EPIC/PICG
Public Safety Power Shutoffs (PSPS)

Microgrids for Resiliency

SCE-E3-P4 *Control and Protection of Microgrids and Virtual Power Plants*
SCE-E3-P13 *Smart City Demonstration*

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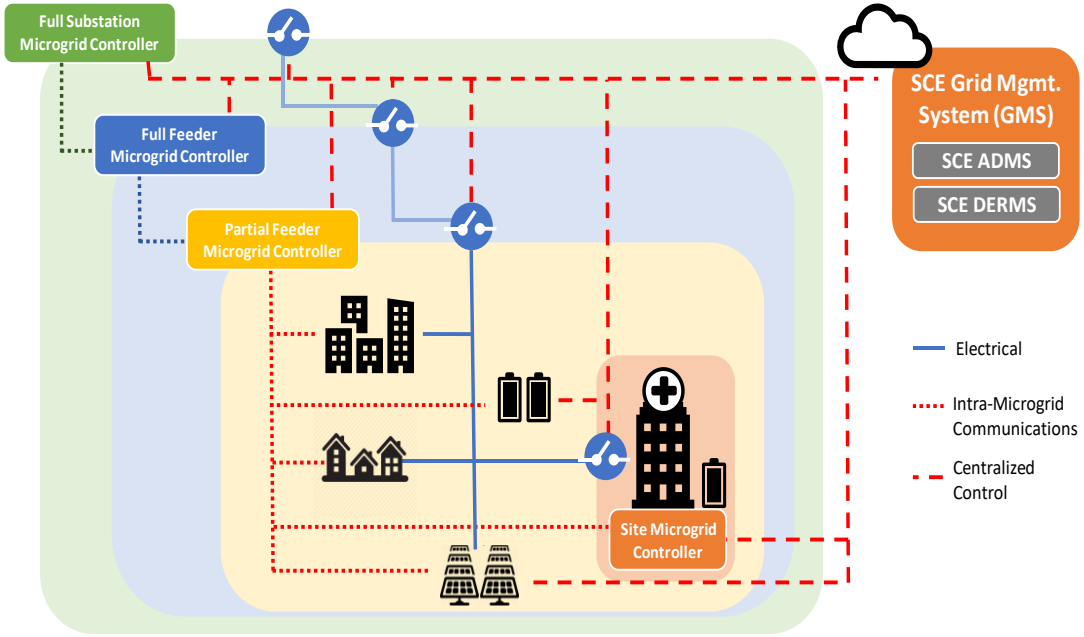
SOUTHERN CALIFORNIA EDISON®

Microgrids for Resiliency

SCE-E3-P4 and SCE-E3-P13, EPIC 3 Projects

Goals

The overall goal is to **build the technical foundation** for future microgrid projects by
(a) developing a microgrid control **design & implementation process** to be operationalized by SCE once sufficient technical maturity is achieved
(b) demonstrating **microgrid platforms** in the lab and field environments.



Project Overview

Customers need **adaptable smart energy solutions** to optimize usage, reduce emissions, and improve outage resiliency

Develop a HIL microgrid **lab test bed** to support testing of control and protection schemes, use cases and microgrid projects

Demonstrate cybersecurity compliant **front-of-the-meter** (FTM) **microgrid** to enhance grid & customer **resiliency**, support **recovery** from planned & unplanned outages, and reduce emissions

Utilize SCE energy storage and microgrid controls to **enhance the value** of **third-party Distributed Energy Resources** (DER) integration and optimized coordination

Microgrids for Resiliency

SCE-E3-P4 and SCE-E3-P13, EPIC 3 Projects

Microgrid Use Cases

- Planned Island
- Island Operation
- Black Start
- Grid Resynchronization
- Unplanned Island
- Grid Support (Grid or Market Services)

Technical Concepts

- **Advanced HIL Laboratory Testing** with RTDS & DERs and validation of field results
- Scenario with **100% renewable microgrid** (grid-forming ESS, PV & electric vehicles)
- Support **planned** (PSPS or maintenance) and **unplanned outages** at the critical facilities
- Integration with SCE's **Grid Management System**
- **Visibility, control, and operation** of distribution grid to improve reliability and optimal use of DERs across multiple applications (customer, grid, and markets)
- **Complex ownership & operation** (customer/third-party owned DERs, SCE-owned DERs)
- **Nested/networked microgrid** with multiple microgrid-point-of-interconnection (MGPOI
- **Interoperability plan** (DNP3-SA, IEEE 2020.5, SunSpec Modbus)
- **Cybersecurity plan** with a focus on third-party DER integration and control

Project Execution Plan

- Use cases and system requirements
- Site selection and agreement
- Microgrid vendor procurement and design
- Advanced HIL lab test bed and testing
- Integration with enterprise systems and QAS testing
- Site design, deployment readiness, test and training plans
- Field integration and microgrid demonstration
- Measurement & verification and project learnings

Microgrids for Resiliency

SCE-E3-P4 and SCE-E3-P13, EPIC 3 Projects

Key Challenges

Site Selection: Limited technical/spatial flexibility limits available sites that meet project objectives	**Configuration Scenarios:** HFRA rating, land availability, ability to island safely
Local DER Penetration & Mix: Existing DER requirements for control, DER mix for extended duration outages and remote microgrids	**DER Control:** Stakeholder engagement and commitment, hardware/firmware upgrade, cyber-secured architecture, flexible DERs
Aesthetics: Stakeholders need to visualize completed installation	**Visualization:** Clear concept renderings needed for non-technical audiences and stakeholders
Community Resources: Municipal resources are scarce, limiting co-investment potential	**Co-Investment:** Partnering with other SCE projects and local agencies is necessary

Lessons Learned