



Commonwealth Edison

Sensors with Intelligent Measurement Platform & Low-Cost Equipment (SIMPLE) for Monitoring and Control of Medium Voltage Distribution Systems with High Penetration of Intermittent Distributed Energy Resources (DERs)

Project Description

The primary focus of this project is to develop voltage/current sensors with enhanced, accuracy, bandwidth and harmonic range; and high measurement granularity for medium voltage distribution system monitoring, protection, and control. The enhancements will be added to commercially available sensors from selected vendors. These “intelligent sensors” will be combined with an “intelligent measurement device (IMD)” for sensor performance compensation/correction; and to interface/communicate with advanced SCADA devices and power quality measurement units/analyzers. The resulting SIMPLE system incorporates data management and object models for a message bus, as required for an open source communication architecture. This approach facilitates data sharing and data utilization by all distribution feeder monitoring/control apparatus while reducing deployment cost and achieving interoperability among multiple devices.

Goals/Objectives

- Develop sensors that address deficiencies identified in commercially available current/voltage transformers (CTs/VTs) used for real-time monitoring of distribution systems with high penetration of intermittent DERs.
- Replaces multiple, proprietary systems, with an open system based on the Internet Protocol (IP).

Key Milestones

- System design completed (November 2018)
- Prototype delivered to the laboratory (December 2018)
- Voltage testing completed (June 2019)
- Field demonstration installed at the utility (September 2019)
- Field demonstration completed (March 2020)

Benefits

- Captures events that may impact distribution system operations but that would go unnoticed by conventional technologies.
- Reduces the amount of data traffic and required communications bandwidth by filtering data transmitted to substations and control centers.

Milestone	Completion Date
1: System specification approval	January 2018
2: System design completion	November 2018
3: Prototype delivery	December 2018
4: ITF testing complete	March 2019
5: High voltage testing complete	June 2019
6: System design acceptance framework	August 2019
7: Demonstration system installed	September 2019
8: Demonstration complete	March 2020

CONTACTS

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PARTNERS

Quanta Technology
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PROJECT DURATION

10/01/2017 – 03/31/2020

BUDGET

Total Project Value
\$2,249,811

DOE/Non-DOE Share
\$1,500,000 / \$749,811

PROJECT IMPACTS

- Real-time monitoring and management of distribution systems with time synchronized local processing of key voltage and power quality variables and high sampling rates.
- Detect events that would go unnoticed when using conventional SCADA technology.
- Reduced data traffic and required communications bandwidth due to transmission of key metrics-based data to substations and control centers only.

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