





Cycle 5 (2015-2019):

Market Progress Report

The Northwest Energy Efficiency Alliance (NEEA) is an alliance of more than 140 Northwest utilities and energy efficiency organizations working to accelerate the innovation and adoption of energyefficient products, services and practices in the Northwest. Working together, the alliance identifies and removes market barriers to energy efficiency to achieve permanent market change.

NEEA's Cycle 5 (2015-2019) Business Plan committed the organization to pursue substantive and measurable change in four strategic markets: Consumer Products, Commercial and Industrial Lighting, Residential New Construction and Commercial New Construction. In 2015, the organization also launched its first five-year Natural Gas Market Transformation effort.

Between 2015 and 2019, the alliance conducted a variety of market interventions targeting identified barriers to energy efficiency throughout the supply chain and capitalizing on strategic opportunities. This report documents key barriers and interventions in each strategic market and highlights some of the market progress that alliance activities delivered.



Commercial New Construction



Commercial and Industrial Lighting



Residential New Construction





Natural Gas



CONSUMER PRODUCTS

Market Description

In 2015, the alliance was poised to capitalize on several opportunities in the consumer products market. NEEA's successful Televisions initiative (2009-2014) had shown the promise of a midstream approach and retailers were looking to the alliance for the next opportunity. Ductless heat pumps were steadily gaining traction with year-over-year gains in market share. After many years of coordinated effort, the alliance had influenced the first major manufacturer (GE Appliances) to bring a heat pump water heater to market. And, for the first time, heat pump dryers were available to U.S. consumers.

Alliance Approach

Throughout Cycle 5, the alliance built strategic partnerships and influenced the supply chain to remove market barriers for a variety of energy-saving products including **ductless heat pumps (DHPs)**, **heat pump water heaters (HPWHs)**, **super-efficient dryers (SEDs)** and a number of other efficient consumer products sold through the retail channel and bundled together in the **Retail Product Portfolio (RPP)** program. Through RPP, the alliance created a robust retail data portal delivering critical market insights previously unavailable to the region.



CONSUMER PRODUCTS: MARKET PROGRESS



Since 2015, the availability of efficient products to Northwest consumers has increased as have overall levels of efficiency. The RPP program, enabled by robust data and insights, has moved beyond an incentive-only strategy to one that also influences product test procedures and efficiency specifications. As ductless heat pump adoption in NEEA's target market has grown, the alliance is exploring new residential HVAC opportunities, including variable capacity heat pumps. Heat pump water heater development has progressed to the point where a suitable product exists for any climate or installation scenario. The technology is also cited in policy initiatives across the country as a critical tool to meet both capacity and carbon reduction goals. NEEA continues to work outside the region to support market adoption nationally and grow the scale necessary to influence national market actors and deliver value back to the Northwest.

Looking Ahead

Leveraging Alliance Data and Relationships

- **Consumer Products** Data and insights gathered through the Retail Platform are shaping program and product development and influencing product specification across the country.
- Water Heating Partnerships with plumbing distributors and water heater manufacturers are providing regional access to full-category sales data. This information is being used to track adoption and measure savings from electric HPWHs as well as to understand the market landscape for gas HPWHs.
- HVAC HVAC equipment sales data is being leveraged to develop the alliance's long-term HVAC market strategy. Relationships and infrastructure created through the DHP program will be leveraged for the next residential HVAC program and to improve performance and energy savings potential of variable speed heat pump technology.

66 Northwest utilities and NEEA have done a great job helping to create demand for the heat pump water heater category. Now some of our key distributors are saying 'I need this product.' NEEA has established itself as a leader in creating sustainable markets for heat pump water heaters, and that was pivotal in our decision to make the investments necessary to continue to build this product in the United States."

Bruce Carnevale, COO
 Bradford White (NEEA 2016 Annual Report)





COMMERCIAL & INDUSTRIAL LIGHTING

Market Overview

In 2015, the **Commercial and Industrial (C&I) Lighting** market was at a precipice. The age of relatively inexpensive lighting savings was ending, being replaced by a rapidly changing market. Networked lighting and controls with LEDs offered enormous potential, but very few products were available and market actors lacked the knowledge and skills to deliver the most efficient solutions. In commodity lighting, customers had little awareness of their options and often defaulted to inefficient products. To complicate matters, regional energy efficiency program managers lacked the data to have a comprehensive picture of lighting sales and how they were rapidly changing, so it wasn't clear where the biggest opportunities were.

