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March 30, 2012

A. 08-06-002

Ed Randolph
Director, Energy Division
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102

Re: SDG&E 2011 Annual Report on Demand Response Emerging Technologies Program

Dear Mr. Randolph:

In accordance with Decision 09-08-027, Ordering Paragraph 14, attached please find San Diego Gas & Electric (SDG&E) Company's report. This report is also being served on the most recent service list in Application 08-06-001 et. al. and has been made available on SDG&E's website. The URL for the website is:

<http://sdge.com/node/711>

If you have any questions, please feel free to contact me.

Sincerely,

Joy C. Yamagata
Regulatory Manager

Enclosure

cc: A. 08-06-001 et. al. - Service List
Steve Patrick – SDG&E
Central Files

**DEMAND RESPONSE
EMERGING
TECHNOLOGIES
PROGRAM**

**ANNUAL REPORT
2011**

March 31, 2012



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I. Summary

This annual report is being submitted as directed in Section 12.2.3 paragraph 3 and Ordering Paragraph 14 of Decision (D.) 09-08-027 Adopting Demand Response Activities and Budgets for 2009 through 2011. As described in Section IV E of the Amended Testimony in Support of San Diego Gas & Electric Company's (SDG&E) Amended Application for Approval of Demand Response Programs and Budgets for years 2009 through 2011 (Application (A.) 08-06-002) and authorized in California Public Utilities Commission (CPUC) D. 09-08-027, the DR-ET group continues to evaluate and demonstrate DR technologies that have strong potential to reduce power consumption during periods of higher energy prices or tight energy supplies in all SDG&E customer segments.

Ongoing projects include Centralized Hotel Guest Room Controls, DR in Data Centers Scoping Study, Mainstreaming AutoDR evaluation, Multivendor HAN Assessment, Zinc-Flow Energy Storage, Wireless Controls and Monitoring for Commercial Buildings (commercial DR), HAN with Communicating Power Strips, and HAN with mobile Apps, HAN with Smart Appliances.

Groundwork was laid for new activities in the following areas: Smart Grid for Buildings, as well as HAN in Smart Home, and Lighting Controls in the newly opened Energy Innovation Center Demonstration Building.

II. Ongoing Projects in 2011 (continuing from 2010)

A. *Multivendor HAN Assessment*

1. Overview

The purpose of this field demonstration is to demonstrate and evaluate technical capabilities of a multi-vendor HAN solution. This project will evaluate off-the-shelf home area network technologies used to manage customer energy usage. Each selected home will have multiple vendors' devices to evaluate technical challenges and assess interoperability. HAN connected devices will include energy management systems, plug load and appliance controllers and Programmable Communicating Thermostats (PCT's). HAN connectivity to a house electric meter will be included. Communications to the home will be through a contractor-hosted web portal with an internet gateway and a ZigBee interface to HAN connected devices. The field demonstration will include up to 12 homes.

2. Collaboration

This project is a collaborative effort with SDG&E's Customer Programs. The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Old equipment that was found to be obsolete in 2010 has been removed or deactivated. Updated, more viable equipment has been identified and lab-tested successfully. Installation and evaluation in homes is partially complete and will continue in 2012. Zigbee network communication between client devices and smart meters turns out prone to instabilities and distance issues even in average-sized homes.

4. Next Steps

Q1 will have remaining installation completed following by home evaluations and surveys. Surveys and evaluations will be immediately followed by review of vendor products; final report is expected in 2012.

B. 100 kW / 150 kWh Zinc-Flow Energy Storage

1. Overview

Premium Power's systems are fully integrated with zinc-bromide ("ZnBr") flow batteries, power electronics, communications, mechanicals, controls and interconnections using UL-certified modular building blocks that can be "racked and stacked" in transportable or stationary configurations. The system will be employed for peak shaving, load management and/or demand response applications. The system will be monitored remotely and data collected for analysis by the project partners.

2. Collaboration

This project is a collaborative effort with California Energy Commission's Public Interest Energy Research Program. Also, PG&E and SDG&E's RD&D teams are contributing to this project. The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Site has been selected. Installation in Q2. Evaluation for at least a year.

4. Next Steps

Install at Site.

