SCE Findings
AUGUST 2016

# DR15.13: COMMERCIAL AND INDUSTRIAL ADR WITH STATIONARY BATTERY STORAGE

## OPPORTUNITY

What has been demonstrated about the potential of demand response using stationary battery storage?

Battery energy storage is an emerging technology as a distributed energy resource (DER). The United States deployed 221 megawatts (MW) of energy storage in 2015 which was an increase of 243% over 2014.

The observations in this study suggest that further refinement is needed with regards to dispatch instructions in order to derive expected consistent and predictable battery response.

## TECHNOLOGY

How does demand response using battery storage work?

When combined with intermittent renewable resources, including solar photovoltaic, batteries can be a shock absorber for the intermittent generation output by storing excess generation for later use and/or discharging to meet consumer electricity demand. The ability to both absorb excess energy and discharge as needed make batteries a key component in the ecosystem of DER.

## M&V

Where did Measurement and Verification occur?

Three customer sites with pre-existing stationary battery systems participated in the demonstration. In addition to DR measurement and evaluation (M&V), power quality was monitored at all three sites for the duration of the project.

SCE conducted a total of 13 events with the stationary storage devices available and receiving signals to participate. Each dispatch event included a corresponding criticality level intended to direct storage performance to either charge, discharge, or turn-off charging.

## RESULTS

How did conditioned crawl spaces perform in M&V?

The demand response battery technology did not perform predictably or consistently across the test events that are analyzed in this study.

While the battery systems performed the anticipated response given the signal, the batteries did not respond to many test events or had results that were inconsistent with expectations.

### MITIGATING FACTORS

- Issues with the battery system being offline or unavailable on event day.
- An imprecise dispatch signal structure.

### DISPATCH SIGNALS

- Customer 1 over-performed delivering an average of 578% of the requested demand response.
- Customer 2 under-performed delivering an average of 71% of the requested demand response.
- Customer 3 over-performed delivering an average of 156% of the requested demand response.

## DEPLOYMENT

What does the study recommend for next steps?

### THE GOAL IS PREDICTABLE AND CONSISTENT PERFORMANCE

It is recommend that adjustments are made to the DR dispatch signal such that a specific amount of energy is dispatched which results in the battery making net facility load adjustments to align with the requested quantity (MW) for the duration needed. Simulating the CAISO dispatch signal through an OpenADR2.0b interface and adjusting the quantity of energy requested during a dispatch will provide insight into the dispatch performance precision that the current battery energy storage systems can provide.