

# Industrial Microgrid Analysis and Design for Energy Security and Resiliency

## CHALLENGE

Industrial utility customers have a unique opportunity to support a modern energy economy and a stronger, more reliable grid. They typically need reliable, secure power in high quantities, and many facilities have their own backup generators and redundant electrical feeds to bolster their reliability. However, many of the generators are only used for routine testing and for their intended purpose only a few hours a year. If these backup assets could be used as a microgrid for both blue-sky and contingency cases, then the microgrid could provide both reliability to the customer and services to the grid. Some utilities are not familiar with some of the emerging grid technologies and how they can be incorporated into their operations to increase grid resiliency for their customers. The perceived risk associated with new technology adoption can present a significant barrier to modernizing the grid.

Addressing utility hesitation head-on by involving utilities in the entire development of grid modernization technologies and providing hard evidence of benefit to both customers and utilities could be the key to unlocking utility modernization efforts across the country.

## APPROACH

Advanced microgrid control schemes are one way to increase the reliability and strength of the grid. Oak Ridge National Laboratory (ORNL), in partnership with Sandia National Laboratories (SNL) and Fortune 10 company United Parcel Service (UPS), is investigating, developing, and analyzing the risks, costs, and benefits of a microgrid at the UPS World Port and Centennial Hub facilities in Louisville, Kentucky. This processing hub, the crown jewel of UPS's company, is the most technically advanced facility of its kind in the world, and UPS is very interested in the development of an industrial microgrid to serve its 50-megawatt power needs.

This partnership will keep the utility engaged in the project and aware of how industry customers want to use microgrids, and how microgrids will affect the larger electric grid.

## At-A-Glance

### PROJECT LEADS

- **Ben Ollis**  
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- **Ben Schenkman**  
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### PARTNERS

- United Parcel Service
- Waste Management
- Burns & McDonnell
- Harshaw Trane
- Louisville Gas & Electric
- State of Kentucky

### BUDGET

\$1 million

### DURATION

April 2016 – September 2017

### TECHNICAL AREA

Security and Resilience

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## EXPECTED OUTCOMES

Technical documents developed from this project will provide a roadmap and set of open-source tools for UPS and other industries interested in microgrid technologies. The institutional and regulatory challenges associated with development of an industrial microgrid will be spelled out. The methods and open-source tools used in this project can be

directly applied to other interested industries. The project will also highlight the interaction between an industrial customer interested in pursuing a microgrid and a utility that may be unfamiliar with adopting such a technology—a scenario that industries across the country are highly likely to face.

## LAB TEAM



Launched in November 2014 under the U.S. Department of Energy's Grid Modernization Initiative, the GMLC is a strategic partnership between DOE Headquarters and the national laboratories, bringing together leading experts and resources to collaborate on national grid modernization goals. The GMLC's work is focused in **six technical areas** viewed as essential to modernization efforts:

Devices and Testing | Sensing and Measurements | Systems Operations and Control  
Design and Planning | Security and Resilience | Institutional Support