

SIDE-BY-SIDE LAB HOMES DELIVER WHOLE-HOME RESULTS WITH LABORATORY PRECISION



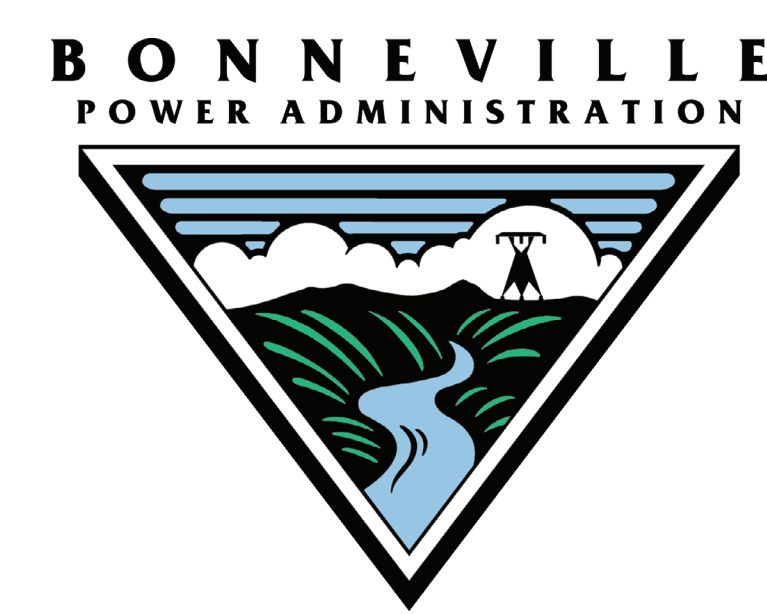
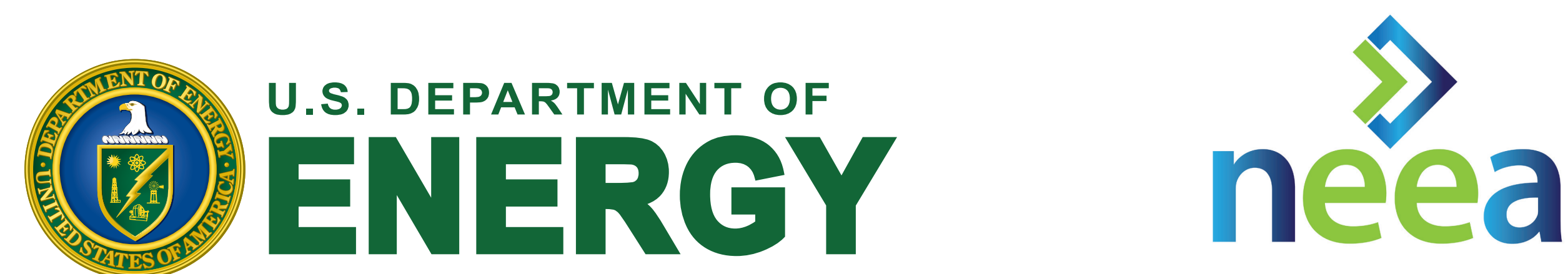
Get energy saving and performance results with **less error**, for a **fraction of the cost** of a field test. PNNL can simulate a wide range of occupants and represent some of the most **extreme climates** in the country.



Interactions between the thermostat and automated window shades, are easily captured.



Lab Home results from cellular shades experiments showed up to 14% energy savings on heating and cooling loads¹.



Thank You Sponsors!

¹JM Petersen, GP Sullivan, KA Cort, MB Merzouk, and CE Metzger. November 2016. Evaluation of Cellular Shades in the PNNL Lab Homes. PNNL-24857, Pacific Northwest National Laboratory, Richland, WA. http://labhomes.pnnl.gov/documents/PNNL_24857_Cellular_Shades.pdf



HPWH/HVAC INTERACTION FACTOR

Preliminary results show a decrease in the heating energy penalty associated with installations in conditioned space as the water heater is moved further from the thermostat and return grill².

²Metzger CE, SH Widder, JM Petersen, and JA McIntosh. February 2017. Space Conditioning Interactions with Heat Pump Water Heaters: A Test in the PNNL Side-by-Side Lab Homes. PNNL-SA-124136. Presented at the 2017 ACEEE Hot Water Forum, Portland, OR.

CO₂ COMBINATION DHW/SPACE HEAT

Preliminary results show the CO₂ combi system can meet low and high occupancy profile loads, with outdoor temperatures down to about 35°F³

³Metzger CE, JM Petersen, JA McIntosh. February 2017. PNNL Lab Home Results for CO₂ Combi System Stress Tests. Presented at the 2017 ACEEE Hot Water Forum, Portland, OR.



GRID-CONNECTION CAPABILITY



Can dynamic shades be used as a grid-response device, either by themselves or in conjunction with the HVAC system?