Electricity Infrastructure Operations Center

MODERNIZING THE ELECTRIC POWER GRID SYSTEM

The Electricity Infrastructure Operations Center (EIOC) at Pacific Northwest National Laboratory serves as a unique platform for researching, developing, and deploying technologies to manage and control the national electric power transmission and distribution grid, and associated networks. The EIOC brings together cutting-edge visualization, real-time grid data, and advanced computation into two fully capable control rooms. Shaped with input from utilities, technology companies, and researchers across the nation, the EIOC allows industry groups and utility professionals to train grid operators and find solutions to anticipated energy problems.

GRID RESEARCH AND OPERATIONS

The EIOC includes two fully functional grid control rooms, one for transmission and one for distribution. These rooms were designed with real industry control room capabilities in mind. These control rooms make it possible to design, test and evaluate tools and concepts in a setting that mirrors current industry conditions. The EIOC features two 39-foot-wide, 10-foot-tall, 452 square-foot video wall systems that have the ability to display a wide range of content from multiple sources.

DATA HOSTING & LIVE DATA FEEDS

The EIOC maintains and operates its own server farm, where we host a number of valuable data sets that can be used for model development, verification, and validation. The server farm also captures several live, streaming synchrophasor data feeds from utilities in our region.
Control rooms, located at the rear of each operations center, are used to manage the video wall.

**HIGH-PERFORMANCE COMPUTING**

The EIOC has the ability to leverage PNNL’s advanced computational capabilities that allow complex computing processes—such as contingency analyses, and dynamic state estimation—to run at ultra high speeds.

**POWERNET**

The EIOC leverages the GridOPTICS™ PowerNET Testbed—a multi-user, remotely accessible, experimental laboratory focused on testing and evaluating power systems for smart grid research. The powerNET enables the EIOC to test models, software, hardware, and middleware, and researchers are able to develop and test new ideas. Designed to be joined with other testbeds to tackle large-scale problems, the powerNET serves to decrease the up-front cost for equipment, reducing the barrier for non-power system engineers to experiment with power system equipment.

**CYBER SECURITY**

PNNL is developing advanced capabilities to protect our grid from cyber-attacks. In collaboration with the EIOC, the Electricity Infrastructure Cybersecurity and Resilience Center (EICC) provides a working space for researchers to develop advanced visualization, analytics, notification processes, and forensic methods for information sharing and situational awareness that directly support electric grid operations and cyber security.

**GRID OPERATOR TRAINING**

The EIOC can be leveraged to provide training for grid operators. Training can range from basic and refresher courses for operator licensing, to advanced training in the use of new technologies, national security-related contingencies and procedures, and advanced computational techniques.

**LOOKING TO THE FUTURE**

The EIOC will continue to make major contributions to the grid modernization strategy, both regionally and nationally. Future expansion opportunities will involve improved testing facilities for grid technologies, use of PNNL-developed web-based control interfaces, and other projects directed at improving grid performance and lowering customer energy costs.

For more information:

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