

**DEMAND RESPONSE  
EMERGING  
TECHNOLOGIES  
PROGRAM**

**SEMI-ANNUAL  
REPORT 2016**

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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. Decision (D.) 14-05-025 approved the extension of the budgets and programs for the 2015 – 2016 cycle.

During the 6 month period of Q4 2015 and Q1 2016, SDG&E DR-ET completed 2 projects, initiated 2 new projects and continued to manage 7 ongoing projects.

## **II. Completed Projects in Q4 2015 and Q1 2016**

### ***A. 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 were shared with other Investor Owned Utilities (IOU's) during scheduled monthly conference calls.

#### **3. Status**

The final draft report is being reviewed by stakeholders and once complete will be uploaded to the Emerging Technology Coordinating Council website for public view.

#### **4. Next Steps**

Internal handoff meeting with the Demand Response Team to go over the logistics of the report and how it might transition into current or new demand response programs.

### ***B. Residential IDSM Pool Pump Controller***

#### **1. Overview**

The intent of the Measurement & Valuation (M&V) study was to investigate a residential pool pump controller that shall facilitate optimization of energy consumption and reduce demand when called upon for all types of residential swimming pool filtration pumps including

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constant speed, dual speed and variable speed pumps with or without existing controls.

**2. Collaboration**

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

**3. Status**

This project was cancelled before completion of the installation due to the vendor's inability to resolve the communication issues of their control system in a timely manner.

**4. Next Steps**

None.

**III. Ongoing Projects in 2016**

**A. 10 kW / 40 kWh Flywheel Energy Storage**

**1. Overview**

Berkeley Energy Sciences Corporation (BESC) has been 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 California Energy Commission Public Interest Energy Resource. BESC received a \$1.8M grant from PIER to build the flywheel. SDG&E will provide measurement and evaluation.

**3. Status**

Permitting issues have been resolved.

**4. Next Steps**

Installation and commissioning of the Flywheel are expected to be complete by Q3 2016.

## **B. *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 Lawrence Berkeley National Lab (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**

Completing the analysis of the simulated DR test events energy data, various system performance, and system latency and writing final report

### **4. Next Steps**

LBNL draft report is complete. Final report will be completed for publishing to the ETCC website in Q2 2016.

## **C. *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**

More than twelve (12) utilities are participating in this study, 15 smart thermostat products and/or services, and other stakeholders such as Environmental Protection Agency (EPA), Department of Energy (DOE), Lawrence Berkeley National Laboratory (LBNL), National Renewable Energy Laboratory (NREL), ICF International, and iTron. The information from this project is also shared with the statewide ET-DR team on our monthly conference calls.

### **3. Status**

The results from summer 2015 are being evaluated, and the field evaluations will also cover heating performance in winter 2015-16 as well as summer 2016 for the pilot hosts.

#### **4. Next Steps**

Develop the technology review, the pilot design for each pilot in the collaboration, the results from each pilot as well as detailed analysis of thermostats data.

### ***D. 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.

#### **2. Collaboration**

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

#### **3. Status**

Two of three sites are in the pre-trending phase. The third site is set to start pre-trending within the month of March. Project kickoff meetings have all been completed.

#### **4. Next Steps**

Complete pre-trending of all three facilities. Installation and commissioning schedule will begin shortly after the accuracy of the pre-data is verified.

### ***E. Electric Vehicle to Grid Integration Platform (VGIP)***

#### **1. Overview**

This project will create requirements and use cases for a unified grid services platform that is secure, low cost, and on an open platform. It will also aide in the development architecture and functionality of the VGIP (OpenADR2.0b, SEP, Home Area Network). 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**

Use cases have been determined and communication protocols have been adopted for product development.

### **4. Next Steps**

Developing measurement and verification requirements for each use case scenario will be developed by Q3 2016. Stakeholder meeting will be held in Q3 with all collaborating entities.

## ***F. Whole Facility HVAC - IDSM***

### **1. Overview**

A complete heating, ventilation, and air conditioning (HVAC) efficiency maintenance, tune up and controls upgrade with Demand Response capabilities is proposed for two small-medium businesses in the fast food industry. Equipment monitoring will be performed before, during and after the upgrade to determine the actual reduction in electricity consumption and demand.

### **2. Collaboration**

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

### **3. Status**

Simulated Demand Response events of various time lengths are being scheduled and should be completed by Q3 2016.

### **4. Next Steps**

Final analysis of any energy efficiency savings and quantifying demand response load shed values per the specific control's scope of work will be complete by Q4 2016.

## ***G. Automated Demand Response (ADR) - Lighting Project***

### **1. Overview**

The goal of the project is to assess and validate the effectiveness of new LED luminaires with integrated sensors and an embedded mesh wireless network to be controlled via a kinetic energy wireless wall switch. The

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switch will receive a command from the main controller to dim the lighting to a pre-established level based upon the type of signal received sent by the utility. The value of this project will be the potential for increasing participation in ADR programs due to the ability to allow customer better control of levels of response based upon utility signal in a demand reduction situation.

### **2. Collaboration**

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

### **3. Status**

Pre-data have been collected. Installation of the wireless system is complete and post-monitoring equipment is being installed.

### **4. Next Steps**

Simulated demand response events will take place in Q3 of 2016. Post analysis of the simulated events and final report are estimated to be complete by Q4 of 2016.

## **IV. New Projects in 2016**

### ***A. Battery Power Load Shedding System – ADR Evaluation***

#### **1. Overview**

The objective of this study is to evaluate the demand response capability of the energy storage system. In addition to peak load shaving capability, the impact of the energy storage system on the circuit and the customer bill/economics will be studied.

#### **2. Collaboration**

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

#### **3. Status**

Contracts have been scoped and executed. Implementation schedule and measurement and verification plan have been proposed and accepted by all parties.

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**4. Next Steps**

Installation and commissioning of the battery storage systems is slated for completion by Q2 2016.

**B. Whole Connected Home**

**1. Overview**

The intent of the evaluation will be to evaluate various emerging technologies, as one unified system, for their capability to be developed and integrated into DR programs. The evaluation will consider both technologies as well other program impact factors such as customer adoption, ease of recruitment, persistence, and data availability for M&V.

**2. Collaboration**

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

**3. Status**

Project scope of work and contracts have been completed and executed.

**4. Next Steps**

Vendor interviews will be held through in Q2 of 2016 to establish various product selection and compatibility hierarchy. Site selection will start as vendors are being interviewed.

**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**

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