



Emerging Markets & Technology Demand Response (DR) Projects

Semi-Annual Report: Q1 – Q2 2012

Table of Contents

Emerging Markets & Technology	1
Demand Response (DR) Projects.....	1
Semi-Annual Report: Q1 – Q2 2012	1
Table of Contents.....	1
I. Summary	3
II. Projects Completed in Q1-Q2 2012.....	5
III. Projects initiated in Q1-Q2 2012	6
A. DR12.01 Demand response opportunities with a Permanent Load Shift System.....	6
1. Overview	6
2. Collaboration	6
3. Status	6
4. Next Steps.....	6
B. DR12.03 Lighting Professional Certification Training Program.....	6
1. Overview	6
2. Collaboration	7
3. Status	7
4. Next Steps.....	7
C. DR 12.05 Mid-Size Commercial Building Market Study.....	7
1. Overview	7
2. Collaboration	8
3. Status	8
4. Next Steps.....	9
D. DR12.06 LED and Advanced Lighting Controls Demand Response Field Test.....	9
1. Overview	9
2. Collaboration	9
3. Status	9
4. Next Steps.....	9
E. DR12.07 Demand Response Partnership Program (DRRP)	9
1. Overview	9
2. Collaboration	10
3. Status	10
4. Next Steps.....	10
F. DR12.09 Augmenting AMI DR with broadband.....	10
1. Overview	10
2. Collaboration	11
3. Status	11
4. Next Steps.....	11
IV. Projects continued in Q1-Q2 2012.....	12
A. DR09.02 Home Battery Pilot (HBP).....	12
1. Overview	12
2. Collaboration	12
3. Status	12

4.	Next Steps.....	12
B.	DR09.08 Expanding Residential DR in the Irvine Smart Grid Demonstration (ISGD) project	13
1.	Overview	13
2.	Collaboration	13
3.	Status	13
4.	Next Steps.....	13
C.	DR10.05 Auto-DR PCT	14
1.	Overview	14
2.	Status	14
3.	Next Steps.....	14
D.	DR10.08 DR Pool Pumps.....	15
1.	Overview	15
2.	Status	15
3.	Next Steps.....	15
E.	DR10.09 DRRC – DR Tools (Task 1)	15
1.	Overview	15
2.	Collaboration	16
3.	Status	16
4.	Next Steps.....	16
F.	DR10.11 DRRC – Mainstreaming Auto-DR (Task 3).....	16
1.	Overview	16
2.	Collaboration	16
3.	Status	17
4.	Next Steps.....	17
G.	DR10.16 Smart Appliances.....	17
1.	Overview	17
2.	Collaboration	17
3.	Status	17
4.	Next Steps.....	17
H.	DR11.01 Ancillary Services Pumping Equipment.....	18
1.	Overview	18
2.	Status	18
3.	Next Steps.....	18
V.	Budget.....	18

I. Summary

As described in Section VII of the Amended Testimony Southern California Edison Company (SCE) 2012-2014 Demand Response (DR) Program Portfolio (A.11-03-003¹) and authorized in California Public Utilities Commission (CPUC) D.12-04-045² Adopting DR Activities and Budgets for 2012 through 2014, SCE Emerging Markets & Technology (EM&T) program executes projects to explore innovative and cost effective DR technologies, understand customer preferences and market potential and provide input on DR codes and standards to enable customer participation in SCE's DR programs. This report is being submitted as directed in Ordering Paragraph 59 of D.12-04-045 to provide semi-annual reports on the projects undertaken through the EM&T program.

