EI&BD CORE COMPETENCY:

Technology Deployment and Market Transformation

The Electricity Infrastructure and Buildings Division (EI&BD) at Pacific Northwest National Laboratory (PNNL) accelerates the transition to a sustainable, efficient, resilient, and secure energy system through innovation and actionable solutions. To achieve success, the division applies a distinctive set of core competencies to its work.

EI&BD's **Technology Deployment and Market Transformation core competency** draws upon a deep technical understanding of energy and water systems, PNNL's specialized research facilities and equipment, and practical experience deploying and testing energy and water technologies. This core competency also leverages long-standing partnerships with industry, academia, regulators, and federal and state agencies.

Together, these capabilities and partnerships help provide the value proposition and supporting resources to overcome market, technical, policy, and institutional barriers to the adoption of energy- and water-efficient technologies and management practices. This enables public and private institutions to drive innovation and technology adoption at scale.

Technology Deployment and Market Transformation capability areas include:

Technology Performance Validation: PNNL facilities allow for evaluation of technology and system performance. Results can answer critical questions related to both technology development and market readiness. Facilities, such as the Environmental Chambers (high-precision equipment evaluation) and Electricity Infrastructure Operations Center (grid technology testing), are unique assets operated by subject matter experts possessing deep knowledge of experimental design, industry standards, and test procedures to assure replicability and reproducibility of results.

EI&BD staff played key roles in the Department of Energy's Interior Lighting Campaign, a public-private partnership that supported the development and market adoption of high-efficiency lighting and control systems in commercial buildings.

Field Testing and Validation of Technologies in Real-World Applications: EI&BD possesses extensive capabilities in field study design, as well as measurement and verification. These resources help assess performance of promising new technologies and systems in real-world settings, as well as understand a technology's technical and market readiness in residential, commercial, electrical grid, and industrial applications. EI&BD also deploys observational research capabilities to improve technology performance and increase adoption rates.

Analyzing System and Scale Impacts from Technology and Policy Changes: EI&BD's impact analysis capabilities related to technology adoption and energy systems integration at scale shape policy and inform institutional changes. This includes evaluating technology maturity and identifying technical gaps (i.e., scoping studies) in existing technology solutions. Strong economics capabilities are leveraged to conduct business case analyses and develop novel valuation methods to identify economic impacts from technology deployment in buildings, changes to grid architecture, and equitable distribution of impacts to different communities. EI&BD also identifies barriers to new technology integration and potential solutions.

Stimulating Market Adoption of Clean Energy Technologies: Broad, interdisciplinary subject matter expertise, ranging from buildings and distributed energy systems to grid architecture and cyber-secure operations, helps accelerate early adoption of advanced technologies and encourages deployment at scale. EI&BD's expertise and longstanding collaborative relationships with government and industry leaders are key to the design and delivery of initiatives that address technology and market barriers, support and speed technology adoption, track progress, and ultimately lock in energy savings and carbon emission reductions.

The versatile Eclipse VOLTTRON™ technology, developed at PNNL initially as a grid tool, has demonstrated its ability to manage operational systems in buildings, enable building-grid integration strategies, and even remotely monitor reservoir water levels. The open-source software platform benefits from an active user community that continues to advance the platform's capabilities and identify new ways to deploy it.

EI&BD STAFF AND PARTNERSHIPS

EI&BD's staff members offer expertise in electrical, mechanical, and systems engineering, data and computer sciences, cybersecurity, policy, economics, and other energy- and water-related areas. Staff represent the division's greatest resource and strength and are widely recognized internally and externally for their expertise and commitment to excellence. EI&BD also values its partnership with the Department of Energy and other federal agencies and collaborative relationships with a wide range of major companies, vendors, institutes, academia, and technical societies.

ABOUT PNNL

PNNL is a Department of Energy Office of Science laboratory located in Richland, Washington, with an enduring mission to transform the world through courageous discovery and innovation. Our science and technology inspires and enables the world to live prosperously, safely, and securely.

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