BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking to Consider Smart Grid Technologies Pursuant to Federal Legislation and on the Commission's own Motion to Actively Guide Policy in California's Development of a Smart Grid System.	Rulemaking 08-12-009 (Filed December 18, 2008)

SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) ANNUAL REPORT ON THE STATUS OF SMART GRID INVESTMENTS

KRIS G. VYAS
WALKER A. MATTHEWS, III

Attorneys for
SOUTHERN CALIFORNIA EDISON COMPANY

2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770
Telephone: (626) 302-6879
Facsimile: (626) 302-6997
E-mail: walker.matthews@sce.com

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In Ordering Paragraph 15 of Decision 10-06-047, the California Public Utilities Commission ordered Southern California Edison Company (SCE), Pacific Gas and Electric Company, and San Diego Gas & Electric Company to file annual reports in Rulemaking 08-12-009 concerning the status of their respective Smart Grid investments. SCE hereby files its annual report on the status of its Smart Grid investments for the period of July 1, 2013 to June 30, 2014 (Reporting Period). This is SCE's third annual report, which is attached as Appendix A.

Respectfully submitted,

KRIS G. VYAS
WALKER A. MATTHEWS, III

/s/ Walker A. Matthews, III
By: Walker A. Matthews, III

Attorneys for
SOUTHERN CALIFORNIA EDISON COMPANY

2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770
Telephone: (626) 302-6879
Facsimile: (626) 302-6997
E-mail: walker.matthews@sce.com

October 1, 2014

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I. Executive Summary

California's landmark Smart Grid legislation, Senate Bill (SB) 17, established that "[i]t is the policy of the state to modernize the state's electrical transmission and distribution system to maintain safe, reliable, efficient, and secure electrical service, with infrastructure that can meet future growth in demand and achieve" various goals aimed at a cleaner energy future, energy efficiency, and more engaged customers.[1] SB 17 mandated that electric utilities submit smart grid deployment plans to the California Public Utilities Commission (CPUC or Commission) for approval. Southern California Edison Company (SCE) timely submitted its Smart Grid Deployment Plan on July 1, 2011.[2] The Commission ruled on these plans during their July 25, 2013 business meeting, voting unanimously to approve the plans submitted by the electric utilities.[3]

Also, SB 17 recognized the Commission as a Smart Grid expert, and required that the Commission report annually to the Governor and the Legislature "on the commission's recommendations for a smart grid, the plans and deployment of smart grid technologies by the state's electrical corporations, and the costs and benefits to ratepayers."[4] In turn, the Commission ordered the California investor-owned electric utilities (IOUs) to provide an annual update on the status of their Smart Grid investments.[5] SCE submitted its inaugural annual update report to the Commission on October 1, 2012. In this report, SCE (in compliance with D. 10-06-047) explained the following: (1) deployment of Smart Grid technologies; (2) progress toward meeting the utility's Smart Grid Deployment Plan; (3) the costs and benefits to ratepayers, where such assessments were feasible; (4) current deployment and investment initiatives; (5) updates to security risk and privacy threat assessments; and (6) compliance with security rules, guidelines, and standards.[6] This update reflected a reporting period of July 1, 2011 through June 30, 2012. Subsequent to this filing, the Commission issued D. 13-07-024. That decision, among other things, adopted the reporting format used by the IOUs for their inaugural annual reports.

In this latest annual update to the Smart Grid Deployment Plan, SCE provides an update to cover the most recent reporting period of July 1, 2013 through June 30, 2014 (Reporting Period). Through this Smart Grid Deployment Plan Update, SCE complies with its reporting obligation and assists the Commission in developing the Commission's own annual report to the Governor and the Legislature.

In the Smart Grid Deployment Plan, SCE described its deployment baseline and its vision for the Smart Grid. This Update details SCE's progress on specific projects. There are six types of projects:

1. Customer Empowerment;
2. Distribution Automation/Reliability;

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[1] Pub. Util. Code § 8360.
[2] *See* Application (A.) 11-07-001.
[3] Decision (D.) 13-07-024.
[4] PUB. UTIL. CODE § 8367.
[5] Decision (D.) 10-06-047, Ordering Paragraph 15.
[6] *Id.*

3. Transmission Automation/Reliability;
4. Asset Management & Operation Efficiency;
5. Security; and
6. Integrated & Cross-Cutting Systems.

SCE's **Customer Empowerment** efforts provide customers with information regarding their energy usage, as well as programs, rates, and technologies to enable energy conservation and peak load reductions. This energy information (e.g., interval usage data, near real-time information, event notifications) will enable the capabilities of home area network (HAN) devices and will allow customers to participate in time-variant rates. These customer-oriented efforts will also provide information accessible in a variety of ways (e.g., web, mobile devices, HAN devices) to customers and authorized third-party service providers. From July 1, 2013 to June 30, 2014, SCE conducted various customer empowerment initiatives, including:

- Continued development of the Energy Service Provider Interface (ESPI), a technology platform and infrastructure to enable third parties, when authorized by a customer, to receive that customer's usage data;
- Continued implementation of "Green Button", which enables customers to access their energy information from SCE's website;
- Continued initiation of the Edison SmartConnect Field Trials, in which SCE is testing various HAN capabilities and qualitatively assessing customer behavioral impacts; and
- Testing residential energy storage system components related to end-to-end demonstration of Smart Grid at SCE's Irvine Smart Grid Demonstration site.

Distribution Automation/Reliability (DAR) projects improve information and control capabilities for distribution systems. These projects focus on distribution challenges posed by distributed energy resources and clustered electric vehicle charging. DAR projects also mitigate outages by developing self-healing circuit technology. As part of DAR, SCE continued to deploy assets for its Geographical Information System, which will provide a consolidated solution to manage safety, reliability, and compliance obligations. Additionally, SCE has successfully completed the selection of the pilot site for its Distribution Energy Storage Integration Program, which will help SCE evaluate how energy storage systems interact with the rest of its grid and help guide the development of safe operating parameters and protocols.

Transmission Automation/Reliability (TAR) projects address similar issues on the transmission system. These projects allow us to incorporate utility-sized intermittent power generation such as solar and wind energy in a safe and reliable manner. TAR projects also enhance data collection and automation to prevent wide-scale blackouts. For example, SCE is designing a Centralized Remedial Action Scheme (CRAS) to address increased interconnection complexities. During this Reporting Period, SCE completed the construction of the Central Controller for CRAS. Additionally, as part of TAR, the battery energy storage system (BESS) commissioning activities were completed, which starts the 2-year demonstration period for SCE's Tehachapi Wind Energy Storage Project.

Asset Management & Operation Efficiency projects improve the efficiency of grid operations. These projects identify infrastructure replacements based on asset health rather than time in service; the projects help prevent critical equipment failure. As an example, SCE successfully tested online monitoring of transformers at 500 and 230 kilovolt (KV) substations using Dissolved Gas Analysis technology.

Security projects address both cyber and physical security. These projects address the increased security requirements associated with developing, implementing, operating, and managing Smart Grid systems and assets. SCE is developing security solutions and integrating them into its Smart Grid demonstration projects. As part of its efforts related to security, SCE has developed a Common Cybersecurity Services (CCS) platform to protect its grid infrastructure. During the Reporting Period CCS underwent Factory Acceptance Testing of its integration with SCE's syncrophasor deployment from a cybersecurity and NERC-CIP V5 compliance standpoint.

Finally, **Integrated & Cross-Cutting Systems** refer to projects that support multiple Smart Grid domains (e.g., communications). An integrated approach creates a platform to deliver benefits across utility operations and share those benefits with customers. Integrated systems also enable information sharing between the utility, service partners, and customers. SCE's Advanced Technology Labs are part of this category and provide SCE engineers with an integrated environment to test the spectrum of Smart Grid projects, from renewable generation to substation automation to plug-in electric vehicles (PEVs).

With respect to benefits, these projects are intended to provide benefits to customers in the form of better system reliability, improved safety and security, increased customer choice and reduced costs. The Department of Energy's Office of Electricity Delivery and Energy Reliability (DOE) developed a methodology to quantify Smart Grid benefits as part of the American Recovery and Reinvestment Act effort. For purposes of this report, SCE's benefits calculation is based on DOE's methodology, which has been tailored to SCE's operating environment. SCE is hopeful that this model will reasonably estimate the monetary value of its Smart Grid investments. SCE, Pacific Gas & Electric Company (PG&E) and San Diego Gas & Electric Company (SDG&E) are working to develop a more consistent methodology.

It is worth noting that SCE's Smart Grid vision also carries with it risks and challenges. As noted in previous updates, the grid was initially designed to carry power in one direction from the generator to the end use consumer. Changes in state and federal energy policy (e.g., distributed generation and energy storage) are causing utilities to rethink the initial design and develop a means to create a more flexible delivery system that remains safe, affordable and reliable. This will likely include a transition from more conventional technologies to smarter, computer-based assets , capable of communicating and optimizing. This update details SCE's continued activities toward these goals. Importantly, this transition will be more cost-effective if the technologies are based on common standards. As SCE has maintained since Phase 1 of the Smart Grid OIR (R.08-12-009), standards are necessary to ensure interoperability and maximize market participation.

The importance of cybersecurity to the utility industry and to SCE has increased as systems and data have become more integral to business operations, and as cyber threats continue to grow in number and sophistication. SCE continues to work with the defense and intelligence communities and has developed a Common Cybersecurity Services (CCS) platform to address increased system needs and cybersecurity threats. In short, CCS uses protocols used in defense and intelligence applications and tailors them to specific devices, device classes, and locations for utility purposes. CCS is designed to satisfy various cybersecurity protocols, including the North American Electric Reliability Corporation's (NERC) Critical Infrastructure Protection (CIP) standards and the National Institute of Standards and Technology's (NIST) requirements.

As part of its smart grid efforts, SCE proactively engages with and educates residential customers, business customers, governmental entities, and other stakeholders. During the Reporting Period, SCE continued to inform customers about online energy management tools and services, develop an outage application for smart phones, and enroll customers in the Save Power Day program. SCE also provided marketing, education and outreach to its customers regarding to its Summer Discount Plan, web presentment tools, time-of-use (TOU) rates (including rates for plug-in electric vehicles), Budget Assistant, and Save Power Day programs.

In sum, SCE continued to advance its Smart Grid initiatives, consistent with the requirements of SB 17 and D. 13-07-024. SCE will continue to work in concert with the Commission, fellow utilities, and stakeholders to modernize the grid in support of state and federal energy policy objectives.

II. Plan Update

2.1 Proceedings

Per the Commission's Smart Grid Order Instituting Rulemaking (OIR)[7], SCE submitted its Deployment Plan application.[8] SCE's Deployment Plan was approved by the Commission on July 25, 2013. SCE presents its 2014 Annual Update on the progress of its smart grid projects and initiatives in accordance to the Commission's report template, adopted as part of the Commission's Decision Approving the Smart Grid Deployment Plan.[9]

SCE's decision to invest in Smart Grid technologies and fund their deployment is significantly affected by the policy environment in which it operates. This section provides a summary of key state and federal regulatory proceedings and legislative activities impacting or with the potential to impact SCE operations.

The most significant proceeding affecting Smart Grid efforts is the General Rate Case (GRC), because the GRC provides SCE with the base funding and authorization to perform Smart Grid-related work. SCE

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[7] R.08-12-009.
[8] A.11-06-006.
[9] Decision (D.)13-07-024.

submitted its most recent GRC Application[10] on November 12, 2013. As of the end of the Reporting Period, this application is still open.

On May 5, 2014, the Commission issued Decision (D.)14-05-016 in Phase 3 of the Smart Grid Rulemaking, which adopts rules to provide access to energy usage and usage-related data to local governments, researchers, and state and federal agencies. The Decision requires the IOUs to publish on their websites customer usage data aggregated by zip code; establishes a standard process for submitting and fulfilling data requests from local governments, qualified research institutions, and state and federal agencies; and includes a non-disclosure agreement that assigns liability for breaches of data security.

Within the Energy Storage rulemaking,[11] the Commission issued D.13-10-040, *Decision Adopting Energy Storage Procurement Framework and Design Program.* The decision established the policies and mechanisms for procurement of electric energy storage pursuant to AB 2514, setting an energy storage procurement target for SCE, Pacific Gas and Electric Company, and San Diego Gas & Electric Company (SDG&E) (collectively, the IOUs) of 1,325 MW by 2020. Furthermore, the decision directs the IOUs to file separate applications containing a proposal for their first energy storage procurement period by March 1, 2014. SCE submitted its “Application of its 2014 Energy Storage Procurement Plan” and associated testimony on February 28, 2014.[12]

The Electric Program Investment Charge (EPIC) program replaces the expired public goods charge and provides funding for applied research and development, technology demonstration and deployment, market support, and market facilitation of clean energy technology. Pursuant to the Commission’s Phase II Decision,[13] SCE has submitted two three-year investment plan applications: (1) addressing investments in years 2012-2014 on November 1, 2012[14] and (2) addressing investments in years 2015-2017 on May 1, 2014.[15] The CEC, PG&E and SDG&E filed similar applications and combined with SCE are known as the EPIC Administrators. On November 14, 2013, the Commission issued D.13-11-025 approving the EPIC Administrators’ first three-year investment plan applications. The decision sets the collection of EPIC funds at $162 million, collected from the ratepayers of PG&E (50.1%), SCE (41.1%) and SDG&E (8.8%).

The 21st Century Energy Systems Project (CES-21) is a proposed $35 million, five-year cooperative research and development agreement[16] between SCE, PG&E , SDG&E and Lawrence Livermore National Laboratory (LLNL) to address cybersecurity and grid integration issues. On March 27, 2014, the

10 Application (A.) 13-11-003.
11 R.10-12-007.
12 A.14-02-009
13 D.12-05-037.
14 A.12-12-004.
15 A.14-05-005
16 A.11-07-008.