SCE is working closely with industry groups, academic institutions, and other utilities to develop a vision for DR, identify technologies that can be leveraged for DR and establish standards for interoperability of DR technologies. The California Investor Owned Utilities (IOUs) meet every month to coordinate, collaborate and share results from each IOUs portfolio of EM&T projects. In the ongoing research efforts to institutionalize and expand DR in California, SCE intends to continue collaborations with other statewide agencies and other parties interested in DR, such as:

- California Energy Commission (CEC)
- Demand Response Research Center (DRRC) at Lawrence Berkeley National Laboratory (LBNL)
- University of California Berkeley's DR Enabling Technology Development Project for which SCE is on the Technical Advisory Council
- Emerging Technologies Coordinating Council (ETCC)
- California Lighting Technology Center (CLTC)
- Electric Power Research Institute (EPRI)
- Open Automated Demand Response (OpenADR) Alliance
- Consumer Electronics Association (CEA)
- U.S. Green Building Council (USGBC)
- Custom Electronic Design & Installation Association (CEDIA)
- West Coast Utility Lighting Team (WCULT)
- International Association of Lighting Designers (IALD)
- Illuminating Engineering Society of North America (IESNA)

The positive results from EM&T advance DR only if those results are communicated to our customers and other stakeholders. As detailed in the following bullets, SCE has implemented several approaches for communicating DR advances across SCE to internal stakeholders like the Business Customer Division's (BCD) Account Managers who can then educate and influence customers to enroll in DR

¹ Amended Testimony Southern California Edison Company 2012-2014 Demand Response Program Portfolio [available at: [http://www3.sce.com/sscc/law/dis/dbattach10.nsf/0/6A869CDA85FA7A75882578A200780C94/\\$FILE/A11-03-003+-+SCE-1+Vol+2+Amended+Testimony.pdf](http://www3.sce.com/sscc/law/dis/dbattach10.nsf/0/6A869CDA85FA7A75882578A200780C94/$FILE/A11-03-003+-+SCE-1+Vol+2+Amended+Testimony.pdf)], pp. 84-102.

² D.12-04-045, Decision Adopting Demand Response Activities and Budgets for 2012 through 2014: [available at: <http://docs.cpuc.ca.gov/PublishedDocs/PUBLISHED/GRAPHICS/165317.PDF>].

programs and adopt DR technologies and strategies. Specific approaches for disseminating information include:

- Customer Information Sheets to aid Account Managers in communicating the opportunities associated with DR technologies and strategies developed by EM&T.
- Integrated Demand Side Management (IDSM) exploration through coordination and collaboration between EM&T and the Customer Energy Efficiency & Solar (CEES) organization, as well as partnering with BCD's Design & Engineering Services (D&ES) to execute EM&T projects utilizing the engineering staff within D&ES.
- Creation of a SCE internal Wiki with information regarding industry trade events attended and current projects. This Wiki is shared company wide to keep other interested groups current on EM&T efforts.
- Quarterly Technology Briefings for BCD representatives by D&ES to communicate the results of EM&T DR and D&ES Emerging Technologies, HVAC Technology and System Diagnostics Advocacy, and Codes and Standards program projects at the Energy Education Center (EEC) in Irwindale, CA.
- DR Forum to help communicate and coordinate DR information across SCE by hosting a distinguished group of industry speakers who have offered varied perspectives on DR-related topics to stakeholders from across the company.
- In addition to the EM&T semi-annual reports provided to the CPUC, full reports on the completed EM&T projects are also available to the public through the ETCC web site (<http://www.etcc-ca.com>). ETCC coordinates among its members including California's IOUs, the SMUD, the CEC, and the CPUC to facilitate the assessment of promising Energy Efficiency (EE) and DR emerging technologies that will benefit California customers and respond to the initiatives outlined in the California Long Term Energy Efficiency Strategic Plan (LTEESP). EM&T also plays a role in planning the DR tracks that are part of the ETCC Summit held every two years.

In 2012, SCE chartered EM&T projects in the following areas:

- Establishing DR capabilities in standard commercial product offerings.
- Development and implementation of DR standards for buildings, appliances and messaging protocols.
- Research into the DR potential of consumer appliances and new construction building codes.
- Research and test energy storage technology for use with distributed generation (DG) and DR.
- Enabling future IDSM policy objectives through:
 - Exploring Home Area Network (HAN) capabilities for DR by participating in the Irvine Smart Grid Demonstration (ISGD) project; and
 - Active participation in the Customer Technology Offering (CTO) group composed of representatives from many SCE groups coordinating IDSM related projects being done throughout SCE.

