



NEEA and Market Transformation

A Decade of Market Change

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Over the past ten years, NEEA has conducted a wide range of activities to support and advance energy efficiency in the Northwest. These activities have ranged across all the stages of product life-cycle from planning and market research through the development of more efficient energy codes for buildings and standards for equipment. NEEA has also funded projects that support the region's energy efficiency infrastructure via activities such as education, training, and technical support. This document provides examples of the types of activities and roles NEEA has performed over the last decade.

Bringing new energy efficient products and services to market

Many new technologies show promise in a research and development setting but never achieve commercial success. There are many barriers to moving a product from a "pre-commercialization" stage into a "fully commercialized" status. NEEA has worked with several new technologies to help them move them from a point of technical viability to a point of commercial viability. Examples of this type of work include:

BacGen Waste Water Treatment Optimization. NEEA worked with BacGen, a relative newcomer to the wastewater treatment business who had developed a promising approach to encourage better biological performance of wastewater treatment systems. NEEA worked with the company to identify and overcome key market barriers. NEEA's intervention resulted in a viable wastewater treatment optimization service for small and medium wastewater treatment markets. NEEA also worked with BacGen to verify the performance of the service and to demonstrate the viability of the technology across a range of system types and geographic locations.

Surveyor™ Network Energy Management Software. NEEA worked with a new local company to bring their beta-version software into the market. Their software was targeted at information technology network managers and allowed them to control the energy use settings for personal computers attached to their network. NEEA worked with the company to develop the beta-version into a fully supported version that met the needs of IT managers and to expand its interoperability into earlier versions of the Windows operating system. NEEA also worked to verify the energy savings performance of the system and to do end-user research into product features and usability.

While technologies are often the key foundation to energy efficiency, they often are not adopted for reasons that have little to do with the technology itself and

everything to do with human behavior. In order to address this fundamental market barrier, NEEA has worked to develop new products and services targeted more at behavior as well as technology. Probably the most significant product development effort in this area has come in the commercial and industrial sectors through the relatively new concept of “changing business practices”. Examples of this new concept include the adoption of Strategic Energy Management Planning (SEMP) in the BetterBricks effort and Continuous Energy Improvement (CEI) in the Industrial Efficiency Alliance. Both SEMP and CEI are new products focused on helping large commercial and industrial customers understand how to integrate energy efficiency into their standard business operations.

Developing and implementing comprehensive market strategies to increase the market adoption of commercially available energy efficient technologies

Once an efficient product or service makes it into the marketplace, market barriers often prevent market adoption, thereby preventing realization of the energy savings potential of the technology. Before adopting a project to intervene in such a market, NEEA develops a comprehensive market intervention strategy, which identifies market barriers and opportunities, target market actors, and specific interventions by NEEA and other parties. The majority of NEEA’s work over the last decade has been in the following areas:

ENERGY STAR Lighting. In 1997, NEEA conducted market research documenting the key market barriers to adoption of this technology. These included:

- **Product Performance:** Problems included poor lighting quality, a bulky profile that prohibited use in many applications, and slow start up time. Poor cold weather performance prohibited its use in many outdoor applications.
- **Awareness:** By far, the majority of consumers were unaware of the product.
- **Information:** Consumers had little or no information on how to best use the product and were often unhappy with performance as a result. Manufacturers also tended to overstate actual light output.
- **Availability:** The product was simply unavailable in most places where consumers looked to buy lighting products.
- **Placement:** Where it was for sale, the bulbs were often placed in undesirable locations with minimal shelf-space dedicated to the product.
- **Price:** In these early days, the product was very expensive, averaging around \$14 per bulb compared to \$0.50 for a conventional incandescent bulb. Some manufacturers and specialty products were labeled at well over \$20 per bulb.

- Quality: While some of the bulbs delivered the light output and lifetime claimed by the manufacturers, many products had quality issues, particularly in the area of premature failure and maintenance of light output over time.

NEEA developed a strategy targeting all of these market barriers including developing relationships with both manufacturers and retailers to facilitate greater product availability, placement and pricing. When the ENERGY STAR specification for lighting was finalized, NEEA leveraged ENERGY STAR in-store promotions to raise awareness and differentiate better quality products. NEEA also co-funded the work by Pacific Northwest National Laboratories to develop a commercially viable “sub-compact” fluorescent technology that integrated electronic ballasting with a new, spiral tube configuration that is now considered the “standard” CFL bulb.

