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Pacific Northwest National Laboratory Unveils GridWise™ Initiative to Test New Electric Grid Technologies

'Smart' Energy Devices and Real-time Pricing Information Enable Increased Options for Consumers, Bringing Power to the People

SEATTLE – Pacific Northwest National Laboratory announced today the launch of the Pacific Northwest GridWise™ Demonstration projects, a regional initiative to test and speed adoption of new smart grid technologies that can make the power grid more resilient and efficient.

Senator Patty Murray, D-Wash., representatives from the Department of Energy, as well as demonstration project partners and participants kicked-off the program at an event in Seattle today. Through the GridWise Demonstration projects, PNNL researchers will gain insight into energy consumers' behavior while testing new technologies designed to bring the electric transmission system into the information age.

About 300 volunteers on Washington's Olympic Peninsula, in Yakima and in Gresham, Ore., will test equipment that is expected to make the grid more reliable, while offsetting huge investments in new transmission and distribution equipment.

A new combination of devices, software and advanced analytical tools will give homeowners more information about their energy use and cost, and researchers want to know if this will modify their behavior.

Approximately 200 homes will receive real-time price information through a broadband Internet connection and automated equipment that will adjust energy use based on price. In addition, some customers will have computer chips embedded in their dryers and water heaters that can sense when the power transmission system is under stress and automatically turn off certain functions briefly until the grid can be stabilized by power operators.

"The technologies we're testing will turn today's appliances, which are as dumb as stones with regard to the power grid, into full partners in grid operations." said Rob Pratt, GridWise program manager at PNNL in Richland, Wash.

The year-long study is part of the Pacific Northwest GridWise Demonstration, a project funded primarily by DOE. Northwest utilities, appliance manufacturers and technology companies also are supporting this effort to demonstrate the devices and assess the resulting consumer response.

In the pricing study, automated controls will adjust appliances and thermostats based on predetermined instructions from homeowners. The volunteers can choose to curtail or reduce energy use when prices are higher. At any point, homeowners have the ability to override even their preprogrammed preferences to achieve maximum comfort and convenience.

"We believe this project is the first to provide pricing data on a very short time scale – approximately every five minutes – and the first to include the true costs of transmission and distribution within that price," said Pratt.

Currently, most utilities charge a flat rate per kilowatt hour to homeowners, regardless of the wholesale cost of power or the cost of transmission and distribution. Pratt and other researchers will analyze how customers react to the real cost of delivering energy to their homes through the use of simulated electric bills and pretend money in a mock account that eventually will be converted into cash they get to keep.

If homeowners choose to reduce electric consumption at times of higher prices, the pretend money they save becomes real as they are issued a check from the GridWise program each quarter. Price conscious participants are expected to earn about \$150 during the year and nobody will lose money during the experiment.

The communications, computer and control technologies provided by IBM, Invensys Controls and others can help customers become an integral part of power grid operations on a daily basis – and especially in times of extreme stress on the electrical distribution system.

In the portion of the demonstration focused on the smart appliance technology, a computer chip developed by PNNL is being

installed in 150 Sears Kenmore dryers produced by Whirlpool Corporation.

The Grid Friendly™ Appliance Controller chip could help prevent widespread power outages by turning off certain parts of an appliance when it senses instability in the grid – something that happens about once a day on average. Shutting down the heating element for a few minutes, while the drum continues to tumble, would likely go unnoticed by the homeowner but drastically reduces power demand within the home. Multiplied on a large scale, this instant reduction in energy load could serve as a shock absorber for the grid. It would give grid operators time to bring new power generation resources on-line to stabilize the grid – a process that usually takes several minutes.

At the end of the study, researchers will evaluate customers' reactions to the chip and their responses to the real-time pricing information to determine their acceptance. This will help government and industry to determine whether and how to best make the technologies more widely available to consumers in the future.

An earlier PNNL study shows that creating a smarter grid through information technology could save \$80 billion over 20 years nationally by offsetting costs of building new electric infrastructure – the generators, transmission lines and substations that will be required to meet estimated load growth.

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PNNL is a DOE Office of Science laboratory that solves complex problems in energy, national security, the environment and life sciences by advancing the understanding of physics, chemistry, biology and computation. PNNL employs 4,100 staff, has a \$700 million annual budget, and has been managed by Ohio-based Battelle since the lab's inception in 1965.

Gridwise is a vision for the future electric system built upon the fundamental premise that information technology will profoundly transform the planning and operation of the power grid, just as it has changed business, education, and entertainment.

Pacific Northwest GridWise Demonstration participants include: [Bonneville Power Administration](#), [PNNL](#), [Portland General Electric](#), [PacifiCorp](#), [Clallam County PUD](#), [City of Port Angeles](#), [Mason County Public Utility District #3](#), [IBM](#), and [Whirlpool](#).

[Watch](#) the video shown at the Jan. 11 GridWise Demonstration launch event.

Right click to [download](#) the video file.

[Read](#) more about the demonstration project.