SOUTHERN CALIFORNIA EDISON RESIDENTIAL STORAGE PROJECT

Mark S. Martinez
Senior Portfolio Manager
Southern California Edison

International OpenADR Symposium
San Francisco, CA
June 11-13, 2019
SCE’s Emerging Markets and Technologies Program

• Designed to investigate and assess emerging technologies and systems to enhance customer engagement of demand response (DR) and dynamic pricing programs

• Accelerating the availability of cost effective enabling DR technologies and their communication protocols for wholesale market tariffs and retail programs

• Supporting and developing DR protocols and systems for Title 24 new construction Codes and Standards to mitigate GHG emissions through efficient electrification and load shifting

• Authorized by the California Public Utilities Commission and implemented by Southern California Edison through 2022
Emerging Technology Roadmap Framework

• **Foundational technologies** and/or system capabilities that can support existing utility business operations

• **Emerging technologies** that may be required to support near term forecast scenarios for high penetration of new end uses

• Developing future technological assessments for **speculative and or disruptive technologies** and or capabilities
  ▪ These include **low cost energy storage** deployments “behind the meter” and future distributed ledger transactive energy markets
Market Update: Residential-Sited Storage

• Global Deployment Update – Systems in Operation
  • Germany: 110,000 units
  • Japan: 70,000 units
  • Australia: 35,000 units
    • To install 70k+ units in 2019?

• Leading the Charge
  • CA leads residential and C&I markets
  • HI a leader in residential also
  • NY developing new incentives, permitting still an issue
  • MA SMART Program to incentivize solar + storage

• Key Market Drivers
  • Reliability concerns and increased environmental awareness
  • TOU rate deployments
  • Demand limiting

Self-Generation Incentive Program (SGIP) extension refreshes funding to $800M.
Growth of Residential Customer-Sited Storage

In Q4 2018:
- 123% YOY increase
- 7% QOQ decrease
- California accounts for 50% of deployments in 2018
- Hawaii accounts for 17% of deployments in 2018

(Data Source: U.S. Energy Storage Monitor Q4 2018)
Battery Energy Storage (BES) System Architecture

“It’s not just a battery but an energy storage system”
SCE Residential Storage Project Goals

• *Operational research* on existing products to provide storage visibility and response based on an OpenADR signal

• *Compare and benchmark* current, state-of-the-art communications technologies and services for utilities and battery management.

• *Assess* communications security requirements associated with OpenADR 2.0b

• *Field demonstrate* how OpenADR 2.0b signals will be used for monitoring and control of multi-family project site and three homes involved with another CEC project.
Mosaic Gardens Pomona

PIKA 60 kWh battery
34 kW PV
Low Income Multifamily Housing
Mosaic Gardens Pomona

Battery: (4) Harbor Smart Battery SB15P
Inverter: (3) PIKA islanding inverter X11402
Optimizers: (15) PIKA PV link S2500
Subcontractor: Promise Energy

Current Status:
• Major construction complete; building permit approved.
• Communication lines from batteries / inverters to cloud under construction.
• Awaiting final commissioning of both interconnection and software profiles to assess distribution grid impacts.
RATES

3 sites; 2 with PV, 1 with no generation – grid charge/discharge
LG Battery (10kWh nominal) with SolarEdge Inverters
Single family residential dwellings
CEC Grant to Universal Devices and TeMix; transactive energy management schema
RATES - Moorpark

Battery: (3) RESU 10H
Inverter: (3) SolarEdge 7600A
Subcontractor: Promise Energy

Current Status:
• Major construction complete; building permits approved.
• Rule 21 application in process
• Inverter portals have been transferred to RATES subcontractor for control of batteries via the inverter API.
• Control of batteries to be aligned with virtual tariff simulating real time pricing
Possible Storage Communication Scenarios

1. Vendor and Customer
   • BES is used for local services (e.g., manage roof-top solar photovoltaic[PV], mission-critical applications)

2. Vendor, Third-party Service Provider, and Customer
   • BES is used, as a managed energy service, for integrated customer systems (e.g., manage solar PV and daily peak load management)

3. Utility and Systems Operator and Customer
   • BES is used to directly provide grid services (e.g., day-ahead and ancillary services demand response [DR] programs)

4. Utility, Vendor/Service Provider, and Customer
   • BES is used to provide local and third-party grid services

These scenarios represent the present state-of-art deployments. Generally, the scenarios apply to distribution grid-installed BES.
Utility, Vendor/Service Provider, and Customer (An Integrated View)

- **Multiple Proprietary Communications** (API-based or device control)
- **Standardized Communications** (e.g., Rule-21-compliant)

**Utility**
- Independent Systems Operator

**Vendor**

**Service Provider/Aggregator**

**Proprietary and/or standardized communications**

**INDEPENDENT OR SAME ENTITY: LOCAL OR INTEGRATED SERVICE**

**INDEPENDENT OR SAME: VENDOR(S) AND SERVICE PROVIDERS**

**Retail and/or Wholesale Grid Services**

**Residential Customer**

**M**
The emergence of energy storage gives us an opportunity to transform BES as a grid resource, located at the “right place” and to provide grid services at the “right time”.

• **Information and communication technologies (ICT)** and services are necessary to support these BES grid resource objectives.

• **Communications** support monitoring and control capabilities through OpenADR 2.0b can facilitate the grid services that the BES systems can provide to electric utilities and grid operators, reliability and with dynamic visibility.

• **Standards-based communications** enhance BES value to provide multiple benefits simultaneously and to seamlessly integrate utility, wholesale market, and third-party systems.
Thank You!

Mark S. Martinez
Senior Portfolio Manager
Emerging Markets and Technologies
Southern California Edison

Mark.S.Martinez@sce.com