



**Bright Idea.** PNNL researchers support DOE's Commercially Available Light Emitting Diode Product Evaluation and Reporting (CALiPER) Program, which guides planning for ENERGY STAR® and technology procurement activities, provides objective performance information, and informs standards and test procedures for solid-state lighting products.

*Transforming facility design and operation for America's energy future*

## Energy-Efficient Buildings

PNNL is addressing the challenge by

- ▶ Working with market stakeholders to identify and deliver cost-effective approaches to increase efficiencies in both new and existing buildings
- ▶ Developing control technologies, operations strategies, and training curricula that work with existing building systems to reduce energy use by more than 20%
- ▶ Leveraging grid-friendly technologies to integrate efficient buildings with the smart grid and enable demand management, improve system efficiency, and reduce energy costs.

### Partners

Our partners include major commercial property holders of hotels, office buildings, banks, retail space such as JCPenney™, and hospitals; American Society of Heating, Refrigerating and Air-Conditioning Engineers; International Code Council; Association of Home Appliance Manufacturers; Bonneville Power Administration; State of Washington; City of Seattle; and Northwest Energy Efficiency Alliance.

### PNNL'S SCIENCE AND TECHNOLOGY IMPACT

#### Building Performance

- ▶ **Energy efficiency retrofits** at federal facilities, saving more than 3 trillion kilowatt hours over the past decade

*The cleanest, most cost-effective energy is that which is never used—yet the market has barely tapped tremendous opportunities for increased efficiency.*

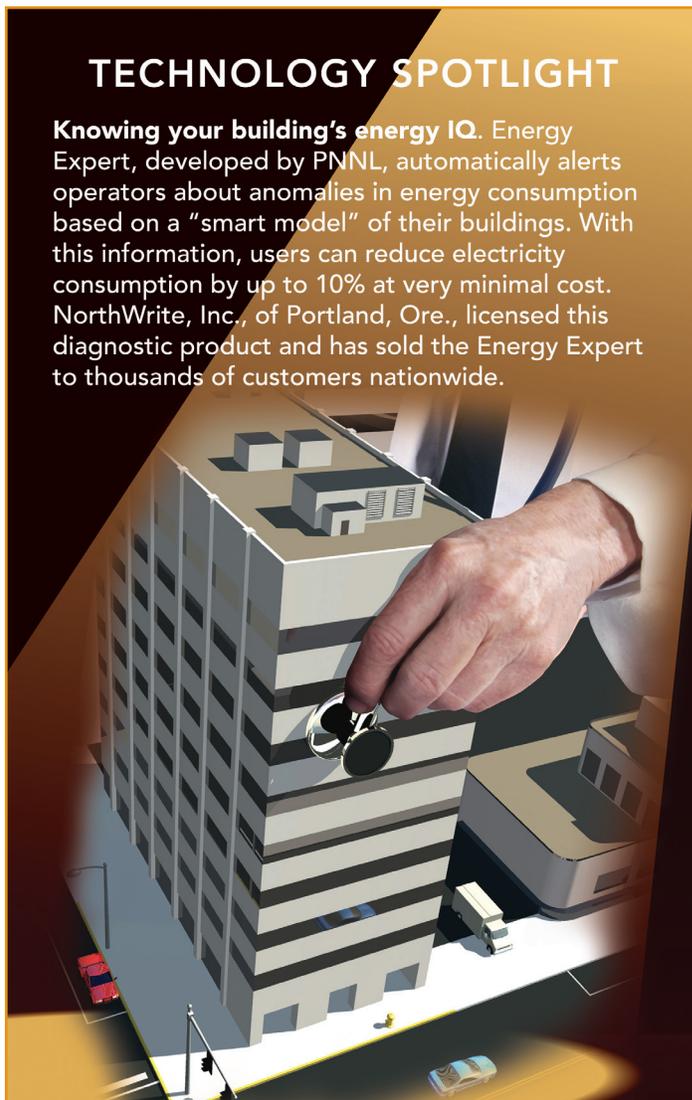
- ▶ **Controls, sensors, and diagnostics** for improved building operations, management, and maintenance, and to measure and verify efficiency gains
- ▶ **Design guides** for new buildings and renovations in existing buildings based on whole-building monitoring

### Working with Stakeholders to Get Efficiency to Market

- ▶ Energy efficiency building codes with software tools that support widespread code adoption, achieving the greatest and most cost-effective efficiencies
- ▶ Equipment and appliance standards developed with manufacturers and the building industry to maximize efficiency while minimizing costs
- ▶ Collaborative market transformation programs that advance new, more efficient technologies (e.g., subcompact fluorescent lights) including volume buying, large-scale product demonstrations, and product competitions
- ▶ Science and technology assistance that improves the design, performance, and economics of energy-efficient technologies to meet market needs

## TECHNOLOGY SPOTLIGHT

**Knowing your building's energy IQ.** Energy Expert, developed by PNNL, automatically alerts operators about anomalies in energy consumption based on a "smart model" of their buildings. With this information, users can reduce electricity consumption by up to 10% at very minimal cost. NorthWrite, Inc., of Portland, Ore., licensed this diagnostic product and has sold the Energy Expert to thousands of customers nationwide.



## ABOUT PNNL

The Pacific Northwest National Laboratory, located in southeastern Washington State, is a U.S. Department of Energy Office of Science laboratory that solves complex problems in energy, national security and the environment, and advances scientific frontiers in the chemical, biological, materials, environmental and computational sciences. The Laboratory employs more than 4,900 staff members, has a \$1.1 billion annual budget, and has been managed by Ohio-based Battelle since 1965.

For more information about PNNL's R&D related to Energy-Efficient Buildings, contact:

**Terry Walton**, Director – K9-46  
 Energy and Environmental Programs  
 (509) 375-4548  
 terry.walton@pnnl.gov

**Mike Rinker**, Manager – K9-69  
 Radiological and Nuclear S&T  
 (509) 375-6623  
 mike.rinker@pnnl.gov

Pacific Northwest National Laboratory  
 P.O. Box 999  
 Richland, WA 99352

[www.pnnl.gov](http://www.pnnl.gov)



**Pacific Northwest**  
 NATIONAL LABORATORY

Proudly Operated by **Battelle** Since 1965