



SCE's TE Technical Projects: Service Center of the Future

ACT EV Charging Workshop:
Advanced Energy Management with Storage, Solar,
and Microgrids

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Energy for What's Ahead®



Southern California Edison and Pathway 2045

- 50,000 square-mile service area
- 5 million customer accounts
- 15 million residents
- Infrastructure
 - 1.4 million poles
 - 700,000 transformers
 - 103,000 miles of T&D lines
- Pathway 2045 (100% of retail sales carbon free)
 - 40% increase in peak load
 - 80 GW of new generation
 - 30 GW of new energy storage needed
 - 75% of vehicles electric
 - 70% of buildings electric
 - Two thirds of medium-duty trucks
 - One-third of heavy-duty trucks



Service Center of the Future EPIC Demonstration

- EPIC – Electric Program Investment Charge: Ratepayer funded RD&D program
 - R&D portion managed by California Energy Commission
 - Demonstration portion managed by state's IOUs, such as SCE
 - 21 projects in various stages of planning and execution
 - 3 Transportation Electrification projects, including SCOF
- Original focus on SCE fleet, 50 electric service centers distributed over 50,000 square mile service area
- Support goal to electrify SCE's fleet of 6000 vehicles as efficiently as possible
 - Equip service center with elements to reliably fuel fleet vehicles at lowest cost and impact, incorporating controls and DERs
 - Utilize the service center and its controls to support the local grid and integrate local DERs

SCOF Project Elements

The diagram illustrates the SCOF Project Elements, showing a central **Microgrid Controller** connected to several key components:

- SCE Grid Management System DERMS**: A dark blue trapezoidal box at the top right, connected to the Microgrid Controller by a red arrow.
- Energy Storage Controller**: An oval connected to the Microgrid Controller by a dotted line, which in turn connects to a **Utility Energy Storage** unit (a large grey container).
- Building Management System**: An oval connected to the Microgrid Controller by a dotted line, which connects to a large industrial building labeled **Building Electrification**.
- Charging Management System**: An oval connected to the Microgrid Controller by a dotted line, which connects to a **Submeters** box and a **Conduit and Wires** path leading to **Electric Vehicles** (represented by three red trucks).
- Submeters**: A box connected to the Charging Management System and the Conduit and Wires path.
- Conduit and Wires**: A path connecting the Submeters to the Electric Vehicles.
- Electric Vehicles**: Three red trucks with yellow cargo, each with a blue lightning bolt icon on its side.
- Other Elements**: The diagram also includes a **Distribution Grid** (represented by power lines and trees), **Meter, Panel and Switchgear** (represented by a blue and grey unit), and a **Building Electrification** unit (a large grey container).

Objectives and Use Cases

Demand Response

- Microgrid control system (MCS) to communicate and manage demand response (DR) events
- Building management system (BMS) to optimize building energy usage
- Charging management system (CMS) to contain EV peak demand

Grid Support

- MCS to support over/under voltage conditions using ESS and controls
- MCS to charge/discharge ESS to support grid capacity needs

Resiliency

- MCS to manage island formations
- MCS to manage grid re-synchronization

EV Charging Management

- CMS to optimize EV charging schedule, satisfying requirements of fleet operation while minimizing electric fuel cost



Delivering Value

- Demonstrate alternative service option and real/controlled capacity needs
- Integration of fleet operational control strategy with site and grid energy management systems
- Interconnection of ESIP storage system and battery management functions (grid side, customer side, generation, distribution)
- Siting of storage and infrastructure components on customer property and consideration of operational needs, configuration, switching
- Outage resiliency of bus charging with energy storage
- Demonstrate advanced metering options and back office systems
- Learnings to enable further deployment of such technology and lower the cost and time required for large-scale fleet electrification