This report summarizes the results and status for individual projects. The DR project numbers assigned to each project are listed and these can be used to locate specific project documentation on the ETCC web site.

II. Projects Completed In Q1-Q2 2012

2012 marks the beginning of a new funding cycle. Many projects were completed at the end of the previous funding cycle (December 2011). The focus during the first half of 2012 has been initiating new projects and continuing work on existing projects.

III. Projects Initiated In Q1-Q2 2012

A. DR12.01 Demand response opportunities with a Permanent Load Shift System

1. Overview

Electrical energy storage based Permanent Load Shifting (PLS) devices are still an emerging technology. Besides shifting load a PLS could be used to provide DR response resources such as local regulation support for distributed generation sources and short term ancillary services. This project will find a commercial site to field test an advanced PLS system. The PLS system may supply all or part of the commercial site's load and will have an advanced control system allowing the implementation and testing of various advanced DR scenarios in addition to traditional PLS capabilities.

This project will identify technical requirements needed to enhance the basic capabilities of a battery based PLS to perform additional DR functionality. This project will look at investigating and defining telemetry, control and islanding requirements. It will also identify and develop recommendations for any regulatory enhancements to allow an enhanced DR compatible PLS to be installed at a site. At the conclusion of the project a final report will be completed and shared with the findings of this work.

2. Collaboration

This project is being executed in collaboration with SCE's D&ES group with support from the EVTC.

3. Status

Site selection and identification of potential vendors is underway.

4. Next Steps

It is anticipated that a site will be selected by the end of 2012, as well as a vendor identified. Procurement, installation, and testing of the system will be completed in time to deliver a report by year end 2014. The estimated budget for this multi-year project is approximately 1 million dollars.

B. DR12.03 Lighting Professional Certification Training Program

1. Overview

Lighting designers, engineers and architects have not been able to keep up with the rapid development of DR capable lighting systems, and as a result these technologies are rarely specified. This project will develop the curriculum for training lighting professionals to better design and select lighting systems with advanced controls that are DR capable. This program will develop and deliver a focused training curriculum, classes and tests for

lighting professionals and paves the way for a future industry-supported advanced DR lighting design certification programs.

2. Collaboration

This project will leverage the format and structure of the successful California Lighting Contractors Training Program (CALCTP) and will also leverage the financial participation of members of the West Coast Lighting Consortium consisting of:

- New York State Energy Research and Development Authority (NYSERDA)
- Consolidated Edison of New York
- Northwest Energy Efficiency Alliance (NEEA)
- National Grid
- NStar
- Sempra
- Pacific Gas and Electric
- Southern California Edison Emerging Technologies Program
- Southern California Edison Codes and Standards Program

The past success of the CALCTP program will allow for the continued collaboration with the Illuminating Engineering Society of North America (IESNA) and the International Association of Lighting Designers (IALD).

3. Status

This project was initiated in Q2 of 2012. Efforts to date have focused on convening expert working groups to develop an understanding of prospective students and their activities (Jobs Analysis) and what information they need (Book of Knowledge).

4. Next Steps

It is anticipated that the analyses will be completed by the end of 2012, allowing for curriculum development, as well as alpha and beta classes to be completed in 2013.