Alliance Approach

Through the **Reduced Wattage Lamp Replacement (RWLR)** program, the alliance built relationships with electrical distributors and created the **Distributor Platform**, which enabled regional access to full-category sales data. The **Luminaire Level Lighting Controls (LLLC)** program worked with manufacturers to advance lighting controls products and, along with the **Top Tier Trade Ally (TTTA)** training program, focused on building market capacity for networked lighting controls and other more advanced energy-efficient lighting projects.

Regional Strategic Market Planning



In 2015, recognizing that regional coordination would deliver better, faster and more cost-effective results, NEEA staff facilitated a region-wide collaborative effort to develop the first Regional Strategic Market Plans for the Commercial and Industrial Lighting market and the Consumer Products market. The purpose of the strategic planning process was to establish regional goals, improve coordination and maximize long-term efficiency opportunities. Thanks to this regional collaborative effort, the Northwest is now benefiting from better alignment, greater understanding of the market, and tighter collaboration on shared challenges.

COMMERCIAL & INDUSTRIAL LIGHTING: MARKET PROGRESS



Today, there is a wide range of qualified networked lighting products on the market and commodity lighting is considerably more efficient. Utilities across the region are offering rebate programs for advanced lighting controls and hundreds of lighting designers and installers have been trained to deliver advanced lighting solutions. Between 2015-2017, the adoption of TLEDs happened far more quickly than NEEA had anticipated eroding a large share of the potential low-watt fluorescent lamp market and, therefore, the projected savings opportunity from the Reduced Wattage Lamp Replacement program. Still, the program delivered important lessons about the necessity of timely and granular data, and led to the development of NEEA's Distributor Platform, a critical tool for success in Cycle 6.

Looking Ahead

Leveraging NEEA's Data and Regional Resources

- The **Distributor Platform** is continuing to support product groups, including lighting, motor-driven systems and water heating. It is also supporting utility mid-stream lighting pilots.
- Timely access to sales and pricing data through the Lighting Data
 Dashboard is enabling planners and energy efficiency program managers to align programs and strategies with market dynamics.
- Advanced Lighting Controls training, created by NEEA in partnership with the DesignLights Consortium, will continue to be available to market actors through the Washington Lighting Design Lab.

44 The Distributor Platform allowed Seattle City Light to leverage existing agreements, subcontractors, data, and, most importantly, the distributor relationships NEEA had built. This momentum allowed us to rapidly scale the program and provide a seamless transition for the distributor partners."

 Joseph Fernandi, Business Solutions Supervisor Seattle City Light (NEEA 2018 Annual Report)





RESIDENTIAL NEW CONSTRUCTION

Market Overview

In 2015, positive trends in residential new construction were driving a boom in new housing starts. To differentiate themselves, home builders were increasingly adopting 'green' home certification programs. These voluntary programs weren't always aligned with utility programs and builders had no incentive to exceed program requirements (typically 10 percent above code). Manufactured home factories had excess capacity post-recession and a pending Housing and Urban Development (HUD) code change presented a time sensitive opportunity to introduce a new higher tiered specification and ramp-up market share prior to adoption of the new code.

Alliance Approach

During Cycle 5, NEEA's strategy in the Residential New Construction market was to increase the adoption of advanced energy-efficient building techniques so that they might eventually be adopted into code. The **Next Step Homes (NSH)** program conducted pilots to demonstrate advanced home building techniques and best practices, provided training and technical support for builders, raters and verifiers and developed energy modeling tools and calculators to enable performance-based utility programs. The **Manufactured Homes (MH)** program introduced a new advanced specification known as NEEM+ (Northwest Energy Efficiency Manufactured Homes) and helped manufacturers introduce the new specification into production lines.

> Influencing Code Development

In Cycle 5, the alliance supported the development of progressively more efficient energy codes in all four Northwest states, including:



2015 & 2018 Washington State Energy Codes Percent efficiency gains over prior code was 9% and 5% respectively



2015 & 2018 International Energy Conservation Code (IECC)

The basis for code in Idaho and Montana, 2018 IECC is 2% more efficient than 2018.