Commission issued D.14-03-029, approving the CES-21 Program. Importantly, the decision modifies D.12-12-031 to conform to recent California Legislation, SB 96.[17]

On September 25, 2013, the Commission issued R.13-09-011 to enhance the role of DR in meeting California's resource planning needs and operational requirements. The Rulemaking will establish policies to inform future DR program design. SCE was party to a proposed settlement filed on August 4, 2014 that would resolve the majority of the policy issues in the proceeding. SCE's next DR funding application, for the 2017-2019 period, is currently due on November 30, 2015.

SCE continues to participate in the Commission's Alternative-Fueled Vehicle (AFV) rulemaking.[18] SCE and other stakeholders have continually collaborated to develop a submetering protocol during Phase 4. On November 14, 2013, the Commission issued D.13-11-002, modifying the requirements for the development of plug-in electric vehicle submetering protocol, adopting and Energy Division Staff Roadmap for a two-phased pilot project and extending until September 30, 2015, the deadline for the IOUs to submit a final proposal for the submetering protocol. Subsequent to the aforementioned decision, the Commission issued an Order Instituting Rulemaking to consider alternative-fueled vehicle programs, tariffs, and policies.[19] This rulemaking will continue the work started in R.09-08-009, to support California Executive Order B-16-2012, which sets a target of 1.5 million zero-emission vehicles on the roads in California by 2025.[20] The rulemaking has three phases: Phase 1 is focused on policy issues like utility ownership of PEV infrastructure, Phase 2 discusses bidirectional flow for vehicle-grid integration, and Phase 3 addresses rate and financing issues.

In addition to Commission proceedings and filings, smart grid deployment is also affected by federal regulatory decisions, such as the CIP standards developed by the NERC and adopted by the Federal Energy Regulatory Commission (FERC). CIP standards set a regulatory cybersecurity framework for protecting SCE's critical assets. On November 21, 2013, FERC approved NERC CIP Version 5.

Additionally, SCE is actively evaluating the impact of complying with NERC Reliability Standard CIP-014-1 (Physical Security) requirements for its bulk electric system to comport with pending legislation SB 699. Reliability Standard CIP-014-1 was submitted by NERC to FERC for approval on March 7, 2014. The purpose of CIP-014-1 is to enhance physical security measures for the most critical Bulk-Power System against physical attacks.[21]

SCE is committed to supporting state and federal energy policy objectives. Moreover, SCE is committed to making its grid smarter, and maintaining reliability while improving interoperability through new technologies that can accommodate disparate generation at a reasonable price. However the rate at

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17 CA Senate Bill 96 reduced the program budget from $150 million to $35 million, limited the scope to cybersecurity and grid integration, eliminated the CES-21 Governance Board, and requires LLNL to validate that the cybersecurity project is truly incremental and does not duplicate existing efforts.

18 R.09-08-009.

19 R.13-11-007.

20 California Executive Order B-16-2012 was issued on March 23, 2012.

21 On July 17, 2014 FECR issued a Notice of Proposed Rulemaking to approve CIP-014-1.

which SCE is able to study, test, deploy and enable smart grid technology is largely dependent upon the pace and outcome of regulatory processes and proceedings.

2.2 Benefits

In this section, SCE provides an estimate of Smart Grid benefits accrued during the reporting period. In identifying and estimating these benefits, SCE leveraged the publicly-available methodology from the U.S. Department of Energy's (DOE's) Office of Electricity Delivery and Energy Reliability. Using this approach, SCE developed a set of smart grid assets, functions, and benefits, modifying DOE's terminology when necessary to reflect SCE's specific Smart Grid investments. For this annual report, SCE reviewed the status of all Smart Grid projects to determine which assets and functions were in place and producing benefits during the reporting period.

SCE's methodology categorizes benefits into five areas:

1. Operational;
2. Reliability;
3. Demand Response/ Energy Conservation
4. Environmental; and
5. Other.

Operational benefits consist of reduced and avoided costs of utility operations, including procurement, customer service and T&D costs. Reliability benefits include the societal value of avoided outages and reduced outage duration for all customer classes. Demand Response/ Energy Conservation benefits are reflected in measured load impacts from SCE's DR resources. Environmental benefits include avoided greenhouse gas and particulate emissions. Finally, other benefits include areas that are difficult to quantify, such as safety and customer satisfaction. This annual report includes estimates of operational , reliability, and demand response/ conservation benefits and provides descriptions of environmental benefits and other benefits.

Estimated benefits for the reporting period are summarized in the table below:

Estimated Smart Grid Benefits in the Reporting Period

Benefit Area	Reporting Period Value
Operational Benefits	$4,256,989
Reliability Benefits	$167,300,000
Demand Response/Energy Conservation Benefits	$11,500,000
TOTAL Estimated Benefits	**$183,056,989**

In previous reports operational benefits were mainly attributed to benefits enabled by SCE's Edison SmartConnect program. Edison SmartConnect-related capabilities and systems are now fully integrated into SCE's normal operations. As such, the associated operational benefits have not been recorded in a balancing account since December 2012 and are no longer separately tracked.[22] Therefore, SCE did not include Edison SmartConnect-related operational benefits in this report. Operational benefits shown for the current reporting period are associated with implementation of mobile work management tools and processes developed under SCE's Consolidated Mobile Solutions (CMS) project, as described in greater detail in SCE's General Rate Case (GRC) filing.

Reliability benefits come primarily from SCE's circuit automation program, which shortens the amount of time required to restore power to a portion of customers during an outage. This is not a new program, and the benefits accrue from roughly two decades of deployment. As noted in Grid Operations Metric 8, SCE has automated 2,538 of its 4,617 distribution circuits (as of 30 June 2014). For purposes of this report, the benefit was estimated using a Value-of-Service (VOS) reliability model developed by the Lawrence Berkeley National Laboratory. A rough estimate for VOS was based on this model and SCE's specific customer class mix.

Demand Response/Energy Conservation benefits are associated with two types of DR resources: (1) those DR resource MW that are achieved by AutoDR-enabled program participants; and (2) those DR resource MW achieved by residential customers participating in Edison SmartConnect-enabled demand response and energy conservation programs (e.g., Save Power Day program and Budget Assistant). The MW of these resources are derived from the average ex post load impacts from 2013, which are based on the Load Impact Protocols adopted in D.08-04-050, and the avoided generation capacity value from the DR Cost-Effectiveness Template adopted in D.10-12-024.

Environmental benefits in the form of reduced greenhouse gas emissions have resulted from several of SCE's smart grid initiatives. Peak demand reduction and energy conservation programs both result in fewer emissions. A reduction in truck usage due to the smart meter program has also produced lower emissions. This report does not provide an estimated value of these benefits. Other benefits resulting from the Smart Grid include a reduction in SCE employee and customer safety incidents due to the circuit automation program, higher customer satisfaction resulting from improved outage response, and the availability of better customer data and options for managing energy use.

III. Projects Update

In this section, SCE provides an update regarding its deployment projects and pilot projects described in its July 1, 2011 Smart Grid Deployment Plan. The projects have been grouped in six categories:

1. Customer Empowerment;
2. Distribution Automation/Reliability;
3. Transmission Automation/Reliability;
4. Asset Management & Operational Efficiency;
5. Security; and

[22] The settlement agreement approved in D.08-09-039 required that SCE would credit $1.4246 per meter of O&M operational benefits per month during the deployment period, beginning eight months after the meter is reflected in rate base. SCE's operational benefits and capital benefits was included in SCE's ERRA Review Application (A.13-04-001).

6. Integrated & Cross Cutting Systems.

A. Customer Empowerment

SCE's customer empowerment efforts support the Commission's Smart Grid vision which includes smart customers "who are informed about the Smart Grid and [are able] to use electricity more efficiently and save money." [23] In support of this vision, SCE's customer empowerment efforts will provide customers with accessible information regarding their energy information. As such, these projects result in customers gaining a better understanding of their energy consumption, both on an hourly and near real-time basis. To empower customers, event notifications and price signals will be provided to customers and will be integrated into the HAN solution. Furthermore, SCE continues to develop rates and programs to encourage energy conservation and peak load reductions. SCE provides this energy information while protecting each customer's data privacy, in accordance with the Commission's decision adopting rules to protect the privacy of customer's electric usage data.[24]

Generally, projects in this area develop communication infrastructure, information systems, and energy management services, along with customer-facing tools, services, programs, dynamic rates and outreach capabilities. Furthermore, SCE's efforts will provide automated interval usage information to customer-authorized third parties.

The following discussion provides descriptions and updates regarding the customer empowerment projects. Throughout Section III, the dollar amounts associated with specific projects refer to the total amount spent from July 1, 2012 through June 30, 2013.

Energy Service Provider Interface	$1,410,000
Description: Pursuant to D.11-07-056, on March 5, 2012, SCE filed an Application (A.12-03-004) proposing a technology platform and infrastructure to enable third parties, when authorized by a customer, to receive that customer's usage data in a secure, automated manner. SCE's proposal uses the data format from the Energy Service Provider Interface (ESPI) national Smart Grid standard (adopted by the North American Energy Standards Board in October 2011). This platform will support customer authentication and authorization, data exchange from SCE to a technically eligible third party, and customer revocation of authorization, and a formal complaint process customers may use in instances when a 3rd party may be considered a "bad actor". (The Commission may order SCE to revoke a third party's access to customer data in appropriate circumstances.) On September 23, 2013, the Commission issued Decision (D.) 13-09-025. That Decision approved SCE's ESPI Application. The Decision authorizes SCE to spend $7.588 million in capital and $1.512 million in O&M through 2014. Start/End Date: Development of the platform has already begun. Implementation is scheduled for November 2014.	

[23] Decision Adopting Requirements for Smart Grid Deployment Plans Pursuant to Senate Bill 17 (Padilla), Chapter 327, Statues of 2009, June 24, 2010.

[24] See D.11-07-056, Decision Adopting Rules To Protect the Privacy and Security of the Electricity Usage Data of the Customers of Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company, July 28, 2011.

Funding Source: A.12-03-004
Update: The project team has completed business requirement workshops, finalized business processes, finalized SCE.com wireframes, completed a Usability Study with customers and 3rd party vendors, filed the Advice Letter that explains the program, and held a technical workshop for 3rd parties to provide a preview of what ESPI can do for them. The project is currently in construction phase. The project team is actively working to prepare for system testing. SCE continues to work with the other IOUs to help ensure program consistency.

Green Button Initiative	$0
Description: In September 2011, the White House challenged utilities to enable customers to download their usage data in a consistent format by clicking a "Green Button" on the utility's website. Start/End Date: Implemented Phase 1 in December 2011, and Phase 2 in December 2012. Phase 3 will be implemented in 2014. Funding Source: A.07-07-026, A.07-11-011.[25]	
Update: SCE is implementing the Green Button capability in three phases. The first phase, implemented in December 2011, converted the existing usage download button on SCE's MyAccount webpages to use the standard Green Button icon. Phase 2, implemented in December 2012, enables customers to download historical interval usage data using a customer-defined time period (up to 13 months) and gives customers the choice to download data in spreadsheet (CSV) or extensible markup language (XML) format. Phase 3 will leverage SCE's ESPI platform (see summary above) for Green Button Connect, which expands the ability to access energy information and will be funded via the ESPI application.	

Edison SmartConnect Field Trials – HAN Real-time Cost Pilot (RTCP)	$0
Description: The RTCP, implemented pursuant to D.11-07-056, leveraged the IHS Phase 1 project. The only difference was that 250 of the 500 customers received a HAN device that was capable of calculating near real-time cost using SCE's daily cost/price HAN text message. The purpose of the RTCP was to determine how SCE can convey cost information to customers and gain insight as to how customer's value cost information relative to energy usage information. Start/End Date: Complete, April 2012 – July 2014 Funding Source: A.07-07-026	
Update: SCE deployed 500 RTCP devices to customers as of June 30, 2013. The RTCP IHDs, which displayed energy costs rather than energy consumption, were deployed after the standard IHS devices deployed as part of IHS Phase 1. As provided in SCE's bi-annual RTCP report on July 31, 2013, data analysis performed by Itron focused on integrating a proper control group to compare to similar IHD	

[25] A.07-07-026 funds system updates to provide Green Button functionality (Phase 2 and 3), A.07-11-011 funded costs to modify the existing SCE.com web pages with no functionality changes (Phase 1).

and RTCP customers. The analysis found that both customer groups reduced usage within the first 90 days, but customer engagement appears to decrease after a few months, regardless of the type of information that is received. The final report on efforts from this pilot was submitted to the ED early in 2014.

Edison SmartConnect Field Trials – HAN Third Party Limited Launch	$0

Description: This pilot enabled customers to purchase SCE-compatible HAN devices via a retail provider or service provider. The pilot included the same features as the IHS Phase 1 project, including enrollment in Save Power Day Incentive Plus and daily cost/price messages sent to the HAN devices. SCE evaluated customer experiences with SCE and third parties to adjust the processes and customer education materials appropriately for the next HAN project (HAN with Load Control).

Start/End Date: 4th Quarter 2012 – Ongoing

Funding Source: A.07-07-026

Update: SCE leveraged the system functionality implemented in IHS Phase 1 for this project. Operational process development is complete. SCE planned to partner with two 3rd parties, a retailer and a service provider. However, the retailer adjusted their strategy regarding HAN products and did not participate. SCE launched this project with a third party service provider with SCE employees first, but has since expanded and made participation available throughout its service territory. Market demand continues to be low with less than 50 total participants. An additional retailer has partnered with SCE to provide energy information as part of their home automation system, but the launch has been delayed until the second half of 2014.

