Smart Water Heater Pilot

Working Toward a More Resilient Northwest

With over three million water heaters installed in the Northwest, demand response-enabled, or connected, water heaters could be a flexible, low-cost way of reducing energy use during periods of high demand. These "smart" water heaters also have the potential to deliver a host of other benefits, including lower utility costs and better integration of renewable energy into the grid. To assess the opportunity, Bonneville Power Administration (BPA) and Portland General Electric (PGE) are leading an innovative, region-wide pilot with eight Northwest utilities, the Northwest Energy Efficiency Alliance (NEEA) and two national manufacturers—A.O. Smith and Bradford White.

Applying Market Transformation Expertise to Demand Response

Pilot organizers asked NEEA to join the effort because of its market transformation expertise, deep experience in heat pump water heater technology and knowledge of the water heater market, including strong partnerships with manufacturers. “Typical demand response programs are about turning things on or off, it’s cut and dry,” said Conrad Eustis, Portland General Electric's Director of Retail Technology Strategy and pilot co-lead. “This is the first time we’ve taken a market transformation approach to demand response, and NEEA is probably the best in the country at doing that.”

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With pilot funding supplied by BPA, NEEA’s role is to establish a market baseline, work with manufacturers to add smart controls to their product lines and develop a long-term market transformation strategy for smart water heaters in the region. The alliance will also spearhead the development of an education platform that supports Northwest utilities in helping their customers understand smart water heater technology and its benefits for the region.

External command port for connected water heater models

Continuing a Tradition of Innovation

To conduct the pilot, BPA, PGE and other participating utilities recruited more than 250 households across the Northwest (80 percent with heat pump water heaters). "We're asking utility customers to help us pioneer what could be a very valuable program for the region," said Conrad Eustis. "This approach could provide utilities with much more flexibility to keep costs and rates down without impacting the customer comfort or lifestyle."

Throughout 2017 and into 2018, the pilot will evaluate the potential of flexible demand response enabled water heaters and test a new, modular, open-source, communications port that allows utilities to remotely control and monitor demand response events. One of the main goals of the pilot is to develop a business case for a future market transformation effort to influence manufacturers to add the communications port, known as CTA-2045, to their water heaters. The final pilot report is expected at the end of 2018.

> "If all new water heaters purchased in the Northwest were demand-response enabled, by 2038 we would have built a capacity resource equivalent to 250 megawatts - that is half the output of a coal-fired power plant." – Jeff Harris, Chief Transformation Officer, NEEA

Did you know?

By controlling time of use, smart water heaters can be used as 'thermal batteries,' shifting load away from peak-use periods and capturing the benefits of electric storage batteries - at a fraction of the cost. In addition, smart water heaters can help utilities integrate renewable energy onto the grid by increasing alignment between generation and demand, and could potentially help utilities take advantage of fluctuations in wholesale electricity prices. Along with BPA and PGE, Northwest utilities participating in the pilot are Clark PUD, Emerald PUD, Franklin PUD, Puget Sound Energy, Snohomish PUD, Springfield Utility Board and Tacoma Power.

TOGETHER *We Are Transforming the Northwest*

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