2017 Oregon Residential Energy Code Percent efficiency gains over prior code was 9%



BARRIERS	ALLIANCE INTERVENTIONS	MARKET PROGRESS HIGHLIGHTS
Advanced building practices not promoted in the supply chain	 Created NEEM+ manufactured home specification Conducted pilots to demonstrate how builders could achieve deep energy savings cost-effectively Tracked and participated in energy code development in all four Northwest states Worked to align home certification programs with available utility incentives and contributed to program and specification design 	 Manufactured Homes program 30% NEEM+ increase in efficiency over NEEM NEEM+ homes built and sited around the region NEEM+ homes built and sited around the region
Unclear value proposition for consumers	 Provided retailer outreach and support to increase understanding of NEEM+ value proposition and ability to sell NEEM+ manufactured homes Developed marketing collateral and educational resources Supported and leveraged voluntary green building programs 	32,397 – 26% of new homes built in Cycle 5 were above code 32 utilities offering incentives for NEEM+ manufactured homes
Builders and manufacturers not able or willing to exceed code requirements	 Developed modeling protocol to enable utility programs to measure whole- building energy savings Provided training and technical support to raters and verifiers Developed tools and resources to support education and awareness Provided incentives to offset increased costs to manufacturers of adding NEEM+ product lines 	A Constant of the second se

Modeling protocols developed by the alliance in Cycle 5 have enabled utilities to provide incentives and claim energy savings based on whole-building energy performance – rather than a prescriptive list of requirements. As a result, home builders now have more flexibility in delivering energy efficiency and are incentivized to maximize energy performance. To further support the market, the alliance has developed a stable network of raters and verifiers who provide support to home builders and deliver third-party evaluation. And, while a new HUD code is unlikely in the near term, the NEEM+ specification for manufactured homes enjoys strong manufacturer and utility awareness and growing adoption.

Looking Ahead

Leveraging NEEA's Data and Regional Resources:

Data from voluntary home certification programs and utility Performance Path programs provides ongoing insights and best practices for building above-code homes. These insights will continue to inform and influence future code proposals.

44 Our passion is building high-quality homes that are efficient, healthy and affordable. The science and support we've received from the [Next Step Homes] program and our local utility, Idaho Power, have helped us offer superior options to our customers at an affordable price.

– Tim Nau, Owner Benchmark Development Company, LLC (NEEA 2015 Annual Report)





COMMERCIAL NEW CONSTRUCTION

Market Overview

As building techniques have become progressively more efficient, finding cost-effective and solution-oriented strategies to effectively incorporate into policy and practice has become more and more difficult. In Cycle 5, NEEA took a new approach to influencing commercial code.

Alliance Approach

In 2015, the alliance developed its **Commercial Code Enhancement (CCE)** program to bridge the gap between market practices and state policies. CCE identifies and demonstrates the feasibility and affordability of next-generation technologies and practices and paves the way for future code changes by:

- Queuing up the technologies and practices;
- Building market awareness and capability;
- Connecting utility programs to code development; and
- Demonstrating market support of new code measures.

The alliance worked closely with local code stakeholders, such as the Integrated Design Labs and State Code Collaboratives to support code development through targeted demonstration projects, technical research, and education.



In 2018, the alliance developed a new proposal for the 2018 Washington State Commercial Energy Code to increase HVAC system efficiency. The new requirement, which was approved in 2019, compels building designers to evaluate HVAC systems based on whole-system performance rather than individual HVAC components. Known as Total System Performance Ratio (TSPR), this approach could significantly reduce building energy use by encouraging building designers to incorporate higher-efficiency HVAC systems into their projects.

Partners: The alliance, the City of Seattle, Pacific Northwest National Laboratory (PNNL), Puget Sound area utilities, and the University of Washington Integrated Design Lab.