Edison SmartConnect Field Trials – HAN with Load Control (LC)	$951,720

Description: HAN with LC involved upgrading systems and automating processes from IHS Phase 1 to enable self-registration of HAN devices via sce.com My Account. Customers have been able to purchase HAN devices through retailers and service providers and register the devices through the web. Customers who register a new HAN device are eligible to receive a HAN device rebate ($25 for IHDs, dongles or gateways, $125 for PCTs ($50 towards the device purchase and $75 for the installation). This project also included a limited launch of 500 programmable communicating thermostats that were provided by SCE and installed by an SCE contractor. Customers who choose to participate are enrolled in the Summer Discount Plan (SDP) program and have the capability to override the load control event on the thermostat (depending on the SDP option they choose). This limited launch enables SCE to evaluate the technology and processes before offering this option to a broader set of customers.

Start/End Date: December 2012 – Fall 2014

Funding Source: A.07-07-026

Update: System testing began in September 2012 and recruitment for the SDP limited launch with Smart Thermostats began in May 2013. The SDP with Smart Thermostat limited launch sent almost 32,000 e-mail messages to recruit customers to participate in the program. This marketing effort resulted in a total of 435 thermostats provisioned to smart meters and enrolled in SDP. This represents a 1.36% take rate in marketing to SCE customers. During the Summer and Fall of 2013, 15 SDP events (12 actual and 3 test) were dispatched with an average of 63% of thermostats receiving and reacting to the events. Two issues caused this participation: 1 _thermostats not being correctly added to dispatch groups in the load control platform and 2 _thermostats not maintaining their connection to the smart meter. SCE has worked to resolve both of these issues as much as possible (however in the case of disconnection to the meter it was determined that the firmware of the disconnected thermostat needed to be upgraded to allow consistent connection to the smart mater – which can't be done remotely) and will compare events dispatched in 2014 to those from the previous year. However, based on the results from 2013 combined with the lack of consumer demand, no development of a retail market, immaturity of available retail HAN technology and control systems, and the emergence of a retail market of broadband connected PCT's and gateways which offers a customer friendly and cost effective method for reducing electric load, SCE does not plan to continue HAN with load control beyond 2014 or invest in the additional automation planned with HAN Phase III.

HAN Phase III-Automate Back Office Processes (Formerly HAN Support Systems)	$430,000
Description: HAN Phase III will automate manual back office processes to enable SCE to support forecasted customer HAN adoption forecasts, enable customer HAN self-service tools, support DR and pricing programs load reduction goals, and begin marketing HAN capabilities to customers. Start/End Date: 2012-2014 Funding Source: Edison SmartConnect Balancing Account (ESCBA)	
Update: Work on HAN Phase III was discontinued early in 2014 as SCE evaluated the results of all HAN related projects and pilots to date, lack of consumer demand, no development of a retail market, immaturity of HAN technology and control systems, and the emergence of more cost effective, customer friendly alternatives for reducing electric loads.	

HAN Phase IV-Advanced Load Control System and Enhancements	$0
Description: HAN Phase IV will enable customers (residential and business) to register SEP 2.0 Wi-Fi enabled HAN devices to communicate with SCE back office systems so they may enroll in SCE demand response and energy efficiencies programs. This project will require enhancements to the infrastructure that supports registration of SEP 1.x ZigBee enabled HAN devices and the enrollment in demand response programs, as well as, system updates to support HAN operations. This additional HAN communication channel will enable SCE to support customers who prefer to leverage internet-based devices (e.g., their mobile devices) verses ZigBee-enabled HAN devices and enable SCE to offer new HAN programs (e.g., TOU price signals) to help customers manage their energy usage and costs. Start/End Date: 2013-2014 Funding Source: A.07-07-026 (basic functionality) and A.11-03-003 (enhancements). Costs for basic functionality are included in the Edison SmartConnect field trials described in this section.	

Update: HAN Phase IV has been discontinued based on the lack of SEP 2.0 devices in the marketplace (no SEP 2.0 certified products currently exist).

Home Battery Pilot	$0
Description: Deploy residential energy storage units in up to 18 different customer locations to assess their performance in a variety of environments and applications. Start/End Date: 2009-2014 Funding Source: A.11-03-003	
Update: The Home Battery Pilot is split into two parts. About half of the Residential Energy Storage Units (RESU) will be tested as part of the Irvine Smart Grid Demonstration (ISGD) project and the other half will be tested outside of the ISGD project. The non-ISGD project is nearing the completion of the lab testing phase of all the units. LG, the battery manufacturer received UL certification in early 2013. In June 2013, several RESU units were installed as part of the ISGD project. The non-ISGD project unit has completed the lab testing phase of the project and is ready to be deployed. The location of this deployment is still pending.	

Summer Discount Plan (SDP) Transition	$129,549
Description: SCE modified its residential and commercial Summer Discount Plan (SDP), an air conditioner load control cycling program, from a reliability-based DR program to a price-responsive program that offers customers the choice of override or cycling options to mitigate the potential inconvenience and discomfort of curtailment events. Start/End Date: 2011-2014 Funding Source: A.10-06-017, A.11-03-003, A.12-12-017	
Update: Summer 2012 completed the first season that the residential program was dispatch for economic or high price event days. Also, in the summer 2013 event season, SCE modified its Commercial SDP from a reliability based program to one that can be used to mitigate high wholesale market prices.	

Smart Charging PEV Pilot	$246,142
Description: The Smart Charging PEV Pilot investigates utilization of the utility's AMI to effectively manage plug-in vehicle loads. Through this pilot, SCE will explore DSM programs that aim to reduce overall system demand along with programs that decrease the impact of vehicle charging on distribution infrastructure such as transformers. Start/End Date: 2012-2014 Funding Source: A.11-03-003	

Update: SCE completed the development of requirements and test cases for the Smart Energy Profile 2.0 Home Gateway and AutoGrid's OpenADR Demand Response Management Server. Moreover, SCE tested and validated these developments within its AT Labs.

Additionally field deployment activities have initiated, including recruitment of participants, site inspections, and installation of field equipment (i.e., smart charging equipment, gateways, and a few Android tablets) in participant homes.

SCE has been collaborating with General Motors to design & develop a "central server", which would host DR and other communications directly to smart vehicles. Test cases have been developed and testing of this architecture has commenced.

Plug-In Electric Vehicle (PEV) Workplace Charging Pilot	$35,000

Description: The PEV Workplace Charging Pilot is deploying 76 electric vehicle chargers with payment and real-time communication functionality at eight SCE facilities to test, monitor, and analyze the impacts of PEV workplace charging. The objectives of the Pilot are to gain a better understanding of consumer behavior related to fee-based charging and DR events, evaluate DR technologies that support non-proprietary charging options and an open communications standard (OpenADR 2.0b), measure system and building load impacts related to plug-in electric vehicle charging, better quantify DR potential of EV charging in the workplace, help determine the balance between DR and customers' needs for EV charging at the workplace, and advise business customers regarding the costs, benefits, and impacts of workplace charging to inform future installation plans at customer properties.
Start/End Date: 2012-2014 (Funding ends in 2014; Pilot activities will continue through 2015)

Funding Source: A.11-03-003

Update: The CPUC approved SCE's Advice Letter 2746-E and Pilot Plan on January 3, 2013. SCE staffing changes and employee relocation efforts in Q2 2013 resulted in delays to the planned schedule. SCE conducted a competitive proposal solicitation in Q3 2013 that resulted in selection of a suitable vendor in October 2013. Updates to the budget baseline based on responses to the competitive solicitation resulted in a decrease of EV charge stations from the original plan. Project scope was revised to enable costs to remain within budget. SCE distributed a company-wide survey to employees in September 2013 to identify current EV owners and employees who expected to purchase an EV within 12 months, the results of which informed site selection. SCE developed a detailed installation plan in December 2013 to provide guidance on pre-construction and installation activities. The plan includes construction of new charging spaces, as well as replacement of some existing EV chargers to minimize costs. An OpenADR 2.0b based DR Optimization & Management System (DROMS) was procured in January 2014 to provide signaling and reporting functionality for the project. Final selection of eight 8 SCE facilities suitable for the pilot, based on EV adoption and facility staffing, was accepted in January 2014. Complex business and functional requirements were finalized in May 2014, which resulted in issuance of the equipment/software purchase order in June 2014. As of June 30, 2014, 66% of the new construction has been completed and approximately $35,000 from the approved budget has been spent.

Metering Capital Requirements	$24,172
Description: SCE plans to deploy additional ESC meters to accommodate customer adoption of time-variant PEV rates through 2014. These meters will leverage the AMI network and back office systems deployed as part of Edison SmartConnect to acquire and manage PEV load data. Start/End Date: 2012-2014 Funding Source: A.10-11-015	
Update: During the reporting period, SCE installed a total of 215 meters of PEV customers. Of the 215 PEV customers, 205 selected the EV-1 rate (Residential), six selected EV-3 and four selected E-4 rates (Commercial).	

Submetering Pilots & Protocol Development	$322,902
Description: The purpose of this project is to develop a protocol for customer-owned submeters, pursuant to D.11-07-029 and to execute two submetering pilots pursuant to Resolution E-4651, released June 27, 2014. The pilots will demonstrate emerging technologies such as data communication between customer-owned submeters and utility systems, test current and future meter technologies and evaluate back office processes including subtractive billing. Start/End Date: The Phase 1 Submetering Pilot for single Customers of Record starts September 1, 2014 and ends February 28, 2016. The Phase 2 Pilot for multiple Customers of Record starts May 1, 2016 and ends October 31, 2017. Funding Source: EPIC	
Update: Resolution E-4651 set the above schedule for the two pilots and extended the due date for the protocol for customer-owned submeters to April 30, 2018. The extension was needed to allow sufficient time to conduct the Phase 1 and 2 Pilots, analyze the findings, and develop the submetering protocol.	

Dynamic Pricing System Modifications	$0
Description: SCE will modify existing systems to support the additional dynamic pricing rates and associated rate analysis and energy management tools. These new rates are required by D.09-08-028. Start/End Date: 2012-2014 Funding Source: D.12-11-051 (on SCE's A.10-11-015)	
Update: In April 2013, new Time-of-Use (TOU) rate structures were implemented to support the Dynamic Pricing mandate for business customers, and made available for voluntary customer enrollment. Preparations for the mandatory default to TOU rates completed in Q4 of 2013. Per instructions in the final decision on 2012 GRC Phase 2, SCE began defaulting customers to the new TOU rates in Q1 of 2014.	

Two rate analysis tools, Rate Analyzer and Pro-active Rate Analysis Tool, were also deployed in 2013. The Rate Analyzer, available on SCE.com, provides customers with personalized rate comparisons, detailing the monthly costs of the customer's current rate against other TOU rates and options. Rate Analyzer was launched in phases for selected business customer segments beginning the fall of 2013 in November. A full launch was completed in February 2014. The Pro-active Rate Analysis Tool is an internal-facing tool used to perform rate analyses on a mass scale for selected customer segments. These individualized analyses can be emailed directly to customers who have a user ID on SCE.com. The tool was brought online in April 2013.

Alerts and Notifications System	$0
Description: The Alerts and Notifications system will automate the delivery of important information to help customers manage their bill and payments, prepare for planned outages, and successfully adopt a smart energy lifestyle by taking advantage of dynamic pricing, DR, and EE programs. Start/End Date: 2014-2016 Funding Source: No current funding source	
Update: Initial planning and scoping for the Alerts and Notifications System began in January 2014. High-level business requirements were gathered and initial documentation was completed in Q2. The project team continues to develop plans and schedules for a future deployment in multiple phases, currently targeting 2015 and 2016. The project team is currently documenting detailed business requirements and working on designing overall the system for managing customer contact data and notification delivery mechanisms.	

PEV Support Systems	$0
Description: SCE plans to upgrade customer information systems in the 2012-2014 time period to support a more efficient and transparent process by which customers can enroll in dynamic rates for PEVs. Start/End Date: 2012-2014 Funding Source: GRC	
Update: Planning efforts have been put on hold due to pending request for the PEV Support Systems Project in its 2015 GRC Phase 1 Application. If project is approved, SCE will update forecast of PEV customers, develop a cost-benefit analysis and evaluate priority of implementation within its project portfolio. In the meantime, the team continues look at making minor improvements to existing process and databases.	

DR Systems Enhancements	$82,854
Description: SCE owns and licenses a variety of systems used to dispatch and measure demand response events. These systems primarily consist of notification systems, load control dispatch systems, event status webpages, customer enrollment and reporting systems, and demand response bidding platforms. During the 2012-2014 funding cycle, SCE proposes various changes and enhancements to these systems to increase self-service, prepare for integration with the CAISO markets, and incorporate Edison SmartConnect-enabled programs. Start/End Date: 2012-2014 Funding Source: A.11-03-003	
Update: Prior to summer 2014 event season, SCE redesigned systems and processes related to its programs to accommodate the integration of DR resources into the CAISO wholesale market and provide SDP notification to residential customers. In addition, SCE upgraded its Base Interruptible Program to allow for geographic dispatch by A-Bank substation.	

Ongoing Customer System Enhancements (Future GRCs)	N/A - Conceptual
Description: Ongoing customer system enhancements were included in SCE's Smart Grid Deployment Plan as an indicator of future funding requests beyond 2014. Start/End Date: TBD Funding Source: TBD	
Update: SCE estimates future funding requests may range from $155 million to $347 million between 2015 and 2020 for Customer Service capital software costs. Any such requests will be included in future GRC Applications.	