C. DR 12.05 Mid-Size Commercial Building Market Study

1. Overview

The mid-size commercial building market (200-499kW) consumes approximately 7.1% or 4,739 GWh of energy used in the State of California. Traditionally this market has not participated significantly in utility DR or ISDM programs. This project will characterize this market and help guide utility program development for it. This project will help in easing adoption of implementation of future DR and ISDM programs with an anticipated DR load reduction of 10-15%. This project will concentrate on understanding the

market, performance and technical understanding and will provide both program marketing and technical recommendations to further the adoption of DR programs in this segment. In particular it will:

- Identify and document the organizational structure, decision drivers and roles and responsibilities for key market actors with direct or indirect influence over energy consumption;
- Identify main market barriers including economic, market, informational and behavioral barriers;
- Identify main market drivers including certifications and tools most often used advance DR improvement at the building or portfolio level;
- Identify overall building performance that can be expected in terms of energy and peak power use;
- Identify DR capabilities and telemetry in this segment including:
 - Lighting and mechanical systems and controls;
 - Building energy management systems;
- Analyze Tenant Space and operating practices to determine practices which will promote DR adoption; and
- Document this segment's improvement history and planning including capital and operational improvements.

2. Collaboration

This project will be completed with the West Coast Lighting Consortium and it also leverages the financial participation of the following entities:

- Northwest Energy Efficiency Alliance (NEEA)
- California Lighting Technology Center (CLTC)
- British Columbia Hydro
- San Diego Gas & Electric
- Pacific Gas & Electric
- Southern California Edison Energy Efficiency Programs
- Southern California Edison Emerging Technologies Program

3. Status

This project was initiated in Q2 2012 and has completed the first phase of the research, literature review. The project is continuing on with the second and third phases; site data collection and program recommendations, respectively.

4. Next Steps

It is anticipated that this project will be completed by December 2012 and a final report posted to the ETCC web site during January of 2013.

D. DR12.06 LED and Advanced Lighting Controls Demand Response Field Test

1. Overview

LED based lighting has already proven itself as a highly energy efficient light source. Unlike fluorescent or compact fluorescent technologies, LEDs are easily dimmable and controllable using low cost electronics and telemetry. This project will identify and field test advanced LED lighting and controls at five fast food service field sites. Initially the existing lighting systems will be evaluated to provide a baseline. Once evaluated, the appropriate new LED lighting systems will be installed for each site and will support or enhance the requirements of the food service establishment that they are installed in. The systems will be able to adjust their light levels based on local environmental conditions, occupancy, and day lighting. Additionally the new lighting systems will be able to respond to DR notifications and events using open DR protocol such as OpenADR. This research will result in a report on the DR opportunities, energy savings, economic benefits, and market potential of the LED lighting market.

2. Collaboration

SCE will collaborate with the CLTC to evaluate the energy savings, DR capabilities and market potential for recessed LED lighting systems for the food service sector. The project is also being co-funded by SCE's Emerging Technologies Program.

3. Status

This project began early in 2012 with site selection. Customer agreements are in place with field test sites ready for installation.

4. Next Steps

LED lighting systems will be installed at test sites during Q3 of 2012 with testing and a final report completed by the end of 2012.

E. DR12.07 Demand Response Partnership Program (DRRP)

1. Overview

As a result of efforts by the IOUs and LBNL, Automated Demand Response is being piloted as a point for Leadership in Energy and Environmental Design (LEED) for both new and existing non-residential buildings. If adopted in late 2012 this will encourage building owners to add demand response capabilities to their facilities.

There are approximately 1,400 LEED certified buildings in SCE's service territory representing 18 million square feet. It is estimated that 58% of these buildings could earn the LEED DR credit immediately. Demand reduction will vary by building size and type; however, the initial requirement of the LEED DR point is to achieve a minimum reduction of peak energy use of 10% or 20 kW, whichever is greater.

The establishment of LEED DR credit will benefit the building owner, lower energy use and help spark more development of DR technologies.

2. Collaboration

SCE will team with the U.S. Green Building Council (USGBC), the Environmental Defense Fund (EDF) and the Demand Response Research Center (DRRC) at LBNL to complete the project objective of refining the LEED DR credit.

Tasks include:

- Outreach to LEED certified building owners through telephone, webinars, USGBC meetings.
- Research market adoption, grid reliability and overall environmental impact.

