Pacific Northwest NATIONAL LABORATORY

EIOC ELECTRICITY INFRASTRUCTURE OPERATIONS CENTER

SHAPING THE FUTURE ELECTRIC GRID

The Electricity Infrastructure Operations Center (EIOC) at Pacific Northwest National Laboratory (PNNL) is a premier, real-world testing ground for advancing the U.S. power grid. Located at the PNNL-Richland campus in Washington, the EIOC is dedicated to transforming how America's power grid is operated and managed.

By simulating end-to-end operations, researchers can see how incremental and localized changes affect other parts of the grid, delivering technologies that help grid operators respond to events, forecast conditions with confidence, and plan for an increasingly dynamic system.

Designed with industry input and based on actual utility control centers, the EIOC offers a risk-free space for utility operators, technology developers, government agencies, and researchers to collaborate on the development of next-generation grid technologies.

What You Can Do at the EIOC

In the EIOC, experts from diverse disciplines work together to advance grid reliability and build new grid management tools. Serving as a technology pipeline, the EIOC enables collaborators to transform ideas into deployable solutions through an end-to-end innovation process. Capabilities of the EIOC include:

Research and Development

- Develop new technologies in a realistic operational environment
- Conduct operator performance studies to understand human factors in grid operations
- Advance synchrophasor applications for real-time monitoring and control
- Explore machine learning and artificial intelligence for predictive operations and decision support

The Electricity Infrastructure Operations Center (EIOC) includes two fully functional and configurable independent control room environments linked with a dedicated network and server enclave. The EIOC serves as a valuable resource to utilities, vendors, government agencies, and universities interested in research, development, or training, providing a risk-free environment for learning how to better manage and control the power grid. *Andrea Starr | Pacific Northwest National Laboratory*

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Technology Validation and Integration

- Evaluate solutions against end-user needs in authentic utility scenarios
- Test grid management tools using real data from major utilities at interconnection scale
- Assess control systems through high-fidelity simulations with industry-standard tools
- Conduct system studies to understand vulnerabilities
- Test Remedial Action Schemes and energy assurance plans in secure environments
- Validate cybersecurity tools and practices in real-time utility scenarios using secure, high-fidelity testbeds

Training and Education

- Train grid operators and dispatchers in state-of-the-art control room environments
- Provide North American Electric Reliability Corporation-certified training on grid operations with new technologies
- Conduct incident response exercises for cybersecurity and physical security events
- Develop workforce capabilities for managing the increasingly complex modern grid
- Facilitate knowledge capture from experienced operators through simulation scenarios

Key Facility Features

- Two fully functional control rooms with 40-foot-wide, 10-foot-tall video wall systems
- A dedicated server enclave with over half a petabyte of storage space
- Ability to display content from multiple sources, including live utility data feeds
- Comprehensive library of industry-leading power systems software
- Advanced computing resources for large-scale grid simulations and data analytics
- PowerNET Testbed integration for hardware-in-the-loop testing

Let's Make the Grid Stronger Together

The grid is evolving rapidly, and the technologies used to manage operations are advancing in response. From transmission to distribution, the EIOC supports innovation across the entire electricity system to help shape a more reliable, affordable, and secure energy future.

The Electricity Infrastructure Operations Center's West room screens in preparation for virtual synchrophasor training. *Andrea Starr | Pacific Northwest National Laboratory*

Contact us below to explore how we can collaborate:
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U.S. DEPARTMENT of ENERGY

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