Irvine Smart Grid Demonstration	$21,266,235
Description: ISGD is a comprehensive demonstration that spans the electricity delivery system and extends into the customer premises. The project is using phasor measurement technology to enable substation-level situational awareness. It extends beyond the substation to evaluate the latest generation of distribution automation technologies, including looped 12 kV distribution circuit topology using URCIs. Distribution volt/VAR Control (DVVC) capabilities are also being used to demonstrate conservation voltage reduction (CVR). The project scope also includes customer homes, where it is evaluating home area network (HAN) devices such as smart appliances, energy storage, solar PV systems, and a number of energy efficiency measures. One block of homes is being used to evaluate strategies and technologies for achieving zero net energy (ZNE). A home achieves ZNE when it produces at least as much renewable energy as the amount of energy it consumes on an annual basis. The project is also assessing the impact of device-specific demand response (DR), as well as load management capabilities involving energy storage devices and plug-in electric vehicle charging equipment. DR events use HAN protocols that are being adopted by Advanced Metering Infrastructure programs such as Edison SmartConnect™. In addition, the ISGD project is seeking to better understand the impact of ZNE	

homes on the electric grid. ISGD's Secure Energy Network enables end-to-end interoperability between multiple vendors' systems and devices, while also providing a level of cybersecurity that is essential to smart grid development and adoption across the nation. The ISGD project has been organized as a series of sub-projects grouped into four logical technology domains: Smart Energy Customer Solutions, Next Generation Distribution System, Interoperability and Cybersecurity, and Workforce of the Future. Start/End Date: 2013 - 2015 Funding Source: GRC, DOE, and other
Update: Throughout the 12 month period between July 1, 2013 and June 30, 2014, the ISGD team deployed various project components and conducted measurement and verification (M&V) activities. The team completed integrated the cloud services used for data collection, cutover the SA-3 system at MacArthur Substation, and completed installation of the 2 MW distribution-level battery energy storage system. The universal remote circuit interrupters used for the self-healing distribution circuit are expected to cutover to operations mid-September 2014. M&V activities included performing data collection on the ZNE homes and solar car shade; performing DR experiments using the HAN devices within the ZNE homes, and operating the DVVC application. M&V will continue until the end of the project on June 30, 2015.

B. Distribution Automation/Reliability

Distribution Automation/Reliability (DAR) projects improve utilities' information and control capabilities for distribution systems. These capabilities may be used to address the complexities associated with integrating distributed energy resources and electric vehicles, advanced outage management, and/or volt/VAR control. DAR projects provide the ability to safely and reliably incorporate high penetrations of distributed energy resources by mitigating voltage fluctuations resulting from intermittent power generation. These projects would also provide the ability to safely and reliably incorporate the increasing load of charging electric vehicles (EV). The incremental customer load from EV charging is expected to be clustered in specific distribution circuits of the power grid that are not currently designed to manage high levels of electric vehicle penetration.

DAR would detect and isolate faults when they occur, immediately restore service to customers as soon as possible and provide information to customers about outages in real-time. "Self-healing" circuits will reduce the number of customers affected by system disturbances and enable faster service restoration. DAR would also provide optimization of voltage and reactive power on the system to enhance power quality and decrease energy consumption.

DAR helps enable electricity markets to flourish and helps deliver a Smart Grid that has the infrastructure and policies necessary to enable and support the integration of demand response, energy efficiency, distributed generation and energy storage.

Geographical Information System	$19,522,887
Description: The Geographical Information System project will consolidate the physical, electrical, and spatial features of all Transmission & Distribution assets and allow end-users to access this information from one reliable source. This comprehensive system will provide the ability to integrate multiple databases, both internal and external to Transmission & Distribution (T&D), and help meet safety, reliability, and compliance obligations. It will include detailed asset information, electrically linked information, and federal and local government information from such sources as the United States Geological Survey, the California Department of Forestry and Fire Protection, and weather services. This information will be used by other key SCE systems to gain operational effectiveness. Start/End Date: 2010-2015 Funding Source: GRC	
Update: GIS implemented its first release of Phase 2 in January 2014. This release deployed the process and configured applications to maintain distribution and land assets within the GIS. The release also included the first cutover of distribution assets (covering the North Coast region) into production. The project was also able to deploy the GIS web viewer into production in February 2014. The web viewer is the browser based application used by consumers of the GIS data to navigate and query SCE GIS data. The project completed the implementation of Cutover 2 (covering the rural region) into production. Realignment of distribution circuits against the GIS land base has also been completed for approximately 25% of the service territory. The project completed the detailed design for release 2 of Phase 2. Release 2 - planned for October 2014 - will integrate GIS with the AUD graphical design tool and provide tools for detecting and managing changes to the subscribed land base. Project will complete implementation of Cutover 3 (covering the Desert region and San Jacinto) in October 2014. The project competed data conflation specifications for substation assets. These assets as well as street lights will be implemented as part of cutover 5 and 6 in 2015 as will the updates to the tools and processes to maintain them.	

Consolidated Mobile Solutions	$8,921,400
Description: Consolidated Mobile Solutions (CMS) will enable field personnel, system operators, and office workers to share real-time information related to software systems. The maps from these software systems will enhance SCE's safety, improve outage responsiveness, and contribute to SCE meeting its compliance obligations. CMS will reduce lost time, enabling the existing work force to be more productive. Start/End Date: 2010-2016 Funding Source: GRC	
Update: Deployed CMS Release 2 to T&D Streetlights and Outdoor Lighting (SOLO) business line on November 2013. Deployed an updated CMS release 2 to a pilot group in the Electrical System Inspector (ESI) business line on April 2014. Addressed issues from the pilot. Completed deployment to the rest of the Electrical System Inspector (ESI) and Quality Control (QC) business lines on June 2014. Stabilization of the CMS release for our users in production is in progress. Performed project re-planning to resolve the significant schedule issues the project experienced.	

Distribution Management System	$5,338,086
Description: Distribution Management System (DMS) is the centralized computing system that allows SCE to gather data from various automated distribution devices and facilitates automated operation and control of the distribution system. DMS will replace SCE's current Distribution Control and Monitoring System, which is obsolete. DMS will provide an improved, comprehensive solution, intended for long-term use, to assist Grid Operations' System Operators in responding to routine and emergency field conditions. Start/End Date: 2010-2015 Funding Source: GRC	
Update: For DMS Phase 2, SCE successfully completed delivery of the "Distribution Volt/Var Control" (DVVC) application in December 2013. For DMS Phase 3, the project team has completed design, pre-factory acceptance testing, and the first cycle of factory acceptance testing on the advanced engineering and operational applications. Implementation of DMS Phase 3 is scheduled to complete in June 2015.	

Integrated Smart Distribution	$0
Description: SCE's Integrated Smart Distribution program will have three main sub-projects. First, SCE will begin targeted roll-out of a new circuit design that will serve as the foundation of a self-healing distribution grid. This roll-out will help keep customers on-line and maintain system reliability. The other two sub-projects will address issues that SCE anticipates will arise from increasing penetration of distributed energy resources, including intermittent resources like wind and solar. To address the two-way power flows that SCE expects will result from deployment of these distributed resources, SCE will begin upgrading protective relays at its distribution substations. In addition, SCE will invest in large, distribution support devices (including energy storage) to accommodate the intermittent nature of electricity produced from distributed solar and wind generation. Together these technologies will form the core of a smart distribution grid that will improve system reliability and meet California's and the Commission's policy goals as defined in Senate Bill 17 and the Commission's Smart Grid OIR. Start/End Date: TBD Funding Source: TBD	
Update: SCE has not completed any activities related to its Integrated Smart Distribution project during the Reporting Period.	

Circuit Automation	$6,544,000
Description: The primary purpose of SCE's Circuit Automation Program is to automatically restore power to customers after outages caused by faults. In providing this service, the Circuit Automation helps minimize the impact on customers of outages that occur in the ordinary course of business. The capabilities provided by the Circuit Automation Program are consistent with basic service provided by most utilities in this country. Start/End Date: 2010-2014 Funding Source: GRC	
Update: In order to maintain a reliable system, SCE has integrated remote control switches within its distribution system. Between July 1, 2013 and June 30, 2014, SCE installed 202 remote control switches and spent $6,544,000. SCE has recognized that automating distribution circuits can help improve overall system performance and increase the reliability of the system.	

Capacitor Automation	$1,101,000
Description: SCE's Capacitor Automation program automates existing manual capacitor controls and upgrades obsolete, first-generation automation equipment. Capacitor controls are used to remotely operate switched capacitor banks installed on the distribution system to provide voltage and VAR support. Without capacitor banks, the voltage supplied to SCE customers would drop to levels that can damage the customers' equipment or appliances, and present safety hazards. Automating the control of these capacitor banks allows SCE to remotely monitor and control the operation of these devices, rather than sending a person to operate the device manually in the field. Start/End Date: 2011-2016 Funding Source: GRC	
Update: As part of the Automation program, SCE is, on an ongoing basis, deploying fully programmable capacitor controls (PCCs). By automating capacitor controls, we are replacing failing capacitor controls while improving voltage and Volt-Ampere Reactive (VAR) control. Additionally, SCE is adding the capability to remotely check and monitor capacitor bank operating status. During the July 1, 2013 to June 30, 2014 time frame, SCE installed approximately 249 PCCs.	

Distribution Energy Storage Integration (DESI) Program	$0
Description: The DESI program includes the deployment of several energy storage systems to provide value to local distribution circuits. The first project will install a battery energy storage system (BESS) with an active power rating between 2.0 MW and 4.0 MW, and usable stored energy capacity between 3.5 MWh and 4.0 MWh in a pilot deployment to support a primary distribution circuit that has problematic loading characteristics. This project will measure the operating parameters of the BESS and determine the values created by the BESS. The first project plan and "lessons learned" will be used as guidance for subsequent pilot deployments.	

Start/End Date: 2013 – 2017 Funding Source: GRC	
Update: The pilot site has been selected and a set of requirement created. An RFI and RFP were issued and reviewed. Currently, SCE is negotiating a contract with the Energy Storage supplier selected.	

Outage Management System	$0
Description: The Outage Management System (OMS) Project provides the business processes and supporting technology to effectively utilize new functionality provided by smart meters and the associated communications infrastructure. This project is compatible with utility system applications that promote and enhance system operating efficiency and improve service reliability, such as outage management, reduction of theft and diversion, improved forecasting, and workforce management. Smart meters will send a Power Outage Notification (PON) to the OMS Gateway any time there is a loss of line side voltage of the customer's power. In turn, this will create a trouble order in OMS and the Operations Support Specialist will dispatch a Troublemen to the identified location of the problem. Upon completion of repairs, we will receive a Power Restoration Notification (PRN). Both the PON and PRN will include a date and time stamp which will be populated into OMS. Over the past year we have designed and enhanced processes and procedures to identify many different uses for this technology. We have been successful in identifying the line side voltage reads to assist our customers with restoring power in a timelier manner. Start/End Date: 2012-2016 Funding Source: GRC	
Update: SCE launched the project in May 2011. SCE subsequently engaged with Itron to refine requirements and determine how future meter firmware upgrades may benefit the project. SCE worked with the OMS vendor to refine and add new enhancements to identify the types of customers in SCE's service territory. Proof of Concepts User Acceptance Tests (UAT) tests were performed with several parties on these enhancements. SCE also reviewed these changes with IT to assess any impacts on system performance. SCE is now in the midst of implementing its pilot project for Dispatcher use of PONs and PRNs in the identification and resolution of outage Trouble Calls. In parallel, we have also explored the different types of extenders that can be used for different types of applications to ensure communication in remote parts of our service territory. Current deployment has been in 50% of our service territory with the expectation of deploying the remainder by January 2014.	

C. Transmission Automation/ Reliability

Transmission Automation/Reliability (TAR) includes projects that provide wide-area monitoring, protection and control to enhance the resiliency of the transmission system. TAR also includes projects to provide the ability to safely and reliably incorporate utility-sized intermittent power generation such as centralized solar and wind energy. TAR projects help mitigating voltage fluctuations resulting from integrating intermittent resources.

The wide-area capabilities of TAR provide the ability to monitor bulk power system conditions, including but not limited to voltage, current, frequency and phase angle, across the IOU geographic area in near real-time. This functionality provides system operators with current information about emerging threats to transmission system stability, enabling preventive action to avoid wide-scale black outs. In addition, the wide-area capabilities of TA also include projects for coordination of high-speed communicating transmission protection equipment that detect conditions in the transmission systems and automatically respond to stabilize the system.

PHASOR	$1,949,231
Description: In collaboration with the Western Electricity Coordination Council and for use by Reliability Coordinators, the Phasor system will enable SCE to collect, store, verify, and share Phasor Measurement Unit information about the status and health of the grid, at millisecond intervals. The Phasor system will also serve to accommodate compliance obligations, as part of SCE's commitment to participate in the Western Interconnect Synchrophasor Program. Start/End Date: 2011-2013 Funding Source: GRC	
Update: System availability testing was successfully completed in June, 2013. Post-implementation testing was completed August 2013. Currently working to implement change requests. As of June 30, 2014, evaluation of post-implementation enhancements and transition activities were ongoing. Phasor system is currently sending Synchrophasor data to and receiving data from PEAK (one of the entities that resulted from WECC's recent restructuring).	

Centralized Remedial Action Schemes (CRAS)	$7,087,370
Description: Centralized Remedial Action Scheme is needed because current logic controllers in individual Remedial Action Schemes are limited and cannot cope well with increasing interconnection complexities. Centralized Remedial Action Scheme improves architecture, management, oversight, and effectiveness of remedial action. Centralized Remedial Action Scheme reduces tripping of generation and/or shedding of load as needed. Start/End Date: 2011-2015 Funding Source: GRC	
Update: Factory Acceptance Testing was the main focus of the July 2013 – June 2014 time frame and was on track for successful completion as of June 30, 2014 with system shipment to SCE expected in early August 2014.	

Application of Advanced Wide-Area Early Warning System with Adaptive Protection	$1,609
Description: This project's focus is an adaptive protection system that will alter relay trip logic to adjust for security-dependability balance in response to changing system conditions to reduce the likelihood of cascading outages in a stressed transmission system, as determined by real-time synchrophasor	

measurements.