As these initial barriers were addressed, a “second tier” set of issues within these general categories became apparent. For example:

- Product: While the “60 watt” equivalent product was doing well, other incandescent replacements were not including standard 75 and 100 watt replacements as well as dimmables and specialty lamps
- Availability: While the product was widely available in the big-box home improvement stores, it was still not available in more conventional market channels including drug stores, small hardware and grocery stores. Further, not all areas of the region had the same level of availability, with the rural areas tending to lag behind the “I-5” markets.
- Price: While price had dropped significantly, the average bulb price was still about \$5 or ten times that of the incandescent alternative.
- Quality: While the introduction of the ENERGY STAR program resulted in some quality improvement, consumers still complained of premature bulb failure and lack of brightness.

In 2003 NEEA revised its market strategy to address some of these remaining barriers. The strategy included special negotiations with manufacturers and retailers to ensure product availability in rural as well as urban markets. In order to deal with the quality issue, NEEA co-founded a third-party testing program to ensure compliance with ENERGY STAR requirements. NEEA also worked with the region’s utilities and manufacturers to do targeted promotions that would increase sales volume and lower consumer pricing. Special promotions were also used to increase availability of higher output CFLs and specialty bulbs. Lastly, NEEA provided support for an upgraded ENERGY STAR specification and for national standards for CFLs.

ENERGY STAR Clothes Washers: Another of NEEA’s early projects was focused on the residential laundry market and targeted towards increasing market share of more efficient horizontal axis machines. While these

machines had been available in the market for a very long time, when NEEA started the project they only had an estimated 2% of market share. A newly available model from a US manufacturer created an opportunity to promote the technology and get other domestic manufacturers to commit to making competing models. Lastly, there was an opportunity to influence the upcoming new federal standards for clothes washers if enough of the new machines could be sold.

However, there were numerous market barriers including:

- Awareness: Most consumers had never seen front-loading machines.
- Information: There was also a perception from many years ago that front-loading designs had problems with vibration and leakage from poor products dating back to the 1950s. Consumers needed information on how this new generation of machines was different from the old technology. They also needed to understand the large benefits in both water savings and superior cleaning capability of these machines.
- Availability: These machines were available typically only in high-end appliance stores with limited geographic spread.
- Experience: With the exception of the European models that were sold in relatively small quantities, there was little market or consumer experience with the new generation of technology. A significant number of consumers needed to purchase the machines in order to begin to build confidence in the superior performance of these new machines.
- Price: These new machines cost more than double their conventional counterparts. There was serious doubt about consumer's willingness to pay such a significant premium.

With these barriers clearly identified, NEEA developed a strategy to address them:

- Working with local and national chain retailers to build awareness of the new technology
- Development of a large-scale consumer marketing effort that included a limited time rebate that represented roughly 20% of the purchase price. The rebate was coordinated with the retailers to be taken at the time of sale and combined with other in-store promotional efforts.
- Surveying consumer attitudes and behaviors towards the new machines and creating marketing materials based on real consumer experiences.
- Working with manufacturers to make sure that they could make products available throughout the region.

The resulting effort moved market share from roughly 2% when the program began in mid -1997 to 13% within the first 12 months of operation. Even after the rebate ended in the fall of 1998 market share remained high at about 12% and then grew steadily up to 20% by the year 2000, roughly double the national average. The Northwest presented the sales data and consumer

survey results to the federal standards process. The Northwest was the only region to present data in the federal process based on consumer acceptance in the absence of incentives. While there were certainly many factors in the ultimate decision, the US DOE agreed in 2000 to a phased revision to the federal standard that would mandate efficiency levels comparable to the program levels in 2007.

Increasing/accelerating market adoption of commercially available technologies.

In some markets, an energy efficient technology may be readily available in the market place and even have significant market share. Such technologies can present attractive opportunities for incentive-driven local resource acquisition programs. Under these circumstances, the opportunity also may exist to accelerate and increase long-term market adoption via market interventions that influence regional and national market actors. In that case, NEEA can sometime effect sustained market changes that would be more difficult or costly for utilities acting individually.

ENERGY STAR Windows: In 1997, NEEA began work on a market strategy to increase market share of high-performance residential windows. There were only a handful of regional manufacturers of windows and a few large national manufacturers that produced virtually all of the windows sold in the region. Despite a market share of about 12%, sales of high performance windows was relatively flat due to a lack of product differentiation and a strong incentive to make a “code- minimum” product as cheaply as possible. Coincidentally, ENERGY STAR was drafting a specification for windows at the time.