C. Centralized Hotel Guest Room Controls

1. Overview

The purpose of this assessment is to gain an understanding of the potential increases in energy efficiency and ability to participate in demand response (DR) events when a hotel uses a centrally controlled room energy management system (EMS). The product to be evaluated in a hotel in San Diego is a centrally controlled energy management system suited for the hospitality industry. The System shall include a smart digital thermostat with infrared occupancy sensor in each guest room and central interface network including server and software to enable EMS functions. The thermostat will be connected to each guest room HVAC unit. Network communications will be via cabling backbone to each guest room. The system will provide centralized control of individual room energy use based upon room sale occupancy allowing the room to be placed in a “deep” energy conservation mode when not occupied or rented and activate load shed mode during DR events.

2. Collaboration

The results will be shared with other investor-owned utilities (IOUs) during scheduled monthly conference calls.

3. Status

The report draft was completed in 2011; however some measurements turned out incomplete or inaccurate and need to be repeated. The project is waiting for summer-like weather conditions to complete measurement and verification.

4. Next Steps

Complete measurement and verification in Q2 or Q3, then update and publish final report on ETCC by Q4 and transfer technology.

D. Wireless Controls and Monitoring for Commercial Buildings

1. Overview

Emerging Technologies plans to assess a wireless technology for a Building Management System to control and monitor common HVAC equipment including AC Packages, Chillers, Boilers, and Thermostats. The solution includes an access point with a 6-mile range on top of the building with Nodes to control each device. Customers can control their devices through the customer interface and cloud computing. Emerging

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technologies team plans to test the system at three sites this year. The sites include large commercial buildings of various types.

2. Collaboration

This project is a collaborative effort with SDG&E's Demand Response Customer Program team and Commercial Account Executives. The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Two test sites have been selected (a large resort, and a local library), and the vendor has installed & commissioned their technology on site. Measurement and verification is in progress. Background research and market analysis for final report have been completed. Preliminary data analysis shows the technology is most promising during summer-like weather.

4. Next Steps

Results of measurement and verification will have to be analyzed and inserted into final report. A third site should be selected, and/or project may need to wait for warmer weather if preliminary results are inconclusive or do not allow for accurate annual predictions. Report and technology transfer into programs are planned for 2012.

E. DR in Data Centers Scoping Study

1. Overview

The overall goal of this project is to improve the understanding of DR opportunities and automation for data centers. The specific project objectives include conducting a set of field tests to evaluate and improve the understanding of the feasibility and adoption of DR in data centers, exploring practical barriers and opportunities, and identifying perceived versus actual risks as well as methods to overcome them. With the feasibility and adoption information, the consultant will determine a set of potential DR strategies to manage data center loads for both site infrastructure (such as HVAC and lighting) and IT infrastructure (including servers and storage).

2. Collaboration

This project is in collaboration with PG&E. The results will be shared with other investor-owned utilities (IOUs) during scheduled monthly conference calls.

3. Status

Site has been selected. Demand Response shedding strategies have been determined.

4. Next Steps

Evaluations have started in Q1. Report in Q2 and Q3.

F. *Mainstreaming AutoDR*

1. Overview

The goal of this project is to facilitate and accelerate the adoption and outreach of Auto-DR both in new construction and in existing buildings, engage industry stakeholders and participation, and provide support to codes and standards.

2. Collaboration

This project is in collaboration with PG&E and SCE. The results will be shared with other investor-owned utilities (IOUs) during scheduled monthly conference calls.

3. Status

Technology and market evaluation, as well as M&V and data processing have been completed.

4. Next Steps

Final report and applicable technology transfer are planned for completion in 2012.

G. *Home Area Network with Smart Appliances Assessment*

1. Overview

The purpose of this project is to assess demand response enabled appliances alongside the home area network (HAN). Appliances include a washer, dryer, dishwasher, stove, microwave, and refrigerator. The DR enabled appliances have a communicating chip preinstalled, and they turn off features of the appliance to reduce demand instead of completely shutting of the appliance. These DR enabled appliances will connect to the HAN, which includes a gateway, programmable communicating thermostat, customer portal, and load controllers. Emerging Technologies will measure load drop during a simulated demand response event. Also, energy efficiency using HAN with Smart Appliances will be compared to

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the previous years without enabling technologies. Vendors have been selected using results from the REMA Study.