Start/End Date: 2009-2014

Funding Source: GRC

Update: SCE has been working to establish a dedicated communication network between SCE and PG&E synchrophasor facilities to exchange PMU data streams. The work on the communication circuit, including firewalls for security considerations are completed. SCE and PG&E are working to configure their respective Phasor Data Concentrators (PDC) to comport with the new standard, C37.118. The project will be completed in 2014.

Establishing Alarm Limits on Bus Voltage Angles for Grid Stress Assessment and Control	$0

Description: This project's focus is to provide a base-lining study (data-driven analysis) that relates system measurements of voltage phase angles with the system performance measures for normal operating conditions and its variations over a period of time and during various limiting conditions, such as: thermal limits, proximity to voltage instability or voltage collapse, frequency and damping of oscillations, transient stability, etc. This analysis facilitates establishing warnings/alarms thresholds for voltage phase angle measurements.

Start/End Date: 2012-2014

Funding Source: GRC

Update: The first phase of work on Establishing Alarm Limits on Bus Voltage Angles for Grid Stress Assessment and Control started in April 2012 and was completed in December 2012. The first phase of this work was done using base-lining collected from SCADA and PMU data. The second phase of this project is contingent on the Phase 2 of the "PHASOR" project (Wide Area Situational Awareness System. This project has not started.

PMU Enabled Voltage and VAR Control at Devers Substation	$0

Description: This project is aimed at development of local voltage control algorithm at a substation for coordinating the switching of discrete reactive power resources available at the substation. Conceptually, the controller is designed as a two-level controller: a local controller at each bulk power substation and a system-wide coordinator at the control center. The local controller uses local measurement (mostly from PMU) and optimally controls local VAR resources within the substation. The system-wide coordinator calculates optimal voltage schedule, and coordinates local voltage controllers so they do not counteract each other's actions.

Start/End Date: Complete, 2010-2014

Funding Source: GRC

Update: The R&D work on the analysis and formulation of this project is complete. This project was completed in May of 2014, and continuation to deploy the technology at a substation will be piloted

under another project name and funding: "Voltage and VAR Control of SCE Transmission System".

Wide-Area Monitoring and Control of WECC Transfer Paths using Real Time Digital Simulator (RTDS).	$64,000
Description: The objective of this research project is to develop an experimental framework for testing transient stability, frequency response and oscillation damping of the Western Interconnection (WECC) using a Real-Time Digital Simulator (RTDS). This study will be done in two phases: 1) Modeling and Analysis of WECC Inter-Area Oscillations, and 2) Application to Large Scale Renewable Energy Resources and Development of Control Strategies. Start/End Date: 2011-2014 Funding Source: GRC	
Update: The first phase of work was completed on August 31, 2013. Under Phase 1, in order to construct a reasonably manageable framework, a reduced order model on WECC transmission paths was developed. The model was validated by simulated and real-time data. The second phase of this project was cancelled.	

Voltage and VAR Control of SCE Transmission System	$80,000
Description: The objective of this project is to perform RTDS hardware-in-the-loop testing of the local controller developed in the project "PMU Enabled Voltage and VAR Control at Devers Substation". In addition, the scope of this project also included preliminary design and formulation of the Supervisory Central Voltage Coordinator for SCE's bulk power transmission network application Start/End Date: 2013 – 2014, Complete Funding Source: GRC	
Update: This project was completed in May of 2014.	

Dynamic Line Rating	$3,142
Description: This project will demonstrate and evaluate two very different types of transmission line monitoring (TLM) systems to address the difficulty of installation, system performance, and operators benefit of real-time line loading information. Transmission lines are limited in their loading capacity by static ratings which are based on most severe weather conditions (e.g. hot summer day with no wind). Dynamic ratings take into account real-time weather conditions, allowing transmission line to increase power throughput without compromising safety or reliability.	

Start/End Date: 2014-2016 Funding Source: EPIC	
Update: This project started in 2014. Initial project planning and approvals are completed. Barre-Lewis 230 kV transmission line is chosen to demonstrate dynamic line rating applicability to SCE transmission system. TLM vendors are selected and materials are being ordered.	

State Estimation Using Phasor Measurement Technologies	$1,071
Description: Accurate and timely estimation of electric power system state is essential in present day system operation. Energy Management System (EMS) advanced applications, use power flows and bus voltage measurements to estimate state of the system. With the newly developed PMU technology, the state can directly be measured. Since not all buses in the a bulk power transmission system are equipped with a PMU, it is necessary to develop applications that can estimate voltage phasors at buses without a PMU. Such an application tool is called the "Linear State Estimator (LSE)". This work will be demonstrated at SCE Real Time Digital Simulation (RTDS) Lab, and then deployed at Grid Control Center for operator's application. Start/End Date: 2014-2016 Funding Source: GRC/ EPIC	
Update: This project started in 2014. Initial project planning and approvals are completed. The technical approach used in Virginia Tech's three-phase LSE will be used to develop a single-phase (positive phase sequence) LSE applicable to SCE system.	

Voltage and VAR Control of SCE Transmission System.	$30,429
Description: This pilot project is designed to demonstrate technology developed by the "PMU Enabled Voltage and VAR Control at Devers Substation". The two level hierarchical controller will be installed at SCE Antelope Substation and tested with operator-in-the-loop for one year. The technology will be refined and enhanced for deployment in other SCE bulk power substations. Start/End Date: 2014-2019 Funding Source: GRC/ EPIC	
Update: This project started in 2014. Initial project planning and approvals are completed. The preliminary engineering and design started.	

Wide-Area Reliability Management and Control.	$16,424
Description: The objective of this project is to develop a strategic vision, specific to the interests of SCE, which will enhance grid resilience to extreme contingencies. The work encompasses at least: actionable stress monitoring and risk indices, control methods for the present system topology, and develop real-time control algorithms. Effectiveness of developed control actions will be demonstrated using SCE's Real Time Digital Simulation (RTDS) Lab, and recommended for application in SCE bulk power transmission system. Start/End Date: 2014-2018 Funding Source: GRC/ EPIC	
Update: This project started in 2014. The initial planning and scope has been completed.	

Tehachapi Wind Energy Storage Project (TSP)	$18,751,396
Description: The TSP, principally funded by SCE at $29.8 million and federal stimulus funding awarded by the DOE at $24.9 million, as part of the American Recovery and Reinvestment Act (ARRA) of 2009, is positioned to demonstrate the effectiveness of lithium-ion battery and smart inverter technologies to improve grid performance and assist in the integration of variable energy resources. The project will be based at SCE's Monolith Substation in Tehachapi, California and house a battery energy storage system (BESS) connected to SCE's Antelope-Bailey 66kV system. This site location was selected as it is part of the Tehachapi Wind Resource Area (TWRA), currently capable of delivering over 2,000 MW of renewable energy and where up to 4,500 MW of wind resources will be able to come online by 2015. Start/End Date: 2010-2016 Funding Source: Smart Grid ARRA Balancing Account	
Update: The BESS replacement supplier, LG, completed the remaining manufacturing, integration and installation activities by April 2014. The BESS commissioning activities were completed in June 2014 which starts the 2-year demonstration period. SCE also provided quarterly reports to the CPUC concerning the status and progress of this project.	

D. Asset Management & Operational Efficiency

Asset Management & Operational Efficiency (AMOE) enhances monitoring, operating and optimization capabilities to achieve more efficient grid operations and improve asset management. AMOE includes projects that will allow SCE to manage the maintenance and replacement of energy infrastructure based on the health of the equipment versus a time-based approach. This functionality will prevent failures of critical energy infrastructure as well as manage costs associated with maintaining and replacing equipment.

Online Transformer Monitoring	$4,642,472
Description: Field devices will collect of real-time information about the health of transmission and distribution system infrastructure. The particular field devices that enable equipment monitoring depend on the equipment targeted for monitoring. SCE uses Dissolved Gas Analysis (DGA) technology	

and bushing monitoring devices for bulk power transformers. SCE has targeted a total of 68 500-kV (AA) and 137 230-kV (A) transformer banks at substations to deploy online transformer monitors. As part of its Online Transformer Monitoring Project, SCE plans to deploy DGA technology and bushing monitoring devices on one AA substation and four A substations per year from 2011 through 2014. Start/End Date: 2009 - 2016 Funding Source: GRC
Update: The following online DGA monitored projects are in progress and scheduled to be completed by the end of 2014: • Vincent 3AA Bank • Devers Substation • Mirage Substation • Victor Substation

E. Security

Physical and cybersecurity protection of the electric grid is essential and becomes more important as the Smart Grid is deployed. The communications and control systems that enable Smart Grid capabilities have the potential to increase the reliability risks of Smart Grid deployments if they are not properly secured. The Security program includes a comprehensive set of capabilities to address the increased physical and cybersecurity requirements associated with the development, implementation, operation and management of Smart Grid systems and edge devices. These projects would place and execute security throughout the network to resist attack, manage compliance and risk, and support security from the physical to application layers.

Common Cybersecurity Services	$8,801,891
Description: The Common Cybersecurity Services (CCS) aims to transfer advanced cyber security technologies from the defense and intelligence industry to secure our Smart Grid implementations (SA3, Phasor Measurement, CRAS, ISGD, and TSP). CCS is designed to implement security mechanisms to enforce confidentiality integrity and availability in the form of security services and policies that protect electronic information, communication and control systems necessary for the management, operation, and protection of the SCE Smart Grid System of Systems (SoS) as well as comply with key provisions of NERC CIP version 5. Start/End Date: CCS development and initial deployment is scheduled to end in 2016. After 2016, CCS products will be procured and deployed as regular standard products. Funding Source: GRC	

Update: The CCS solution is being tested to help ensure successful roll-out of CCS to substations in synchronization with the roll-out of SA3, CRAS, DMS and Phasor programs. The CCS solution is under Factory test of its integration with SCE's Syncrophasor deployment both from a cybersecurity and NERC-CIP V5 Compliance standpoint. SCE's goal is to roll-out the CCS integration to all substations that host the Phasor sub-system by the end of 2015. In addition, the CCS deployment will be scalable and extended to CRAS and SA3 in production in the coming years.

F. Integrated & Cross Cutting Systems

Integrated and cross-cutting systems refer to projects that support multiple Smart Grid domains, such as grid communications, application platforms, data management and analytics, advanced technology testing, and workforce development/technology training. An integrated approach ensures that investments are managed efficiently while creating the platform to deliver a stream of benefits across utility operations and to customers.

Integrated communications systems provide solutions to connect and enable sensors, metering, maintenance, and grid asset control networks. In the mid-to-long term, integrated and cross cutting systems will enable information exchange with the utility, service partners and customers using secure networks. Data management and analytics projects will improve the SCE's ability to utilize vast new streams of data from transmission and distribution automation and Smart Meters for improved operations, planning, asset management, and enhanced services for customers.

Advanced technology testing and standards certification are a foundational capability for the utilities to evaluate new devices from vendors and test them in a demonstration environment prior to deployment onto the electric system. This reduces the risks associated with new technology projects, and helps the utilities maximize technology performance and interoperability.

Workforce development and advanced technology training enable the successful deployment of new technologies, ensuring that the utilities' workforces are prepared to make use of new technologies and tools, maximizing the value of these technology investments.

Substation Automation Integration IEC 61850	$1,219,043
Description: The goal of Phase II is to transition to an open standards based automation and control system design demonstrating secure Smart Grid interoperability while allowing seamless integration to future Smart Grid standards. The functional enhancements proposed include Communications Security, Automatic Configuration and Configuration Management, Remote Secure Access, PMU Data Collection, and Substation to Field Area Network Interoperability. Process improvements supporting these functional enhancements include IEC 61850 standard based XML formatted configuration for all substation devices generated from the Substation Engineering Modeling Tool (SEMT) and the Node Category Standards (NCS) Library which will house relay configurations for each of SCE's in-service protective relay applications. The new SA-3 Substation Automation design will ultimately (in Phase III) support integration of SCE's installed legacy Modbus Plus and Modbus TCP designs when power grid changes are made to these systems. Successful implementation of SA-3 will result in measurable engineering, operations and maintenance benefits through cost reduction, reliability and safety. Start/End Date: 2013-2015	

Funding Source: GRC
Update: On October of 2013, the pilot SA-3 system was commissioned at MacArthur substation. Testing and demonstration will continue until the end of 2015.

SAS System Replacements	$0
Description: This project implements an IEC 61850 standard Substation Automation System for SCE's distribution substations, which will be piloted at MacArthur Substation in June 2013. Functions and features will include open standard design supporting Manufacturer's Message Specification (MMS) and Generic Object Oriented Substation Events (GOOSE) communication protocol support for multi-vendor Intelligent Electronic Devices (IEDs). Additional benefits will be automatic system configuration including Substation Gateway, HMI and IEDs, which will eliminate the requirement for vendor HMI configuration. Engineering and design is scheduled to begin in 2014 and B Stations will be commissioned beginning in 2015. Start/End Date: 2011-2014 Funding Source: EPIC	
Update: The SA-3 system is expected to become the new production standard. However, before production approval, the system must demonstrate compatibility with existing back-office systems and legacy field devices. The SA-3 Phase III is designed to address and demonstrate the integration of SA-3 with legacy systems and its application to transmission substations using IEC61850.	