© COMMERCIAL NEW CONSTRUCTION: MARKET PROGRESS

BARRIERS	ALLIANCE INTERVENTIONS	MARKET PROGRESS HIGHLIGHTS
Unknown viability of advanced technologies and building practices	 Demonstrated feasibility of advanced technologies and building practices through case studies, technical analysis, pilot projects and outreach Engaged with code officials to provide technical guidance and conduct research and analysis Invested in research, technical assistance and education to support early adopters 	Washington2new proposals adopted into the 2018 commercial code that promote whole building performance and encourage innovationIdaho/ Montana3Montana technical briefs showcasing emerging technologies and building strategiesOregon40050060070080090909
Lack of alignment on long-term code goals within states and among market actors	 Initiated development of a technical road map to help guide future code cycles in WA and eventually influence code in each Northwest state Leveraged existing code collaboratives to raise greater awareness of above-code best practices and prepare market for future code changes Strengthened relationships with key code stakeholders 	State Coordination Plans are in place for each WW state that identify Image: Coordination Image: Coordination (Note stakeholders,) Image: Coordination Image: Coordination (Note stakeholders and tilities are now convening to plan for pcoming code cycles) Image: Coordination (Note stakeholders and tilities are now convening to plan for pcoming code cycles) Image: Coordination (Note stakeholders and tilities are now convening to plan for pcoming code cycles) Image: Coordination (Note stakeholders) Image: Coordination (Note stakeholders)
Resistance to change among market actors	 Developed value propositions for technologies and practices Provided tools, education and training to support code compliance Identified areas of lower compliance to better understand and address implementation barriers 	<image/>

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As a result of alliance activity, code development efforts are better aligned in all four states, new proposals have been developed and adopted into code and utilities are better prepared for future code changes. Overall, the market is closer to system efficiency and whole-building performance based codes. To better align efforts towards the ultimate goal of advancing code, NEEA has moved its individual market transformation programs related to new construction under the codes and standards department rather than being stand-alone efforts.

Looking Ahead

Leveraging Relationships, Best Practices and Regional Resources

- In Cycle 6, the alliance will leverage lessons learned from the successful 2018 Washington code proposal process in the code development processes for Idaho, Montana, and Oregon.
- Relationships with key stakeholders of voluntary commercial new construction programs will continue to enable more effective coordination of commercial new construction and code related efforts.
- BetterBricks, which underwent a refresh in 2017, will continue to provide dynamic tools and a robust library of educational resources with the goal of increasing market capacity for advanced building practices.

Washington statute requires incremental reductions in energy use every code cycle. NEEA's contributions have been absolutely instrumental in achieving those targets, which amount to a 35% reduction since 2006."

– Chuck Murray, Senior Energy Policy Analyst Washington State Department of Commerce (NEEA, 2019 Annual Report)







Natural Gas Overview

Cycle 5 marked NEEA's entrance into natural gas market transformation. At the request of the region's natural gas utilities, NEEA organized a collaborative of stakeholders to develop a strategy for initiating natural gas market transformation in the Northwest. The result was the region's first natural gas energy efficiency market transformation business plan funded by Avista Utilities, Cascade Natural Gas, Energy Trust of Oregon, NW Natural and Puget Sound Energy.

The 2015-2019 Natural Gas Business Plan included a portfolio of five new residential and commercial gas initiatives — efficient gas water heaters, combination space and water heating systems, hearth products, rooftop HVAC and ENERGY STAR dryers. NEEA's objective for hearth products and ENERGY STAR dryers, which were already commercially available, was to explore market transformation opportunities and validate energy savings. For the other products in the portfolio, NEEA focused on prototype testing and feasibility studies. The goal of this two-pronged strategy was to capitalize on near-term opportunities while exploring new products that could help the region's gas utilities achieve their long-term efficiency goals.

> Accelerating Natural Gas Product Development

NEEA's initial foray into natural gas market transformation allowed the alliance to:



Build experience working in natural gas markets and with natural gas products



Leverage lessons learned from NEEA's electric market transformation efforts



FOCUS AREAS	ALLIANCE ACTIVITIES	PROGRESS
Evaluating efficient natural gas technologies	 Conducted product lab and field testing Completed market research to inform program opportunities and design Developed product test procedures 	 Indext products of gas products funded or co-funded Advanced a new standard for commercial gas-fired furnaces - developed with Canadian Standards Association and other partners - expected to be published Q4 2020 Added gas criteria to Advanced Water Heating Specification for the first time (2019)
Establishing market relationships	 Provided funding and technical recommendations to manufacturers to support product development Facilitated connections between new technology providers and major manufacturers Promoted natural gas market transformation at conferences and other events to generate interest and investment in gas-efficiency- related topics 	image: state of the state
Partnering outside the region to accelerate market transformation	 Built coalitions of utilities and other partners across North America to increase market influence and develop momentum behind efficient gas technologies Initiated North American Gas Heat Pump Water Heater Field Demonstration 	27% of natural gas customers in the U.S. and Canada are represented by North American Gas Heat Pump Collaborative
Leveraging NEEA's experience and expertise	 Conducted market research across fuels Employed analysis methods and tools honed through electric market transformation experience Leveraged lessons learned and existing market relationships 	First dual-fuel-funded program - Next Step Homes - and the first alliance natural gas energy savings Electric and Natural Gas funders co-invested in HVAC and Water Heating distributor datasets