2. Collaboration

This project is a collaborative effort with SDG&E's Customer Programs. The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Delivery and installation of appliances has completed. Configuration of "smart" modules is in progress. Measurement and Verification Plan for assessment has been completed. Market Analysis has been partially completed.

4. Next Steps

Measurement & Verification will follow as soon as possible after installation of smart modules. Results analysis and report development will begin as soon as data is available, and are planned for completion in 2012.

H. Home Area Network with Communicating Power Strips Assessment

1. Overview

The purpose of this project is to assess communicating power strips alongside the home area network (HAN). These DR enabled power strips will connect to the HAN, which includes a gateway, programmable communicating thermostat, customer portal, and load controllers. Emerging Technologies will measure load drop during a simulated demand response event. Also, energy efficiency using HAN with communicating powers strips will be compared to the previous years without enabling technologies. Vendors have been selected using results from the REMA Study.

2. Collaboration

This project is a collaborative effort with SDG&E's Customer Programs. The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Installations, functional product evaluation, market reviews, and surveys of home owners have been completed.

4. Next Steps

Compile and analyze results of installation experience and in-home evaluations. All activities including final report and applicable technology transfer are planned for 2012.

I. Home Area Network with Mobile Apps Assessment

1. Overview

The purpose of this project is to assess mobile apps alongside the home area network (HAN). The mobile app can access the HAN energy management system and the HAN, which includes a gateway, programmable communicating thermostat, customer portal, and load controllers. Emerging Technologies will measure load drop during a simulated demand response event. Also, energy efficiency using HAN with Mobile Apps will be compared to the previous years without enabling technologies. Vendors have been selected using results from the REMA Study.

2. Collaboration

This project is a collaborative effort with SDG&E's Customer Programs. The results will be shared with other IOU's during scheduled monthly conference calls.

3. Status

Installations, functional product evaluation, market reviews, and surveys of home owners have been completed.

4. Next Steps

Compile and analyze results of installation experience and in-home evaluations. All activities including final report and applicable technology transfer are planned for 2012.

III. Projects initiated in 2011

A. *Smart Grid for Buildings*

1. Overview

The purpose of this project is to assess a solution to optimize the operation of energy resources against user-defined constraints, including but not limited to economics, reliability, comfort, and safety. In the case of utilities, the solution will interface with conventional and alternative energy generation, energy storage, and energy consumption resources, thereby optimizing and aggregating them into a virtual power plant, capable of meeting financial, reliability and other operational objectives of assets. These assets may range from loads, micro grids, to larger electric distribution feeders and transmission grids.

2. Collaboration

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

3. Status

Vendor and host sites have been selected, proposals and contracting has completed. 8-stage project plan for installation and commissioning has been completed by vendor, to be completed by Q4 2012. Evaluation is presently being planned, and will be ongoing in parallel with vendor activities.

4. Next Steps

Installation is scheduled to begin in Q2 2012, with evaluations beginning in parallel. Evaluation is tentatively scheduled to complete in late 2012. Publishing of final report and technology transfer are scheduled to complete in early 2013.

B. *Energy Innovation Center Demonstration showcase*

1. Overview

The purpose of this project is to develop a demonstrational showcase that exhibits energy saving demand response projects and activities. The showcase will be used for educational purposes and be placed in SDG&E's recently commissioned Energy Innovation Center. The two

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main DR technologies that will be demonstrated will be Home Area Network technology and lighting controls in the EIC.

2. Collaboration

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

3. Status

Technologies in the Smart Home and the Lighting Controls have been installed and showcased. Next is to evaluate their use in Q1 and Q2 as well as adding new technologies.

4. Next Steps

Evaluation in Q3 and Q4

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IV. Budget

SDG&E is on track to accomplish the DR-ET goals as per CPUC D. 09-08-027. SDG&E will be aggressively pursuing the goals of the DR-ET program as described in Section IV E of the Amended Testimony in Support of San Diego Gas & Electric Company's Amended Application for Approval of Demand Response Programs and Budgets for years 2009 through 2011 (A.08-06-002).