Advanced Technology Labs	$1,105,000
Description: Southern California Edison (SCE) continues to implement smart grid technologies to create a smarter, safer and more reliable energy future. This grid of the future will provide customers with advanced tools and resources that enable informed and responsible energy consumption, and better serve customers by achieving an appropriate balance between energy policy and safety as well as reliability and affordability. Achieving this balance is a challenge, as the electric grid is an immense and complex system. To ensure proper operation, rigorous technology evaluation must take place in a controlled environment before smart grid technologies are deployed on the grid. Thus, SCE developed the Advanced Technology Labs to provide an integrated platform for evaluating the safety and operability of Smart Grid technologies without impacting customers by testing on distribution circuits or other equipment. Start/End Date: 2011 - N/A Funding Source: GRC	
Update: In order to continue providing a controlled testing environment, SCE continues to consistently makes the necessary enhancements to the Advanced Technology Lab facility and its associated test equipment in order to continue to effectively provide SCE with a testing facility where the rigorous and safe technology evaluation of smart gird technologies can take place without impacting the grid or its	

customers The SCE Advanced Technology Labs are still as follows :

- **Situational Awareness Lab** - Allows SCE to monitor the status of the electric grid and display test data from adjacent labs. Utilizing Hiper-Wall technology – a scalable video wall – this facility is also able to analyze historic outage data using proprietary system modeling tools.

- **Communications and Computing Lab** – Provides a platform to test and evaluate Smart Grid communications and cyber-security hardware, software and systems. Understanding the properties of high-speed, low latency and wireless communications networks is critical to developing a digitally networked grid.

- **Power Systems Lab** – Utilizing a Real Time Digital Simulator (RTDS) – power system simulator – allows SCE to perform closed-loop testing of protection and control equipment and power system studies. These studies are conducted to understand the impact of large scale renewable integration, as well as develop more sophisticated wide area monitoring, protection and control capabilities for the electric grid.

- **Distributed Energy Resources Lab** – Inverter based generators and loads, such as residential solar panel batteries and air conditioners, are tested and evaluated in SCE's Distributed Energy Resources Lab. Understanding the behavior of these devices during grid faults and voltage and frequency transients will help SCE continue to maintain a reliable distribution system.

- **Substation Automation Lab** – Designed for interconnecting and testing next generation substation communications, automation and protection equipment. Incorporating these secure and open standards-based systems will help SCE continue to maintain smarter, safer and more reliable substations.

- **Distribution Automation Lab** –Evaluates the performance of advanced field devices to develop an integrated, scalable and fully automated distribution system. These efforts will help SCE safely and reliably manage the integration of distributed energy resources such as residential solar panels and PEVs.

- **Grid Edge Solutions Lab** - Helps provide customers with advanced tools and resources that will enable informed and responsible energy use. The lab evaluates third party smart energy devices to ensure compatibility with Edison SmartConnect® meters and to support SCE's rate programs and services.

- **Garage of the Future Lab** – Demonstrates and evaluates the synergy of various technologies including distributed energy storage, renewable energy resources, PEV charging infrastructure and Edison SmartConnect® meter communication.

Some of the key enhancements that have added to the overall effectiveness and testing capabilities of the Advanced Technology (AT) Labs over the last year are as follows:

- **AT Lab Network Enhancements:** Additional communication switches and servers were added to continue to provide AT with the ability to conduct end-to-end testing within its Lab environment, and support its pilot production environment and increasing project work load. Additionally, network infrastructure enhancements were made to provide Wi-Fi access to the Lab Network in order to continue to give our engineers the flexibility to test out different environments quickly and at a relatively low cost. Finally, these enhancements have allowed for the implementation of tape backups for the AT Lab network to ensure that all test data generated is safely stored and backed up within SCE's communication infrastructure.

- **Design and fabrication of four additional Substation Automation Test Racks and associated equipment:** These Test Racks and equipment are needed for SCE engineers to continue to test on the next generation of substation automation called Substation Automation 3 (SA-3). The test racks and equipment continue to be utilized to test and evaluate the latest substation automation schemes in a Lab environment before we install and demonstrate the system on the grid.

- **Advanced Application Test Relay Procurement:** Additional General Electric (GE) and Schweitzer Engineering Laboratories (SEL) relays were procured to support additional project work throughout various labs. These relays are essential for the testing that is conducted in the following areas:
    1) Substation Automation (SA) - 3 relay testing in the Substation Automation Lab.
    2) Phasor relay and hardware-in-the-loop testing in the Power Systems Lab.

- **Outdoor Testing Area Development:** As AT has evolved as an organization, so has its research work, as there are now more and more projects that require the testing of large pieces of equipment. For example, we currently have projects that require the testing and evaluation of large 10-ton air conditioning units, Pool Pumps, and a variety of distribution apparatus equipment; all equipment that is too large to be safely tested within the confines of the existing AT Labs in the Fenwick Facility. Therefore, with the help of Corporate Resources, we constructed a new testing area within the Fenwick Facility that will allow all of our engineers safely and securely test these large pieces of equipment.

- **Laboratory Management System (LMS) Development:** In 2014, AT launched a project to develop a centralized laboratory management system; phase 1 of the project is set to be completed by the end of 2014. A centralized laboratory management repository was needed to capture key data sets and data elements such as:
    - Equipment information
    - Supplier Information
    - Maintenance of calibration and preventive maintenance history
    - Equipment failure/ incident logs
    - Other valuable laboratory data.

  Additionally, by consolidating functional processes into a centralized database, all Labs will have a single point of entry for all equipment updates, consistent data input and access throughout all labs, improved data integrity, and elimination of shadowed data kept on multiple spreadsheets, email systems, and/or other programs.

- **Real Time Digital Simulator (RTDS) Hardware Procurement:** An expansion of the existing RTDS system hardware was required to accommodate the continual increase in the number of projects requiring RTDS support; projects such as:

1) Centralized Remedial Action Scheme (CRAS)
2) Phasor Advanced Application Evaluation
3) Substation Automation (SA) 3 Testing
4) Universal Remote Circuit Interrupters (URCI) Testing

Protective Relay Scheme Testing

Distribution System Efficiency Enhancement Project (DSEEP)	$4,051,440

Description: The Distribution System Efficiency Enhancement Program (DSEEP) consists of servicing and expanding the NETCOMM wireless communication system. The NETCOMM system provides the radio communication infrastructure to remotely monitor and control SCE's distribution automation devices. These automation devices include all of the devices deployed under the Circuit Automation and Capacitor Automation programs described above.

Start/End Date: Ongoing

Funding Source: GRC

Update: SCE added 1,163 distribution automation devices from July 2013 to June 2014. Additionally, SCE added 48 packet radios, extending communication to the new devices. These new devices include Radio Controlled Switches, New Capacitor Banks and Automated Reclosers. The program also maintained radio infrastructure to existing devices. This maintenance includes supporting 480 automation device replacements, and 109 packet radios to maintain network performance levels. The maintenance activities include replacing 442 end-of-life battery-backed radios.

Mobile Radio System Upgrade	$0

Description: SCE linemen in the field rely on push-to-talk land mobile radio (LMR) system for voice communications. SCE currently uses Motorola analog SmartZone 4.1 LMR which will reach the end of its useful life by 2015. Deferring the Mobile Radio System upgrade beyond 2015 presents a significant safety risk because technical support and repairs will end. SCE's existing towers, antenna and spectrum can be reused with no significant operational adjustments.

Start/End Date: NA

Funding Source: GRC

Update: SCE's Mobile Radio System provides voice communications to support field personnel engaged in daily operations, new construction, and emergency response. SCE's existing mobile radio system is approaching its end of life and will no longer be under vendor support after 2015. To maintain reliable field communication and avoid the end of support, the replacement effort must begin in 2013. SCE has maintained a mobile radio system for its field crews and control center communications since the 1980s. SCE evaluated a consolidated mobile radio solution that supported more than just voice capabilities, however, since SCE owns the radio frequency spectrum that supports the existing solution, the most cost effective and reliable approach was to just upgrade the existing system from analog to digital as part of a standard technology refresh project rather than an integrated Smart Grid solution. As such, SCE is no longer considering its Mobile Radio System Replacement as a Smart Grid deployment and will be removing it from future Smart Grid Annual Updates.

Grid2	$8,000,000
Description: The Grid2 project is an initiative to build a single, scalable, secure and cost-effective IP network to provide support for all current and future grid applications using virtualization. This network is a type of service provider network which is capable of transporting and segmenting data for a variety of applications. Start/End Date: 2012-2016 Funding Source: GRC	
Update: The first Multiprotocol Label Switching (MPLS) core backbone was built last year and the second is planned to start Q4 of 2014 and be completed by Q2 of 2015. DFR/PMU, and the Corporate Security Video Surveillance along with many Control Center to Control Center applications are currently using the first MPLS backbone.	

Transportation Electrification (formerly PEV Readiness)	$3,421,000
Description: Plug-in electric vehicles (PEVs) activities ensure that the utility provides safe, reliable, and cost-effective electric fuel to PEVs and help deliver a positive experience to PEV adopters. SCE is measuring performance of the utility in executing PEV-related customer processes, including neighborhood grid assessment and reinforcement and conducting continuous improvement. SCE is also monitoring leading indicators of PEV adoption and updating PEV sales forecasts and assumptions used to plan for O&M and capital expenditures. SCE executes education and outreach efforts to residential and non-residential customers and engages with external PEV stakeholders to facilitate the deployment of charging equipment. In May 2013, SCE expanded its existing PEV Program to include cross-functional planning and coordination of transportation electrification (TE) activities, development of TE-specific policies, strategy and plans, external and internal coordination and customer education and outreach efforts. Start/End Date: 2009/ On-going Funding Source: GRC	
Update: SCE continued its PEV-related activities, including: • Continuous improvement of its customer processes • Education & outreach efforts to develop awareness of PEV rates and the benefits of off-peak charging • External engagement of state and local agencies and organizations (including CARB, California PEV Collaborative, SCAQMD, etc.)	

SCE also filed two new initiatives with the CPUC, still pending approval as of 6/30/14:

- A new whole-house TOU rate with improved features for PEV adopters, including an extended "super off-peak" period to facilitate overnight charging at Level 1
- An innovative new proposal to return the LCFS credit revenue to PEV customers primarily through a one-time "Clean Fuel Reward"

4G Wireless Network	$0
Description: 4G is the fourth generation of the wireless communications standard. The 4G wireless network will enable field area network to support AMI direct meter communication, passive distribution monitor/control, video surveillance, and line-person-of-the-future mobile applications. Start/End Date: 2013 – N/A Funding Source: GRC	
Update: This project may be initiated as part of the SmartConnect cell rely refresh. We are currently testing a connected grid router that could serve as a replacement for our AMI cell relay and serve as a platform to deploy a field area network. Additionally, we are testing secure GE LTE radios as part of the field area network in the ISGD project. We expect at least several years of research and field trials.	

IV. Customer Engagement Timeline

The common template for the Annual Reports, which was adopted by D.13-07-024 and initially proposed by Commission Staff in the March 2012 workshop report, requires the IOUs to include a customer roadmap that provides an overview of the IOU's customer engagement plan. SCE included its initial customer roadmap as Section IV of its 2012 Annual Report. The general outreach approach and strategy presented in the 2012 Annual Report has not changed and is not repeated in this report.

The common template requires the IOUs to include the following information in their Smart Grid Annual Reports: (1) a timeline that connects specific projects with specific marketing and outreach efforts, and (2) specific steps to overcome roadblocks, as identified in the workshops. As described in the 2012 Annual Report, SCE expanded on the sample template by recognizing that certain ME&O efforts are not confined to a single calendar year. Consistent with this approach, SCE provides its Customer Engagement Timeline (see figure below), which presents the appropriate initiatives provided in SCE's Customer Engagement Baseline and Roadmap Summary, and identifies the anticipated Smart Grid related ME&O efforts by year. Consistent with its GRC and DR application cycles, SCE provides such information from 2012 to 2014. Information beyond 2014 is not yet available, as SCE has not developed detailed ME&O plans beyond its 2012-2014 application cycles.

Customer Engagement Timeline (2012-2014)

	2012	2013	2014
Customer Premise Devices			
A. Smart Meters	X		
B. Summer Discount Plan*	X	X	X
C. Near Real-Time Usage (HAN)*		X	X
Online Tools			
D. Integrated Audit Tool	X	X	X
E. Web Presentment Tools*	X	X	X
F. Budget Assistant*	X	X	X
G. Green Button	X	X	X
H. Energy Service Provider Interface		X	X
I. Mobile Outage Application	X	X	X
Rates and Programs			
J. Save Power Day (PTR)*	X	X	X
K. Dynamic Pricing and TOU Rates*		X	X
L. PEV Time-of-Use Rates*	X	X	X

X = SCE or third party ME&O to support this initiative.

** SCE will market these program / services through its Offer Management Approach, as described in SCE's 2012 Annual Report.*

The common template also requires the IOUs to provide the following information for each identified Smart Grid related ME&O effort:

- Project description;
- Target audience;
- Sample message;
- Source of message;
- Current road blocks; and
- Strategies to overcome roadblocks.

Thus, as it did in the 2013 Annual Report, for each initiative identified in the above figure, SCE has provided such information in Appendix 1 of this report. In addition to discussing the initiatives identified above, Appendix 1 also includes SCE's customer engagement activities for certain pilots and demonstration projects and for conceptual projects.

V. Risks

In this section, SCE provides an overview of activities related to helping ensure grid reliability for its customers. The sections below provide an overview of the motivation behind developing open standards for Smart Grid infrastructure and cybersecurity investments and solutions. The motivation behind developing a smarter grid and its associated architecture remains consistent with those presented in SCE's 2011 Smart Grid Deployment Plan (A.11-07-001) and approved in D.13-07-024.

