

PNNL Laboratory Research Homes



Pacific Northwest National Laboratory's Lab Homes

“The PNNL Lab Homes project is the first of its kind in the Pacific Northwest region. The facilities will be an excellent source for PNNL and its partners to test a variety of smart and energy efficient technologies that ultimately may be used in homes throughout the U.S.”

– Steve Shankle
Director
PNNL Electricity
Infrastructure and
Buildings Division

Residential buildings currently account for approximately 22 percent of the nation's annual energy use. As a result, the adoption of energy-saving technologies could mean substantial savings for the consumer and the nation, and lessen our impact on the environment.

The Department of Energy's Pacific Northwest National Laboratory, or PNNL, has purchased two custom, factory-built, double-wide homes to conduct energy research. These “Lab Homes” are a project test-bed for PNNL and its research partners who aim to achieve highly energy-efficient homes. The homes will be fully instrumented with controllable circuits, dual heating systems, environmental sensors, and a weather station.

Working with multiple sponsors, PNNL will use the identical 1,500 square-foot Lab Homes for experiments focused on reducing energy use and peak demand on the electric grid.

Results and reports from the experiments will be available at labhomes.pnnl.gov.

ENERGY EFFICIENCY RESEARCH

Research and demonstration primarily will focus on technologies that can be added to a home after construction, and the homes will offer a side-by-side ability to test and compare new ideas and approaches that are applicable to site-built as well as manufactured homes in the region and nationwide.

In each study, one home will remain a control, illustrating a typical, existing home while the other will test a new technology. To account for human activity, researchers will simulate occupancy in each home.

Highly Insulating Windows

During a nine-month study of highly insulating, triple-pane windows, researchers will determine the ability of these windows to reduce energy use and cost to the homeowner. They also will assess the ability of the windows to enhance comfort in the home in comparison to standard double-pane windows found in many homes across the country.

Smart Appliances

A second experiment will focus on everyday appliances, such as a range, refrigerator, dishwasher, and clothes washer and dryer. These smart appliances have the ability to quickly respond to a pricing signal. This signal comes from an electric utility and allows the appliances to reduce energy consumption when prices get too high—such as during peak hours—and resume full operation when the prices lower.

RESEARCH PARTNERS

Organizations funding work in the PNNL Lab Homes project include the U.S. Department of Energy's Building America and Building Envelope R&D programs, the



Highly-insulating triple pane window

Bonneville Power Administration, DOE's Office of Electricity Delivery and Energy Reliability and the City of Richland—Energy Services department. The site for the home was donated by Battelle and is included in the footprint of the Tri-Cities Research District in north Richland. The homes purchase and site work was conducted under a competitive contract administered by PNNL.

WHAT THIS MEANS FOR THE CONSUMER

As a home owner or tenant finding new ways to lower an electricity bill always is exciting. Research like this can provide information to help occupants make smart decisions about technologies that can save energy and reduce utility bills. The Lab Homes project is designed to maximize savings and reduce energy use.

ABOUT PNNL

Pacific Northwest National Laboratory, a U.S. Department of Energy Office of Science national laboratory, solves complex problems in energy, the environment, and national security by advancing the understanding of science. PNNL employs nearly 5,000 staff, has an annual business volume exceeding \$1 billion, and has been managed by Ohio-based Battelle since the Lab's inception in 1965.

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