Internally, EM&T will be working with SCE's Account Managers, New Construction Services, and D&ES to achieve the objectives of this project.

3. Status

The contract with USGBC was completed early in 2012 and the project plan is currently being finalized.

4. Next Steps

It is anticipated that the execution of this project will begin during the second half of 2012 and run through December 2013.

F. DR12.09 Augmenting AMI DR with broadband

1. Overview

According to the US Census 63.5% of US Households in 2009 have broadband Internet access. This along with the anticipated release of Smart Energy Profile 2.0 (SEP) which is Internet protocol compatible make augmenting the Advanced Metering Infrastructure (AMI) with broadband a logical second path for the delivery of Demand Response signals. This project will investigate this path of communication, determine vendors of "gateways" that can support bridging Smart Meters and the Internet to various devices and protocols, and finally demonstrate using it to deliver DR signals and services.

To fully be able to demonstrate the bridging of various DR protocols and physical transport media such as ZigBee and WiFi, this project will undertake the search to find a device, or devices, which can interoperate between the Home Area Network (HAN)

which is delivered to the home via the Smart Meter and the Home Network (HN) which is the home's broadband (Internet) service. This gateway should be available to:

- Bridge Zigbee SEP 1.x communication from the Smart Meter to WiFi SEP 2.0
- Bridge Zigbee SEP 2.0 communication from the Smart Meter to WiFi SEP 2.0
- Bridge Zigbee SEP 1.x communication from the Smart Meter to ZigBee SEP 2.0
- Bridge Zigbee SEP 2.0 communication from the Smart Meter to ZigBee SEP 1.x
- Bridge WiFi SEP 2.0 communication from the Internet to SEP 2.0
- Bridge WiFi SEP 2.0 communication from the Internet to SEP 1.x

This minimal set of functionality will enable various types of HAN devices to receive DR notifications either through the AMI or the home's broadband connection. It will also allow existing Smart appliances with previous versions of SEP to be able to continue to respond to SEP 2.0 based DR notifications.

At time of this writing, SEP 2.0 is only in draft state and has not been finalized or ratified.

2. Collaboration

This project is being completed in cooperation with SCE's Advanced Technology Organization.

3. Status

This project began early in 2012 and has identified the requirements for potential gateway products as well as vendors that may be able to provide devices.

4. Next Steps

It is anticipated that an RFI will be sent to potential vendors during Q3 of 2012 with testing, field trial, and pilot phases to follow throughout 2013 and 2014.

IV. Projects Continued In Q1-Q2 2012

A. DR09.02 Home Battery Pilot (HBP)

1. Overview

The primary objective of this project, which began in 2009, is to evaluate and test automotive grade advanced lithium-ion battery modules for use as a Residential Energy Storage Unit (RESU). The goal is to evaluate the potential of using in-home batteries during DR events or localized distribution constraints to decrease customer impact, while still alleviating demand on the power grid. A more detailed explanation of this project can be found in Appendix K³ of SCE's amended testimony in support of its 2009-2011 DR application (A.08-06-001).

2. Collaboration

The HBP project is a collaborative effort with SCE's Electric Vehicle Test Center (EVTC) in Pomona, California, leveraging their expertise with lithium-ion batteries.

3. Status

LG Chem was selected as the vendor to provide the RESU. A prototype device was received in December of 2010 and extensive lab testing has been performed. During 2011, two pre-production units and fourteen additional units were received with increased functionality and several other improvements, including web control. These production units went through the complete series of RESU tests and SCE's energy storage specialists have worked with LG engineers to resolve issues discovered during testing. Unfortunately, UL certification has been delayed leading to a delay in field testing and the need to continue funding this project into the next funding cycle. SCE's Advice 2685-E was approved, allowing the continuation of this project into the 2012-2014 funding cycle. Initial UL testing was positive and it is expected that full UL certification will be achieved by the end of 2012.