A. Introduction – Smart Grid Motivation

After nearly a century of building and operating a power delivery network that fuels economic and societal growth with access to stable and reliable electricity, the electric grid is undergoing a profound transformation. Progressive policy objectives and emerging energy technologies motivate the integration of renewable resources, distributed generation, electric transportation, energy storage and other emerging energy technologies which can undermine the basic principles that support grid reliability today. Specifically, the principles that support the stability and reliability of the electric grid include relying on large synchronous rotating mass in bulk generating plants to provide the inertia necessary to propagate a robust waveform across the system. This inertia allows the electric grid to manage most loading and transient events without impacting customers. Wind and solar power, distributed generation and power electronics, coupled with decommissioning of once-through cooling plants, erode the inertia in the system, causing a more fragile waveform that, if not compensated for, will reduce reliability and stability. A thoughtfully designed, smarter electric grid will allow us to integrate new energy technologies with smart inverter controls and will advance our ability to meet policy objectives without degrading the stability of the electric grid. Further studies are needed to ensure that the removal of the once-through cooling generators does not cause stability issues or cause the need for new transmission or other technological additions.

B. Smart Grid Architecture Challenges

We are shifting today's electric grid from a system that is robust and reliable largely due to the basic laws of physics to a smarter electric grid that increasingly relies on technology to maintain stability and achieve a higher level of resilience. To do this we must obtain an in-depth understanding of systems theory, power systems, computer science and utility operations. Applying these diverse and specialized disciplines in a coordinated approach that yields cost efficient, manageable and reliable solutions requires a clear Smart Grid strategy and architecture approach. The key architecture challenge in evolving the electric grid is to help ensure that the introduction of automation, connectivity and advanced control systems do not create a system that is too complex or too fragile to manage.

Utilities have tended to rely heavily on highly customized solutions that were organized in a silo of proprietary devices, communications, security, configuration and control systems. This approach is commonly known as "security by obscurity." While this approach was efficient for each individual project with clear scope, schedule and cost objectives it results in a higher cost of maintenance and operations and a higher cost of new capabilities because each silo requires integration. If this approach is applied to grid modernization, the result will be a costly and fragile infrastructure that will impact grid reliability. An integrated approach to systems design, coupled with a common services architecture, is required to overcome this architecture challenge.

C. Cost-Efficient Smart Grid Design

A reasonably cost-efficient approach to deploying Smart Grid capabilities involves organizing technologies and systems into loosely coupled, standards-based layers capable of supporting common services. A Smart Grid common services architecture delivers the capability for any device in the forward deployed networks to access common services (such as cybersecurity, device management, network monitoring, etc.) in SCE's control centers. The common services architecture supports multi-vendor interoperability by enforcing standards across the architecture and drives implementation and operational costs down by simplifying the systems design. We simplify systems design by eliminating silos that extend from the application layer through the security, communications and device layers.

Over the past several years, SCE has been working to develop a Common Cybersecurity Service based on the premise that the level of automation and connectivity that is being introduced through grid modernization efforts requires military-grade cybersecurity to help ensure grid reliability in the face of increased cyber vulnerabilities introduced by new Smart Grid technologies.

D. Standards Overview

SCE has a long history of supporting the development of open standards. SCE recognizes that standardization of key areas can yield benefits to both consumers and service providers. Such benefits include enabling market innovation, reducing complexity, and protecting investments necessary to ensure long term deployments. In addition, participating in standards development gives SCE the ability to prevent vendor "lock-ins" and to foster interoperability with legacy systems. Furthermore, SCE's participation in standards development brings extensive technical knowledge and experience along with utility credibility to the relevant working groups and organizations. SCE's approach to standards and interoperability includes supporting the development of the actual standard, laboratory testing and evaluation, and field trials.

SCE has identified over 70 standards of interest for Smart Grid development. Of these 70 standards, SCE's Advanced Technology organization is currently supporting the development of over 40 standards. These standards are found in specific areas, including system integration/architecture, data formats, communications, security and electrical interconnections/power quality. Many of these standards are being developed by the Institute of Electrical and Electronics Engineers (IEEE) and the International Electrotechnical Commission (IEC). SCE is or has been involved in the development of standards, testing and verification within these organizations, including:

- IEEE P2030: Guide for Smart Grid Interoperability
- IEEE1547: Distributed Energy Resource Interconnection Standard
- IEC 61850: Substation Automation
- IEC 62351: Power systems management and associated information exchange – Data and communications security

It is important to acknowledge that extensive involvement in standards development can pose many challenges to an organization. Such challenges include finding internal resources, both human and financial, to support the relatively long and exhaustive process. Standards often require fairly senior staff that is experienced and knowledgeable. Senior staff is then under significant pressure to not only support important core job functions but to also support the standards development. From a financial perspective, organizations not only need to finance staff for participating in standards development and paying applicable fees, but additionally some organizations resort to expensive consultants to fill in gaps when full time staff is severely impacted and/or unavailable. Specifically, participation in IEC standards can be rather difficult for regional electrical utilities to justify travel overseas.

Since 2013 SCE has been reducing its involvement on smart grid standards. The reduction in participation stems from the fact that many of the standards that used to be infant or nonexistent are now mature enough be demonstrated. Standards like Smart Energy 2.0, OpenADE and OpenADR2.0 are available and ready for use. SCE helped drive and mature standards during the early days of smart grid technology and now has made a strategic decision to continue supporting the industry by focusing on the application and demonstration of these standards. Nonetheless, SCE still maintains some involvement in key standards groups including IEEE, SAE and IEC.

1. NIST Smart Grid Standards Coordination

The 2007 Energy Independence and Security Act (EISA) gave the National Institute of Standards and Technology (NIST) the "primary responsibility to coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of Smart Grid devices and systems." To achieve this mandate, NIST devised a three-phased approach to identify an initial set of standards, while providing a robust process for continued development and implementation of standards as needs and opportunities arise and as technology advances.

In 2009, NIST created the Smart Grid Interoperability Panel (SGIP) as a public/private partnership to coordinate the identification and development of Smart Grid standards . Since then the SGIP has grown to an organization representing twenty-two stakeholder categories and over 770 member organizations ranging from electric utilities to consumer electronics providers. One of the obligations of the SGIP is to produce and maintain a Catalog of Standards that could be used for developing and deploying a robust and interoperable Smart Grid.[26]

SCE is a strong supporter of the NIST / SGIP standards process. Since its onset, SCE has participated in the effort and held leadership positions within the governing board, the architecture committee and various Priority Action Plans (PAPs). SCE's director of Advanced Technology (AT) is a former governing board member for the "at-large" category. Additionally, AT's director of Engineering Advancement is a former member of SGIP's Implementation & Methods Committee (IMC). Furthermore, SCE has received various SGIP recognitions for its efforts in PAPs. SCE has participated in the first 16 PAPs, including:

- PAP 5: Standard Meter Data Profiles

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[26] Energy Independence and Security Act of 2007, Title XIII, Section 1305.

- PAP 8: CIM for Distribution Grid Management
- PAP 11: Common Objective Models for Electric Transportation
- PAP 15: Harmonize Power Line Carrier Standards for Appliance Communication in the Home

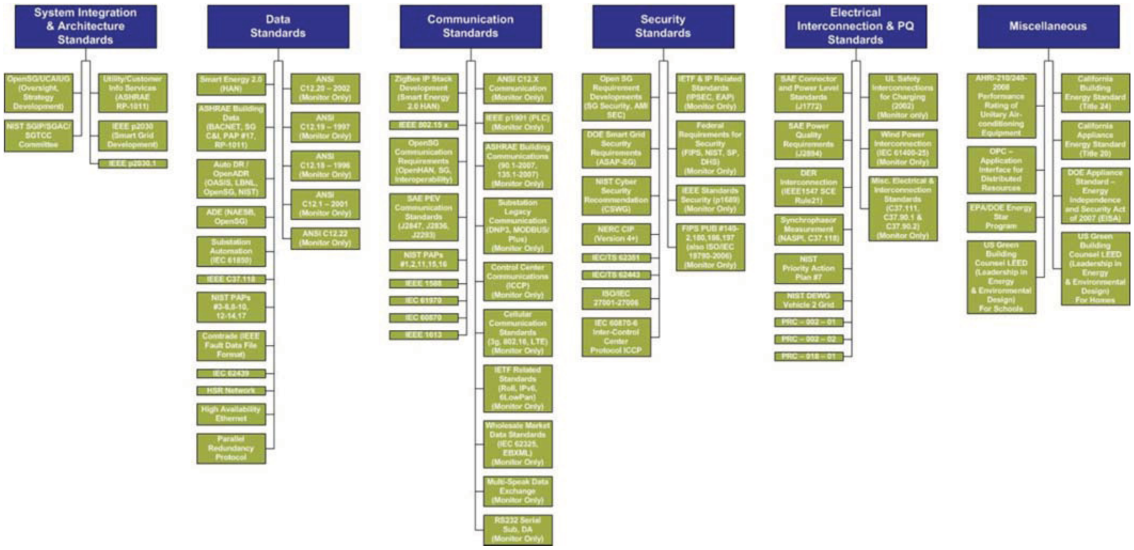
PAPs have been an effective tool in identifying gaps among Smart Grid standards while providing standards development organizations (SDOs) with meaningful recommendations. However, PAP groups occasionally expand their focus beyond the immediate task. PAPs require proper NIST/SGIP leadership and oversight to avoid "scope creep." SCE has demonstrated this leadership by providing sound technical advice.

SCE remained a committed leader of the NIST standards effort through its final transition to the SGIP. SCE's decision to withdraw from the SGIP came when it was time to focus on system demonstrations and deployments. Resources that were previously allocated to standards development were transitioned to large demonstration projects such as the Irvine Smart Grid Demonstration (ISGD) project.

2. Standards Development

SCE's vision of a Smart Grid requires developing, evaluating and implementing open standards. SCE identified five categories that represent the bases for developing the Smart Grid: System Integration & Architecture, Data, Communication, Security, and Electrical Interconnection standards. SCE has identified existing standards within these major categories and identified "gaps" within the existing standards. SCE prioritized the standards and assigned resources to either lead, support or monitor the particular standard. Using this process, SCE identified over seventy applicable standards and assigned resources to lead or support over forty standards. Some of the more notable standards either led or actively supported by SCE include:

- IEC 61850: Substation Automation
- Smart Energy 2.0: Home Area Network Communications
- NAESB ESPI: Automated Metered Data Exchange (e.g. Green Button)
- SAE J2836 & J2847: Electric Vehicle to Grid Communications
- SAE J2894: Electric Vehicle Charging Power Quality
- IEEE 1547: Distributed Energy Resources Interconnection
- ANSI C37.118: SynchroPhasor Measurements
- IEEE P2030: Guide for SG Interoperability of Energy Technology
- OpenADR: Automated Demand Response

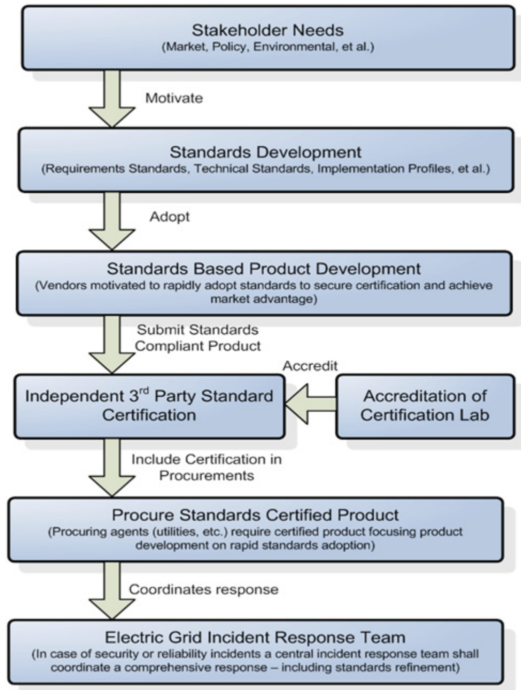


*SCE's Categorized List of Smart Grid Standards

3. Standards Conclusion

SCE leads the industry in its development and support of interoperability standards. The strategic standards development effort is focused on enabling grid modernization while maximizing system reliability, safety and customer value. SCE believes that proper standards development and adoption will ultimately lead to minimized risk to full Smart Grid deployments.

SCE continues to believe that standards are the key to minimizing risk and advancing the deployment of smart grid technologies. This is why SCE is now focus on demonstration of standards in order to encourage product manufacturers move to the "standards based product development" stage of the standards life cycle. Until product manufacturers adopt these standards it will be nearly impossible for electric utilities adopt. SCE is helping along this process by introducing a series of technology demonstrations and pilots that will hopefully lead to the systematic adoption of the smart grid standards portfolio.



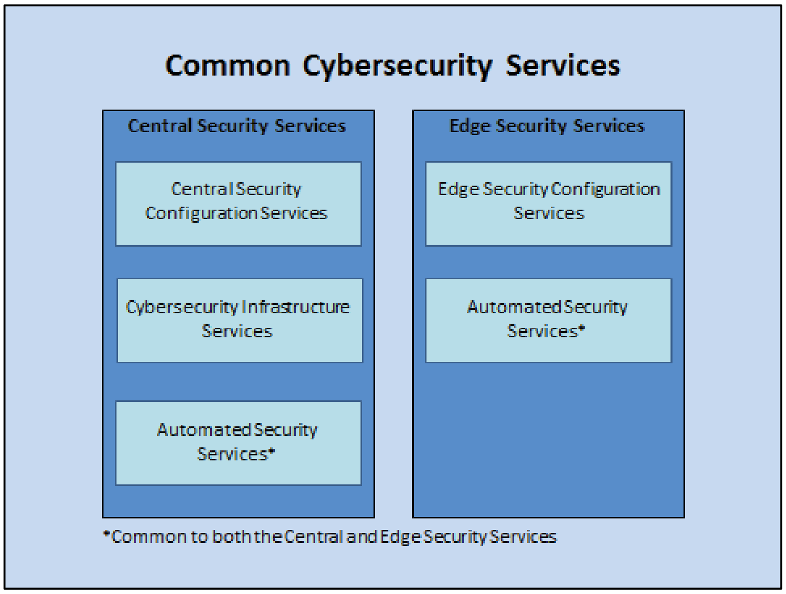
* Standards Life Cycle

E. Cybersecurity Overview

The importance of cybersecurity to the utility industry and to SCE has expanded as systems and data have become more integral to business operations, and as the electric infrastructure has become more essential to national commerce and communication capabilities. Cyber attacks are continually growing in number and sophistication, and the availability of cyber weapons is on the rise as well. Therefore, maintaining a strong defense against cyber attacks requires a continually evolving set of strategies.

