Smart-Grid Ready PV Inverters with Utility Communication

Electric Power Research Institute

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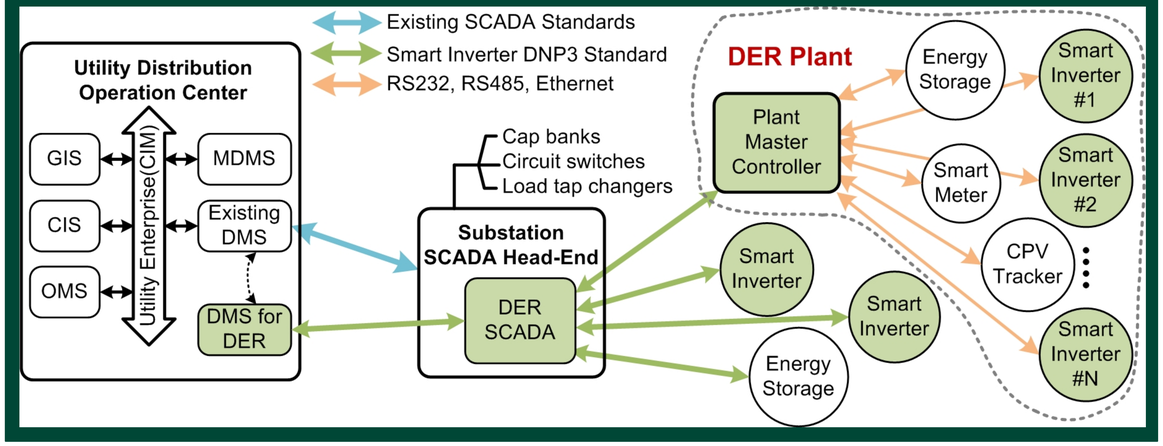
ABSTRACT

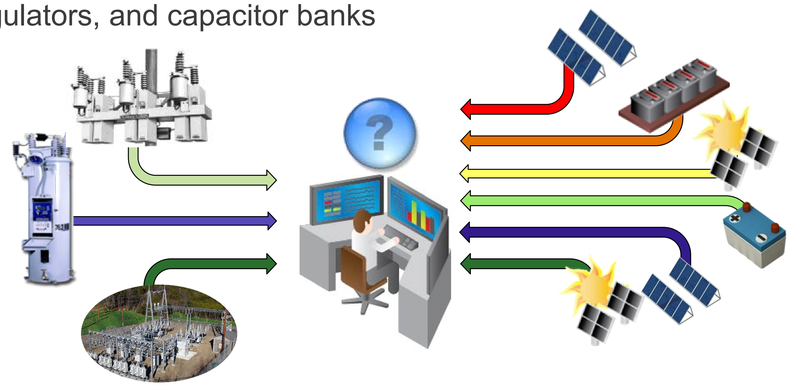
This project aims to develop, implement, and demonstrate smart inverters with grid support functionality and required utility communication links to capture the full value of distributed PV plants. Key objectives are to apply advanced grid-support functions in inverters and establish remote management and configurability of these functions from distribution operation centers—together they will enable utility engineers to better utilize PV grid assets. Grid collaboration will demonstrate an effective way to achieve higher penetration of distributed renewables in existing distribution systems without creating operating, reliability, or safety concerns.

Utility Communication with DER

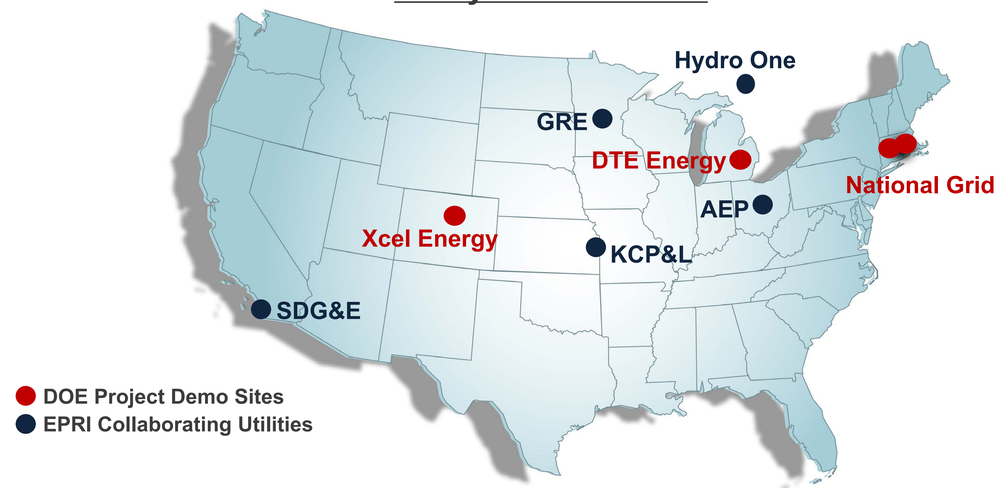


BENEFITS

- Standard communication protocols enable PV inverters from different manufacturers to support the same feeder
- Responsive and controllable PV inverters can be coordinated with existing devices like LTCs, voltage regulators, and capacitor banks



Utility Collaborators



Everett Demonstration Site in Boston, MA

Solar PQ Monitoring System

Smart-Grid Ready Inverter

Project Scope & Key Milestones

- Design, develop, and implement smart inverter grid-support functionality using open communication standard
- Develop and implement DER distributed management system (DMS) for optimum utilization of smart inverters
- Develop and implement utility-controlled unintentional islanding prevention scheme for increased reliability
- Demonstrate smart DER system on multiple utility scale plants
- Comprehend potential benefits of utility connected smart inverters through demonstration and detailed feeder modeling

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