single-family buildings, and multi-family 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. While the timeline for RBSA is subject to change due to uncertainties related to COVID-19, data collection is anticipated to be complete by the end of this year, with data and reports anticipated to be published in early 2023.

End Use Load Research – The Northwest End Use Load Research (EULR) 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. Data is being collected by circuit for each residential and commercial building in one-minute intervals. 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 for the research and its staff participate in technical advisory and oversight roles for the project. Across the region, over 230 homes are being metered for HEMS with a goal of 400 by project end. And, by the end of 2021 a total of 17 commercial buildings are being metered for CEMS, with a goal of 100 by 2023. Lastly, the first and second years of data collected for HEMS became available in 2021 and were posted [on neea.org](http://neea.org). The third year of HEMS data will be made available in Q3 2022.

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 – Hosted in collaboration with Bonneville Power Administration and the Northwest Power and Conservation Council, the alliance held its 2021 annual Efficiency Exchange conference virtually in May 2021 due to the COVID-19 pandemic. The conference hosted 16 sessions and focused on a range of topics, such as equity in energy efficiency, next generation heat pump technology, expanding lighting controls to HVAC, an update on the Northwest End Use Load Research project, large scale heat pump water heating and more. More than 300 energy professionals in the Northwest and across the nation participated across three days of the conference to convene, trade ideas and share best practices. More information on the virtual conference can be found [on neea.org](https://www.neea.org).

ConduitNW.org – Developed in partnership with the Bonneville Power Administration, the Conduit website facilitates information-sharing and collaboration among energy efficiency stakeholders in the Northwest. In 2021, the website continued its core functionality and activities that have been identified as critical to regional Market Transformation efforts. These include the RETAC Database and the file sharing functionality for regional working groups.

ALLIANCE SUPPORT OF Clean Energy Implementation Plan (CEIP) PSE INDICATORS

Puget Sound Energy's CEIP goals are supported through its participation in the alliance. Alliance activities in 2021 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. Through its 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 most 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, the NXT Level program provided over 1,300 individuals across the Northwest the opportunity to participate in a free-online training focused on energy-efficient, advanced lighting retrofits and removed the barriers of location, availability, and cost to deliver training to trade allies and market actors. 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 RBSA and EULR.

Non-energy Benefits - *Improved home comfort*

Alliance activities improve home comfort in a number of ways, including improving indoor air quality, enhancing space heating and cooling year-round, and working with manufacturers to develop efficient products that are quiet. Alliance programs that contribute to improved home comfort include Window Attachments, High-Performance Windows, Ductless Heat Pumps and Codes and Standards. In 2021, the alliance managed the Northwest Smart Thermostat Research Study, a collaboration among utility, manufacturer and energy efficiency organization partners, including Puget Sound Energy. The study sought to develop a method to estimate energy savings for smart thermostats based on thermostat performance metrics. Findings showed significant savings opportunities for consumers. A final report [is available on neea.org](https://www.neea.org).

Reduction of Burdens – *Increase in culturally- and linguistically accessible program communications for named communities*

In 2021, the alliance enhanced participant accessibility for its regional studies. For example, the sample design for NEEA's 2022 Residential Building Stock Assessment (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 will be bilingual, in both Spanish and English, to increase study accessibility and to have broader representation 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 are the baseline. NEEA's current 2020 – 2024 Business Plan seeks to deliver energy efficiency opportunities that support the region while providing 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 CO₂. In 2020, NEEA's electric and natural gas Market Transformation efforts resulted in an estimated 217,00 tons of avoided CO₂ emissions. 2021 results will be published with the alliance's 2021 Annual Report in June 2022.

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 contribute to peak load reduction in both summer and winter. These programs include Window Attachments, Efficient Rooftop Units, High-Performance HVAC, Luminaire Level Lighting Controls, Manufactured Homes, ENERGY STAR Retail Products Platform, Extended Motor Products, Efficient Gas Water Heaters, and Heat Pump Water Heaters.

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.

REGIONAL COORDINATION

Alliance programs are coordinated through regional working groups and committees, whose membership includes representatives from Puget Sound Energy staff. 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 are grateful for the time and energy Puget Sound Energy staff dedicate to participating in these forums and on NEEA’s Board of Directors, including:

Board of Directors: Bob Stolarski (*retired 2021*), 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: Bob Stolarski (*retired 2021*), Gilbert Archuleta

Cost Effectiveness Advisory Committee: Kasey Curtis

Northwest End Use Load Research Steering Committee: Mark Lenssen

Northwest End Use Load Research Working Group: Lorin Molander, Nick Gemperle

Regional Building Stock Assessment Working Group: Kasey Curtis

ADDITIONAL INFORMATION

For additional information, NEEA’s [2021 Quarterly Performance Reports, newsletters](#) and the [2020 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 virtually on March 14-15, 2022. Meeting details will be posted on neea.org in advance.

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