



Southern California Edison Company Irvine Smart Grid Demonstration

Project Description

Southern California Edison (SCE) is conducting an end-to-end demonstration of numerous Smart Grid technologies necessary to meet state and federal policy goals for the year 2020. The Irvine Smart Grid Demonstration (ISGD) project will investigate the use of phasor measurement technology to enable deep, substation-level situational awareness. The project will also evaluate the latest generation of distribution automation technologies, including looped 12 kV distribution circuit topology utilizing universal remote circuit interrupters. Advanced Volt/VAR Control capabilities will also be used to demonstrate customer energy consumption savings through conservation voltage reduction. The project scope includes customer homes, where the integration, monitoring, control, and efficacy of home area network devices such as energy management systems, smart appliances, energy storage, and photovoltaic systems will be demonstrated. The impact of device-specific demand response (DR), as well as load management capabilities involving energy storage devices and plug-in electric vehicle charging equipment will also be assessed. DR events will use the protocol standards being adopted by Advanced Metering Infrastructure programs such as Edison SmartConnect®. The project results will also demonstrate the next generation of Substation Automation (SA-3), an automation and control design based on the open standard IEC-61850. This is expected to provide measurable engineering, operations, and maintenance benefits through improved safety, security, and reliability.

Demonstration of a new auto-configuration application is intended to significantly reduce manual effort, errors, and omissions. SA-3 is designed to meet or exceed current generation North American Electric Reliability Corporation Critical Infrastructure Protection (NERC CIP) compliance requirements, and will demonstrate interoperability among multiple vendors and their existing equipment. ISGD's Secure Energy Network will enable end-to-end interoperability and provide the cybersecurity essential to Smart Grid development and adoption across the nation.

Goals/Objectives

- Verify the viability of various Smart Grid technologies deployed in an integrated manner
- Quantify Smart Grid costs and benefits
- Test and validate the scalability of several Smart Grid elements
- Evaluate the ability of various Smart Grid technologies to help homes achieve Zero Net Energy status

Key Milestones

- Completed engineering design and specifications (12/31/2012)
- Field deployment and installation complete (12/31/2013)
- Systems operations, measurement and verification complete (6/30/2015)
- Submit final technical report (12/31/2015)

Anticipated Benefits

- Advance energy independence through increased renewable energy usage
- Reduce greenhouse gas emissions through energy efficiency, renewable energy resources, and plug-in electric vehicle integration
- Promote open industry standards for interoperability and cybersecurity
- Evaluate organizational capabilities needed for Smart Grid implementation

CONTACTS

David Szucs

Project Manager
National Energy Technology Laboratory
626 Cochrans Mill Road
Pittsburgh, PA 15236-0940
412-386-4899
David.Szucs@netl.doe.gov

Michael Montoya

Principal Investigator
Southern California Edison
14799 Chestnut Street
Westminster, CA 92683
714-934-0810
Michael.R.Montoya@sce.com

PARTNERS

General Electric
University of California, Irvine
University of Southern California
SunPower Corporation
Electric Power Research Institute

PROJECT DURATION

2/9/2010–9/30/2015

BUDGET

Total Project Value
\$79,242,416

DOE/Non-DOE Share
\$39,621,208/\$39,621,208

EQUIPMENT

Residential Energy Storage
Community Energy Storage
Solar Car Shade Battery System
Universal Remote Circuit Interrupters
Substation Automation and Cybersecurity Systems Infrastructure

DEMONSTRATION STATES

California

CID: OE0000199

Managed by the National Energy Technology Laboratory for the Office of Electricity Delivery and Energy Reliability

ISGD Location