4. Next Steps

Necessary design changes have been made and UL certification is anticipated by late-2012. Once the RESU's have UL certification, the field testing phase of the project will proceed. At the conclusion of field testing, a final report will be written to provide information regarding the feasibility of using these types of batteries as a DR resource and any additional learning gained as a result of this project. Additional RESU's will

³ SCE's Amended Testimony in support of its 2009-2011 DR application (A.08-06-001), Appendices A through M [available at: [http://www3.sce.com/sscc/law/dis/dbattach1e.nsf/0/DBCA190DAE972CEB882574C90070C520/\\$FILE/A.08-06-001+2009-11+DR+Amended+App_SCE-04++Appendices+A-M.pdf](http://www3.sce.com/sscc/law/dis/dbattach1e.nsf/0/DBCA190DAE972CEB882574C90070C520/$FILE/A.08-06-001+2009-11+DR+Amended+App_SCE-04++Appendices+A-M.pdf)], pp. 449-455.

also be included as part of the ISGD project and will receive additional testing in several homes in the Zero Net Energy (ZNE) and RESU blocks.

B. DR09.08 Expanding Residential DR in the Irvine Smart Grid Demonstration (ISGD) project

1. Overview

SCE has been exploring how to capitalize on the Edison SmartConnect[®] metering and HAN deployment to further enable residential DR in coordination with EE and distributed energy resources. To further this goal, EM&T provided some of the “matching funds” allowing SCE to leverage funding from the American Recovery & Reinvestment Act (ARRA) in SCE’s proposal for the ISGD project awarded by the DOE.⁴ The ISGD project will demonstrate potential EE and DR approaches to enable Zero Net Energy (ZNE) homes in step with California’s LTEESP. Several groups of homes will receive different treatments including a ZNE group, a group utilizing Community Energy Storage, and a group utilizing individual RESUs. The two major areas of this project are the DR potential of residential HAN devices and the HBP.

2. Collaboration

This project is a collaborative effort with SCE’s Transmission and Distribution Unit (TDBU) Advanced Technology Organization and BCD D&ES. This project also collaborates with the DOE in support of their larger, Smart Grid demonstration efforts.

3. Status

The HAN devices installed as part of the early field test have continued to be monitored. An update to the system that enables testing of DR events resulted in it being offline for a period of time, but it is available again for additional DR testing planned during the second half of the year. Due to delays associated with this project, a request to continue activities and funding was granted in the approval of SCE’s Advice 2685-E.

4. Next Steps

An IHD and PCT from a second vendor will be installed and DR testing will be performed during 2012. Additional HAN devices including gateways, smart appliances, plug load monitors, and RESUs will be procured, tested, and installed in anticipation of the primary testing phase of the project in 2013.

⁴ Department of Energy Recovery Act State Memos [available at: http://energy.gov/sites/prod/files/edg/recovery/documents/Recovery_Act_Memo_California.pdf].

C. DR10.05 Auto-DR PCT

1. Overview

The purpose of this project is to demonstrate the capability of a PCT using Auto-DR through the OpenADR specification. This solution is intended for commercial customers without a building or energy management system (BMS/EMS). The project goal is to offer a solution that provides some automated air-conditioning load reduction for commercial and industrial customers during Critical Peak Pricing (CPP), or other DR, events by enabling temperature setbacks, without the expense of a full BMS/EMS.

2. Status

An OpenADR compatible PCT was identified during 2010 and procurement of the device was completed in early 2011. These devices were tested in a lab setting during several actual DR events throughout the summer of 2011. The PCTs worked as anticipated, but a need to improve the provisioning of the PCT allowing it to be uniquely tied to a specific customer was identified that required an update to the equipment and the associated software. During 2011 an additional vendor contacted SCE with a similar solution and it was decided to move forward with a field test of both solutions. The procurement and contracting process was completed for both solutions during 2011 and the field testing phase is scheduled for the summer of 2012. Due to the addition of a second vendor and updates needed to the original vendor's equipment, a request to continue activities and funding for this project was granted in the approval of SCE's Advice 2685-E. The second vendor selected made a strategic decision to not support the products identified and the purchase order with them has been cancelled. However, an alternate solution was identified that supports both the existing OpenADR 1.0 specification and the new OpenADR 2.0 specification. Procurement and testing of this alternate solution is underway with plans to field test both solutions by the end of 2012.

