

**DEMAND RESPONSE
EMERGING
TECHNOLOGIES
PROGRAM**

**SEMI-ANNUAL
REPORT 2015**

September 30, 2015



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I. Summary

The report is being submitted pursuant to Ordering Paragraph 59, and the discussion at pages 145 – 146 of Decision (D.) 12-04-045, which adopted budgets and programs for San Diego Gas & Electric Company's (SDG&E's) Demand Response (DR) portfolio for the 2012 – 2014 program cycle.

Ongoing projects include Mainstreaming: 10 kW/ 40 kWh Flywheel Energy Storage, HVAC Optimization, Residential Pool Pump DR Scaled Field Assessment, and Open ADR 2.0A/B Evaluation.

II. Completed Projects in Q2 2015 and Q3 2015

A. HVAC Optimization

1. Overview

The purpose of this project is to evaluate a building management system overlay that ties together HVAC, occupancy data, weather patterns, and price signals. This system leverages existing building management systems, which are mostly used in large buildings. This software saves some HVAC energy, and reduces the peak demand of buildings by throttling air handler supply fans. In addition, it enables demand response by reducing energy automatically on a DR signal. By reducing the peak demand, customers can save around 10% on their energy bill.

2. Collaboration

The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

All EE and DR trending period and M&V has been complete for this project. Draft report and Final Report completed. Upon peer review will be uploaded to the ETCC website.

4. Next Steps

Upload final report to the ETCC website following peer review.

III. Ongoing Projects in 2015

A. 10 kW / 40 kWh Flywheel Energy Storage

1. Overview

Berkeley Energy Sciences Corporation (BESC) is developing a low-cost flywheel energy storage device. The first generation device has the target of 40 kWh / 10 kW. This flywheel uses high-strength steel as a rotor, and this design has the potential of a 20 year lifetime with over 90% AC to AC efficiency. If successful, this project leads to BESC's second generation technology which is 125kW/500kWh.

2. Collaboration

This project is in collaboration with CEC PIER. BESC received a \$1.8M grant from PIER to build the flywheel. SDG&E will provide measurement and evaluation.

3. Status

Inverters selected and the fly wheel prototype has been constructed

4. Next Steps

Site location is being selected and install is beginning. Vendor is working through some permitting issues.

B. Residential Pool Pump DR Scaled Field Assessment

1. Overview

Pool Pumps are one of the largest consistent energy users in the home, and the "lowest-hanging fruit" for DR. This approach will hopefully establish a low cost DR retrofit controller for single speed pool pumps. One way this technology aims to be low cost is the capability of delivering DR utilizing digital FM radio signaling.

2. Collaboration

The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Installations have been completed at each home. DR test events have been called and analysis of each DR even has been calculated. The final report is being drafted.

4. Next Steps

Complete the final report.

C. *OpenADR 2.0 A/B Evaluation*

1. Overview

Evaluate OpenADR 2.0 A/B signals for demand response, ancillary services, and real time pricing. Evaluate DR potential at site, and A/S potential at site. Send OpenADR 2.0 signals from LBNL or a certified server.

2. Collaboration

SDG&E has collaborated with the Demand Response Research Center at LBNL on this project. The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Test loads have been selected and simulated DR events have been called per the M&V plan of the project.

4. Next Steps

Analyze the simulated test events energy data, various system performance, and system latency. LBNL to draft final report and finish report by the end of Q4 2015.

IV. New Projects in 2015

A. *Residential IDSM Pool Pump Controller*

1. Overview

One low cost technology that can unlock IDSM potential for single speed, dual speed, and variable speed pool pumps. This residential solution encompassing all pool pumps provides annual kWh savings and additional kW (load) on demand response days. This project will establish the annual savings and aggregated DR dispatchable load to assist in cost effective growth of Demand Response Programs.

2. Collaboration

The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Vendor donated all labor and materials for this project. 3rd party energy engineering firm selected and contracted. 50 residences with pool pumps have been selected. 30 day baseline trending has been completed and installations have started. Approximately 8 out of 50 complete.

4. Next Steps

Complete all 50 installations and start the post trending and simulated Demand Response events.

B. EPRI Smart Thermostat Collaborative

1. Overview

Define methods to translate the value proposition from a field demonstration to utility programs of the products and services in the study. Understand all the costs and benefits from the various thermostat hardware and software offerings as well as the data streams that comes from the products and services.

2. Collaboration

12+ utilities are participating in this study, 15 smart thermostat products and/or services, and other stakeholders such as EPA, DoE, LBNL, NREL, ICF, and iTron. The information from this project is also shared with the statewide ET-DR team on our monthly conference calls.

3. Status

The collaborative project is in year 2 of 3 for the entire project. SDG&E joined the project late based on new internal interest from customer programs demand response team.

4. Next Steps

September / October time frame will have preliminary deliverables for participants in the study.

C. Phase Change Material for Low Temperature Refrigeration Projects (IDSM)

1. Overview

Evaluate the direct energy efficiency savings and DR potential that result from installing Phase Change Materials (PCMs) inside low temperature walk-in freezers.

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2. Collaboration

The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

3rd party energy engineering firm selected to perform the measurement and verification. 3 sites selected waiting for signed Field Demonstration Agreements to hold project kick off meetings.

4. Next Steps

Execute Field Demonstration Agreements for all 3 sites, hold kick off meetings and begin baseline trending of existing refrigeration equipment.

D. *Electric Vehicle to Grid Integration Platform (VGIP)*

1. Overview

This project will create requirements and use cases for unified grid services platform that is secure, low cost, on an open platform. It will also aide in the development architecture and functionality of the VGIP (OpenADR2.0b, SEP, HAN). Lastly, this project will assess performance of the VGIP against utility requirements through field tests and trials. BMW, Chrysler, Ford, GM, Honda, Mercedes, Mitsubishi, Nissan, and Toyota have agreed to be study participants.

2. Collaboration

The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Contracts signed to start the project.

4. Next Steps

Work with EPRI to launch the project.

Budget

Approved Budget source per D.14-05-025 (issued May 15, 2014) "Decision Approving Demand Response Program Improvements and 2015-2016 Bridge Funding Budget".

Projected Program Budget

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Program Name	2015 Budget	2016 Budget	Total 2015-2016 Budget
Emerging Technology Demand Response	\$701,807	\$705,526	\$1,407,333