Today, NEEA has an experienced natural gas market transformation team, a network of collaborators across the country and deep relationships with technology developers and manufacturers. As a result of alliance efforts, the first commercialized gas heat pump water heater is on the horizon. Gas Dryers and Hearth products have been removed from the natural gas portfolio after thorough vetting revealed few opportunities for market transformation. In 2019, Northwest gas utilities joined NEEA's Board of Directors and the alliance delivered its first natural gas energy savings.

Looking Ahead

With the approval of NEEA's 2020-2024 Business plan, the region has committed to five more years of dedicated funding for natural gas market transformation. In Cycle 6 (2020-2024), the alliance will operate a portfolio of natural gas market transformation programs that includes two gas-only programs (Condensing Rooftop Units, Efficient Gas Water Heating) and one dual-fuel program (Next Step Homes). This portfolio covers residential and commercial products, retrofit and new construction applications, a range from pre-commercialized products to those currently in the market, and three product groups: HVAC, Water Heating, and New Construction.

Working with NEEA to help identify high potential technologies and manufacturing partners expedites the entire product development process. NEEA's partnership ensures our efforts are more targeted and have a higher chance of success."

 Raymond VanAssche, VP of Innovation Rinnai (NEEA 2019 Annual Report)



KEY TAKEAWAYS AND LESSONS LEARNED

As the alliance turns its attention to Cycle 6, the following key takeaways and lessons learned throughout Cycle 5 will inform more honed and costeffective Market Transformation strategies and approaches for the coming years.

CONSUMER PRODUCTS

- National engagement is necessary to achieve the rates of market adoption that are necessary to keep manufactures and retailers engaged and influence the federal standards process.
- Supporting a single, new manufacturer can be an effective short-term strategy for spurring major manufacturers participation; however, working with small startups also comes with inherent risks that should be identified early on and regularly monitored.
- Where energy efficiency is not an intrinsic driver of consumer behavior, market transformation programs can be effective by identifying alternative leverage points in the market to affect customer purchasing decisions.

COMMERCIAL & INDUSTRIAL LIGHTING

- Full category sales and pricing data can provide powerful insights into purchasing trends, price fluctuations and more, which can help shape future program strategies.
- Despite the rapid adoption of more efficient LED products, there is still a lot of untapped opportunity in commodity lighting and controls.
- Mid-stream market transformation programs and approaches are a viable channel for the region and may be necessary to continue to capture cost-effective savings from certain product categories.

NEW CONSTRUCTION

- For voluntary home certification programs, builders are motivated by utility incentives and ease of program participation; however, these motivators alone often can't overcome low customer demand for the certification, especially in times when the construction industry is thriving.
- Home energy modeling can produce utility-grade savings, however long-term resources must be dedicated to maintaining modeling requirements, updating state baselines, and providing technical support to raters/verifiers.

💿 NATURAL GAS

- Partnering with utilities, energy efficiency organizations and other entities throughout North America increases the ability to advocate for the needs of the northwest. Bringing a broader value proposition to manufacturers influences their ability to commit investment and tailor products to a variety of climates, including cold climates found in the Northwest.
- Due to low gas prices, residential gas technology adoption is likely to be driven more by utilities than consumer demand. Utilities across North America are increasingly supporting efficient gas technologies as solutions to meet greenhouse gas reduction goals and provide customers with gas equipment options that are highly efficient. The alliance is capitalizing on this opportunity by partnering with utilities and energy efficiency organizations throughout North American and co-funding efforts that will ultimately reduce the region's overall investment while ensuring product performance and viability.



Together We Are Transforming the Northwest



421 SW Sixth Avenue, Suite 600 | Portland, Oregon 97204 503-688-5400 | info@neea.org | neea.org