3. Next Steps

Next steps include the following:

- Finalize selection of customer sites to participate in the field trial.
- Install PCT's at selected sites.
- Monitor PCT functionality during summer DR events.
- Prepare a final report on the results of the field trial utilizing OpenADR 1.0.

SCE will upgrade to support OpenADR 2.0 early in 2013 and additional testing will be completed with the Auto-DR PCT solution that supports both OpenADR specifications.

The final report on this solution will be completed by the end of 2013 following summer testing at the sites participating in this field trial

D. DR10.08 DR Pool Pumps

1. Overview

The purpose of this project is to perform laboratory and field tests of commercially available pool pumps and pool pump controllers that are designed to enable curtailment of pool pump loads in response to DR event signals or pricing signals. This is a follow up to prior studies that estimated the potential for residential pool pumps to act as a DR resource. These were:

- Pool Pump Demand Response Potential⁵; and
- Integration of DR into Title 20 for Residential Pool Pumps⁶

This project will include field trials of a pool pump with integrated DR capabilities, as well as retrofit solutions that would add DR capabilities to existing pool pumps.

2. Status

After initial implementation plans were created, the selected vendor designing the pool pump with integrated communication experienced some delays. The obstacles encountered have been overcome and plans are moving forward to complete the project in 2012. A request to continue activities and funding for this project was granted in the approval of SCE's Advice 2685-E.

A retrofit solution compatible with any existing pool pump has been identified and procurement of this equipment is underway with a planned field trial during the second half of 2012. The pool pump with integrated communication has been tested in SCE's HAN lab and a production ready version is being developed for the field trial.

3. Next Steps

Next steps include, completing the field trial of integrated and retrofit pool pump solutions according to plans and creating reports which document the results of each solution.

E. DR10.09 DRRC – DR Tools (Task 1)

1. Overview

The purpose of this project is to improve the software tools available for estimating DR potential in commercial buildings. The project includes two major tasks with separate

⁵ Pool Pump Demand Response Potential [*available at: <http://www.etcc-ca.com/reports/pool-pump-demand-response-potential>*].<http://www.etcc-ca.com/reports/pool-pump-demand-response-potential>].

⁶ Integration of DR into Title 20 for Residential Pool Pumps - Phase 1 [*available at: <http://www.etcc-ca.com/reports/integration-dr-title-20-residential-pool-pumps-phase-1>*].

deliverables. Task 1 is included in this section of the report, Task 2, the development of a statewide DR database was reported on in 2011 when it was completed:

a) Task 1 - Scoping Study

This project includes a review of the literature on existing DR tools being used or under development and the creation of a framework to evaluate tools and categorize them for a variety of users. This will include a summary of metrics and building characterization parameters that allow facility managers to better understand their building's energy consumption.

2. Collaboration

This project is a collaborative effort with the DRRC and the IOUs to enhance the tools available for understanding and furthering the adoption of Auto-DR at commercial sites.

3. Status

This project will be completed by the end of 2012. A request to continue activities and funding for this project was granted in the approval of SCE's Advice 2685-E.

4. Next Steps

Next steps are to continue to monitor Task 1 to ensure completion on schedule.

F. DR10.11 DRRC – Mainstreaming Auto-DR (Task 3)

1. Overview

The purpose of this project is to facilitate and accelerate the adoption of Auto-DR both in new construction and in existing buildings. The project included three major tasks with separate deliverables. Task 3 is included in this section of the report since Tasks 1 and 2 have been completed, and are included in the earlier sections:

a) Task 3 - Evaluation of load shape changes/shed attenuation

Demand reductions vary with each event and sometimes demand reductions decrease over time. The DRRC will go through a selected number of audits and estimations done by various engineering firms and compare performance of the buildings over time with the initial estimation in order to evaluate how demand reduction performance changes over time.

