

Project Overview:

Heat Pump Water Heater Demonstration



October 2012

Bonneville Power Administration partnered with the Electric Power Research Institute (EPRI) and Snohomish County PUD to be part of a national demonstration pilot for integrated heat pump water heaters (HPWH). 11 public utilities were selected to participate in this field test, which grew to 14 utilities.

HPWH Background

Water heating accounts for 15 to 20% percent of electric use in homes with electric water heat. New HPWH have an energy-savings potential of 50% or more. While HPWH have some great cooling benefits in other regions of the country and are included in the Northwest Power and Conservation Council's Sixth Power Plan, there were questions about their effectiveness in cold climates and their savings potential in the Pacific Northwest.

Demonstration Project Background

The demonstration project began in April 2010 and ran through March 2012. EPRI furnished the HPWH and metering equipment which was installed in 40 single-family homes (treatment sites). Additionally, metering equipment on existing electric storage water heaters in an additional 13 single family homes (control sites) were installed throughout the Pacific Northwest.

Utilities participating in the demonstration project contributed to research that will provide documented performance feedback on HPWH to all utilities, manufacturers and stakeholders in the region. This work will help inform program planning and future generations of HPWH technology. Usage data has been collected for each HPWH and control site water heaters over the

course of the demonstration testing period.

The field demonstration allowed BPA and EPRI to gather impact data specific to the Pacific Northwest region through the selected "treatment sites" and "control sites" and assess the impact of various factors that may affect HPWH performance and customer satisfaction in a variety of regional climate zones. The field demonstration was part of a nationwide test of 160+ residential HWP's. Now that the demonstration project is complete, EPRI will release a final report to be delivered to their members soon.

Demonstration Project Details

40 Treatment Sites (Single-family residential homes)

- Provided with new HPWH
- Instrumented and monitored for up to two years
- Occupant observations before and after installation
- Occupants permitted to adjust water temperature and operating modes as desired Monitoring Capabilities:*
- Occupants instructed to operate HPWH normally, year-round

13 Control Sites (Single-family residential homes)

- Instrumented and monitored for up to two years
- Provides baseline for comparison with treatment sites



Criteria For Site Selection

- Single-family homes
- Wireless internet access
- Residence is owned by the occupants
- Residence has only one water heater
- Residence is likely to be occupied by the same family members during the entire demonstration test period
- Diversity of location (field pilot is seeking sites throughout the region)

(Note: final selection of test sites was at the discretion of the EPRI pilot lead.)

Projected Timeline

- April 2010 BPA to identify (cities/utilities) where HPWH may be installed
- April 2010 BPA, utility and contractor to identify treatment and control sites
- June 2010 Begin installation of HPWHs and/or metering equipment in homes
- March 2012 Metering ends, equipment removal begins
- April/May 2012 Metering equipment removed

Regional and National Efforts

In the Northwest, NEEA has drafted a Northern Tier specification for manufacturers. This specification gained widespread support from Northwest utilities and other northern partners across the U.S., including the Midwest Energy Efficiency Alliance (MEEA) and the Northeast Energy Efficiency Partnership (NEEP). To learn more read [NEEA's Specification for Residential Heat Pump Water Heaters Installed in Northern Climates Version 3.0.](#)

Additionally, the ENERGY STAR program has developed specifications for qualifying high efficiency heat pump water heaters. For more details, visit the [ENERGY STAR website.](#)

Contact

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