NEEA engaged with ENERGY STAR to set the performance level at a point where it would provide significant distinction from the region’s already stringent code values. With a nationally recognized brand, NEEA worked directly with the manufacturers to develop a regional marketing effort to promote ENERGY STAR windows. NEEA and the manufacturers co-funded the promotional efforts that were delivered to the distributors and sales outlets that carried the products. After the first year of operation, market share of ENERGY STAR windows had more than tripled. By 2001, market share of ENERGY STAR windows hit 75% more than double the national average of 31%.

Increase market adoption through the adoption of more efficient energy codes for buildings and more efficient product and equipment standards.

In many markets there are local or national/international standards that govern the manufacture and sale of products. There are some market segments that will likely never adopt higher levels of efficiency without more efficient codes and standards. NEEA has had a defined strategy to work on enhancing the efficiency

of energy codes for Northwest buildings since 1997. NEEA has also incorporated product standards as the end point of many of its comprehensive market strategies for consumer goods and business equipment. The following are a few examples of these activities over the last decade.

ENERGY STAR Homes NW, Oregon Codes and the IECC: The 2003 NEEA residential sector strategic plan included a new construction strategy that was deliberately designed to lead to future code changes both in the region and possibly nationally. In 2003 NEEA began negotiations with the EPA ENERGY STAR new homes program for a unique Northwest specification. The Northwest program was designed around a “prescriptive” approach that would be simple for builders to follow and make it more likely that these requirements could one day end up in code. After receiving approval from EPA, NEEA launched the ENERGY STAR Homes Northwest (ESHNW) Program in late 2004. With significant participation from regional utilities, the program began to gain momentum in 2005 and by 2006 had achieved a small but significant market share of about 3% regionally. However, in Oregon, where the Energy Trust of Oregon was running an aggressive marketing program, market share approached the 10% mark.

Simultaneous to the ESHNW launch, NEEA was working with the Oregon Department of Energy on the development of a revised energy code for residential buildings which had not changed substantially in over ten years. The ODOE proposal that ultimately went forward for adoption incorporated virtually all of the ESHNW requirements. Since builders in Oregon already had significant experience with these requirements, the code change passed relatively easily in 2007 and beginning in 2008 virtually all new homes in Oregon will be built to efficiency levels equivalent to ESHNW requirements.

Following the success in the Oregon code process, NEEA sponsored a series of code change proposals to the International Energy Conservation Code (IECC), the model code adopted by many states nationwide and by Idaho and Montana in the Northwest. The proposals included many of the same requirements of ESHNW. Many of these proposals were accepted into the draft that will be voted on by the IECC governing body in 2008 with a significant chance of approval. As a result, the Northwest effort that began with ESHNW will result in energy savings not only for the Northwest region but for much of the US as well.

Supporting the region's energy efficiency infrastructure.

In the commercial and industrial sectors full energy efficiency potential cannot be realized without trained, skilled people to operate buildings and equipment. Various barriers can prohibit the market from provide training and professional development opportunities. NEEA has operated several projects over its life that has filled this gap. The following are a few of the examples of these types of projects:

Improving Building Operations through Education and Training: NEEA has helped develop several training programs in the region that are focused on improving the knowledge, skill and abilities of the people who operate commercial buildings. All of these efforts provide in-depth, hands on training and include a certification component that students can use to differentiate themselves in the market. Programs include the Building Operator Certification program, the Northwest Building Operator Association Training and the Northwest Energy Education Institute operated by Lane Community College.

Compressed Air Challenge: NEEA was one of the founding members of this national effort to develop a training program for operators of compressed air equipment, primarily in industrial settings. The program included training and certification for multiple levels of expertise.

Planning and conducting regional market research/assessment/evaluation.

A foundation of solid market data and savings measurement data is essential to the development, implementation, and evaluation of comprehensive market strategies. Studies that require field data collection and/or metering tend to be expensive and time consuming, however, they are less costly to conduct as a region than they are individually. NEEA has conducted this kind of research for both its own purposes and for the benefit of the region. Examples include the following:

Residential and Commercial New Construction Baseline: NEEA has conducted these large scale statistically valid studies of regional new construction characteristics roughly every five years. The data from these surveys have provided valuable insight for program planning.

Assessment of Industrial Motor Systems Market Opportunities in the Pacific Northwest: NEEA conducted this market assessment to identify efficiency opportunities in industrial markets. This study examined the energy efficiency potential in the Northwest using the same methodology as a national DOE study and incorporated regional industrial market data.

ENERGY STAR New Homes Impact Evaluation Lighting Usage Study: NEEA is currently conducting a regional study to quantify actual energy savings

realized in ENERGY STAR certified new homes. Prior to this study, energy savings have been estimated based on engineering estimates. In conjunction with the site visits required for the study, NEEA will use lighting loggers to measure lighting hours of use in new homes.