2. Collaboration

This project is a collaborative effort with the DRRC and the IOUs to improve the understanding and adoption of Auto-DR in the market.

3. Status

Delays in securing the data needed by the DRRC to complete this project prevented it from being finalized in 2011. This project will be completed by the end of 2012. A request to continue activities and funding for this project was granted in the approval of SCE's Advice 2685-E.

4. Next Steps

Continue monitoring Task 3 to ensure completion on schedule.

G. DR10.16 Smart Appliances

1. Overview

This project will perform laboratory testing of “smart appliances” from several manufacturers to quantify the DR potential for curtailing load during DR events or upon receipt of a pricing signal. These tests will be done in a controlled lab environment and will provide an opportunity to see first hand how “smart appliances” react to price and DR event signals. Additionally, the results of this study can be used to inform various DR capable appliance efforts underway (e.g., Energy Star connected appliance effort).

2. Collaboration

This project is a collaborative effort with several major appliance manufacturers to test DR potential of smart appliances utilizing SCE's D&ES lab facilities and staff.

3. Status

Initial testing of a “smart” clothes washer was performed during 2011. Some minor updates were made to lab facilities to allow for testing of multiple appliances at once. Currently a refrigerator, dishwasher, and another clothes washer are being tested for DR potential.

4. Next Steps

Delays with getting contracts and Non-Disclosure Agreements (NDAs) in place with manufacturers, acquiring equipment for testing and working with specific manufacturers to create appropriate test cases resulted in the need to continue this project during 2012. Two additional refrigerators and a third clothes washer from several vendors have been received and are scheduled for testing by the end of 2012. In an effort to determine trends, a final report will be created at the conclusion of testing which utilizes data collected from all the tests.

H. DR11.01 Ancillary Services Pumping Equipment

1. Overview

The purpose of this project is to evaluate the potential of customers with pumping equipment to participate in an Ancillary Services DR program. The planning for this project began in 2010 and included market research to determine customer willingness to participate in a program that has short event notifications and durations (e.g., customers must respond within 10 minutes and the events last no longer than 30 minutes). Market research completed by Global Energy Partners recommended that SCE pursue an Ancillary Services DR program for pumping customers as a potential replacement or complementary program to the existing Agricultural Pumping Interruptible (AP-I) DR program which is subject to a MW limit on the amount of emergency DR statewide. Initial projections are that by 2014 approximately 6% of Agricultural and Pumping customers could be participating in an Ancillary Services program.

2. Status

During 2011 several potential technology vendors were identified and the capabilities of each potential solution were evaluated. Two complementary technology vendors have been selected as partners on this project. A potential field trial site has also been selected and visited by SCE and one of the partners. Terms and conditions are currently in negotiation with the vendor partners and a customer agreement is being reviewed by the potential test site.

3. Next Steps

This project will be implemented in several phases testing different communication methods and increasing levels of integration with SCE's DR capabilities and future programs (Ancillary Services). Installation of equipment and completion of the first phase of testing is scheduled for the Fourth quarter of 2012 with the remaining phases to be completed by the end of 2013.

V. Budget

Emerging Markets and Technology Recorded Expense – 2012-2014 (\$)						
Line No.	Expense Type	2012 (Q1-Q2)	2013	2014	2012-2014 Totals	2012-2014 Authorized Funding
1	Labor	\$470,758			\$470,758	
2	Non-Labor	\$900,897			\$900,897	
3	Total 2012-2014	\$1,371,655			\$1,371,655	\$7,303,969
4	2011 Carryover	\$99,733			\$99,733	\$4,200,000
5	Total	\$1,471,388			\$1,471,388	\$11,503,969