Over the past several years, SCE has been working to develop Common Cybersecurity Services (CCS) to protect its grid infrastructure, based on SCE's understanding that as the level of automation and connectivity increases through grid modernization, so does the vulnerability. This, coupled with the increasing threat of cyber attack inherent in the current geopolitical climate, requires that deployment of military-grade cybersecurity solutions to ensure continued grid reliability. CCS aims to transfer advanced cyber security technologies from the defense and intelligence industry to secure SCE's Smart Grid implementations (SA-3, Phasor Measurement, CRAS, ISGD, TSP, and other systems such as SCADA, that require secure communications to substation equipment and devices in the field). CCS is designed to implement security mechanisms to enforce confidentiality, integrity and availability in the form of security services and policies that protect electronic information communication and control systems necessary for the management, operation, and protection of key components of SCE's network and computing systems infrastructure as well as comply with NERC CIP Version 5. Furthermore, CCS is specifically designed to satisfy the Smart Grid requirements and standards developed by NERC, NIST, Department of Homeland Security, and DOE as part of the national effort on critical infrastructure and information protection standards as well as Smart Grid standards development.

The CCS is comprised of the Central Security Services (CSS) and Edge Security Services (ESS). CSS consists of Central Security Configuration Services, Cybersecurity Infrastructure Services, and Automated Security Services, which are physically located at the Grid Control Center, where electrical energy delivery is monitored and managed. The ESS consists of Edge Security Configuration Services and Automated Security Services, which provide distributed enforcement security on devices at or near the perimeter of a system.



The CCS solution enables the design and enforcement of policies that can be configured for specific devices, device classes or locations in the electric grid. Each device on the electric grid secured by CCS will have a unique key to enable secure communications with its control system. This approach mitigates the risk that an attacker will be able to seize control of the electric grid from one end device, such as a relay or capacitor bank controller, and provides the flexibility to create virtual trust domains through the use of key groups to apply different levels of security and the ability to rapidly respond to a cybersecurity event.

SCE is committed to working with the vendor community, federal and state agencies, and standards bodies to make the CCS architecture and design available to the utility industry as a whole.

1. Other Key Cybersecurity Initiatives

SCE's commitment to cybersecurity goes well beyond the development and implementation of CCS and includes a number of other cybersecurity initiatives to help secure the enterprise. SCE employs a defense-in-depth strategy for security, which utilizes multiple layers of protection to prevent unauthorized access to its systems. SCE categorizes these initiatives into three primary categories:

1. Perimeter Defense: Perimeter Defense includes the process, procedures, personnel, hardware and software designed to protect SCE's information and systems from external attacks. Perimeter Defense is especially critical to systems that are accessible via the Internet.

2. Interior Defense: The goal of the Interior Defense program is to secure SCE's internal business systems from unauthorized users, devices and software. Advanced and integrated real time monitoring of SCE's internal business network makes it more difficult for unauthorized users to gain access to SCE's systems and for rogue devices or software to cause business disruption.

3. Data Protection: The objective of Data Protection program is to protect SCE customers, employees, contractors, and other personnel from identity theft, as well as to protect confidential SCE information residing on all computing devices from unauthorized use, distribution, reproduction, alteration, or destruction.

Additionally, SCE anticipates the need to respond to new legislation in the cybersecurity area, as cybersecurity legislation and regulation continue to evolve in response to terrorism, recent blackout, foreign state-sponsored cyber attacks, natural disasters, and increased reliance on the grid for essential services. As a large electric utility that is part of the critical national infrastructure, SCE strives to protect shareholder interests through shaping cybersecurity legislation and regulation, through early compliance planning.

2. Cybersecurity Conclusion

SCE is an industry leader in cybersecurity with transformational strategies, architectures and solutions that enable grid modernization. SCE's focus on risk assessment, standards, architecture and cost effective solutions provides value to its customers and helps foster a safe and reliable grid that is able to support California's policy objectives in a reasonably cost-efficient manner.

VI. Metrics Update

The metrics presented in this section quantitatively asses the progress in implementing Smart Grid-related policy goals in California, namely those enumerated in SB 17 (codified at Public Utilities Code Section 8360). These metrics, which were adopted by D.12-01-025, will provide the Commission with information to assist in the production of its annual report to the Legislature, as required under Public Utilities Code Section 8367. The adopted metrics are broken into four categories:

1. Customer/AMI Metrics;
2. Plug-In Electric Vehicles Metrics;
3. Storage Metrics; and
4. Grid Operations Metrics.

A. Customer Metrics/ AMI Metrics

1. Number of advanced meter malfunctions where customer electric service is disrupted, and the percentage this number represents of the total of installed advanced meters.

Metric - Meter Malfunctions	Total	Percent
Number of Advanced Meter Malfunctions Interrupting Customer Service	0	0

An AMI meter failure resulting in a disruption of customer electric service would occur if there were a malfunction in the integrated service switch or other internal catastrophic failure. For the period of July 1, 2011 through June 30, 2014 there were no instances of an integrated service switch malfunction or other unplanned meter initiated customer interruptions. This metric does not include AMI meter malfunctions that do not result in service disruptions.

2. Load impact in MW of peak load reduction from the summer peak and from winter peak due to smart grid-enabled, utility administered demand response (DR) programs (in total and by customer class).

Metric - Smart Grid Enabled DR	Customer Class	Load Impact Summer Peak (MW)	Load Impact Winter Peak (MW)
Load impact from smart-grid enabled, utility administered demand response programs	Residential	31.1	NA
	C&I < 200 kW	NA	NA
	C&I > 200 kW	NA	NA
	Ag & Pumping	NA	NA
	Total	31.1	NA

In 2013, SCE started participating in a test project with third party programmable communicating thermostats (PCT) service providers to provide demand response for PTR events from participating households with PCTs installed. PCT study customers delivered a 29.8% load impact for the average event, resulting in a 31.1 MW aggregate reduction. The average load impact per PCT study customer ranged from 0.65 kW to 0.85 kW.

3. Percentage of demand response enabled by AutoDR (Automated Demand Response) in each individual DR impact program.

Metric - % Auto DR	Price Responsive Program	Percent
Percentage of demand response enabled by AutoDR by individual DR impact program	AMP	10.4%
	CBP	14.1%
	CPP	1.3%
	DBP	28%

In 2013, SCE's demand response programs with AutoDR capabilities included the Aggregator Managed Portfolio, Capacity Bidding Program, Critical Peak Pricing, and the Demand Bidding Program. AutoDR load impacts from these programs were on average approximately 45 MWs in 2013.

This table shows the AutoDR average estimated ex post load impacts relative to each program's aggregate ex post load impacts. Ex post load impacts were estimated from regression analysis of customer-level hourly load data according to the Demand Response Load Impact Protocols (D.08-04-050). These results reflect the demand reductions delivered during historical events, based on the conditions that were in effect during that time.

4. The number and percentage of utility-owned advanced meters with consumer devices with HAN or comparable consumer energy monitoring or measurement devices registered with the utility (by customer class, CARE status, and climate zone)

Metric - HAN Registered Devices	Total	Percent
The number of utility-owned advanced meters with consumer devices with HAN or comparable consumer energy monitoring or measurement devices registered with the utility (by customer class, CARE, and climate zone, to extent available), excluding pilot participants	567	0%

As of June 30, 2014, SCE had successfully registered 567 customer-owned HAN devices that remained provisioned to smart meters. In addition, SCE has registered 826 utility provided devices that remained provisioned to smart meters as part of its HAN pilots (96 utility provided devices for pilots have been unprovisioned based on customer preference or technical issues). Of these, 391 in-home displays are deployed as part of the Interim HAN solution and Real-Time Cost Pilot. The remaining 435 devices are smart thermostats used as part of the HAN with Load Control pilot.

Devices that connected with a different gateway are excluded. Also, devices that are connected to an energy management system, but not registered with the utility, are excluded (even though the energy management system may be registered with the utility). SCE does not currently have the capability to track devices by CARE/non-CARE and climate zone.

Note that widespread adoption of consumer HAN devices has not developed as expected due to delays with Smart Energy Profile 2.0 (no certified products as of this update), little interest to consumers for purchasing devices that provide energy consumption data, and alternative internet and home automation thermostats and other devices that provide remote access and control of electric loads. SCE expects organic growth of consumer HAN devices to be low with less than 1,000 new devices annually in our service territory.

5. Number and percentage of customers that are on a time-variant or dynamic pricing tariff (by type of tariff, by customer class, by CARE status, and by climate zone).

Customer Class	Program	CARE	BASELINE REGION									Subtotal	Total
			05	06	08	09	10	13	14	15	16		
Residential	CPP	CARE	0	1	0	0	0	0	0	0	0	**1**	**6**
		NONE-CARE	0	1	2	1	1	0	0	0	0	**5**	
	TOU	CARE	1	168	367	224	1,260	11	224	20	21	**2,296**	**20,849**
		NONE-CARE	8	4,165	3,901	3,136	5,546	242	826	354	375	**18,553**	
	PTR	CARE	3	13,556	32,842	25,892	39,180	4,390	13,539	4,086	1,424	**134,912**	**390,840**
		NONE-CARE	16	42,886	64,939	48,326	67,904	3,359	15,409	8,769	4,320	**255,928**	
	EV	CARE	0	33	38	35	37	0	11	4	1	**159**	**5,733**
		NONE-CARE	1	1,953	1,456	1,362	584	17	96	47	58	**5,574**	

Customer Class	Program	CARE	BASELINE REGION									Subtotal	Total
			05	06	08	09	10	13	14	15	16		
C&I > 200 kW	CPP	CARE	0	1	1	0	0	0	1	0	0	**3**	**2,507**
		NONE-CARE	0	390	690	574	606	60	103	45	36	**2,504**	
	TOU	CARE	0	1	3	1	1	0	0	0	0	**6**	**9,119**
		NONE-CARE	4	1,643	2,512	2,008	1,846	306	474	231	89	**9,113**	
	EV4	CARE	0	0	0	0	0	0	0	0	0	**0**	**32**
		NONE-CARE	0	9	7	5	6	0	1	2	2	**32**	
	RTP	CARE	0	0	0	0	0	0	0	0	0	**0**	**110**
		NONE-CARE	0	15	40	21	26	0	5	1	2	**110**	

Customer Class	Program	CARE	BASELINE REGION									Subtotal	Total
			05	06	08	09	10	13	14	15	16		
C&I < 200 kW	CPP	CARE	0	1	0	0	0	0	0	0	0	**1**	**950**
		NONE-CARE	0	79	123	119	117	458	37	6	10	**949**	
	TOU	CARE	0	36	20	27	25	1	8	2	3	**122**	**401,039**
		NONE-CARE	113	84,388	114,502	86,071	73,326	2,382	19,665	15,417	5,053	**400,917**	
	EV3	CARE	0	0	0	0	0	0	0	0	0	**0**	**23**
		NONE-CARE	0	11	2	5	3	0	1	1	0	**23**	

Customer Class	Program	CARE	BASELINE REGION									Subtotal	Total
			05	06	08	09	10	13	14	15	16		
Ag & Pumping	CPP	CARE	0	0	0	0	0	0	0	0	0	**0**	**37**
		NONE-CARE	0	1	5	10	5	13	1	2	0	**37**	
	TOU	CARE	0	0	0	0	0	0	0	0	0	**0**	**14,010**
		NONE-CARE	18	1,344	707	1,617	2,056	5,494	1,423	703	648	**14,010**	
	RTP	CARE	0	0	0	0	0	0	0	0	0	**0**	**26**
		NONE-CARE	1	11	3	2	0	2	3	0	4	**26**	

6. Number and percentage of escalated customer complaints related to (1) the accuracy, functioning, or installation of advanced meters or (2) the functioning of a utility-administered Home Area Network with registered consumer devices.

Metric - Customer Complaints	Complaint Type	Total	Percent
Number of escalated customer complaints related to (1) the accuracy, functioning, or installation of advanced meters or (2) or the functioning of a utility-administered Home Area Network with registered consumer devices	Meter Accuracy	399	12.1%
	Meter Installation	2	0.1%
	Meter Functioning	127	3.9%
	HAN	0	0%

To calculate the percentages, SCE received a total of 3,285 escalated complaints during the period July 1, 2013 through June 30, 2014. SCE defines the types of customer complaints measured by this metrics as follows:

- Meter Accuracy – Escalated complaints to SCE's Consumer Affairs department related to high bills.
- Meter Installation – Escalated complaints to SCE's Consumer Affairs department regarding SCE's Edison SmartConnect installation contractor (e.g., damaged property during meter installation).
- Meter Functioning – Escalated complaints to SCE's Consumer Affairs department regarding issues such as radiofrequency/electromagnetic frequency, net energy metering reconciliation, and customer deployment opt-out requests.

7. The number and percentage of advanced meters replaced before the end of their expected useful life during the course of one year, reported annually, with an explanation for the replacement.

Metric - Meter Replacement	Total	Percent
Number of utility-owned advanced meters replaced annually before the end of their expected useful life	18,418	0.371%

This metric includes the number of Advanced Metering Infrastructure (AMI) meters that were replaced after having been successfully installed during the three-year reporting period. The meter failure percentage is less than SCE's Edison SmartConnect™ business case assumption, as approved in D.08-09-039. The majority of AMI meters replaced before the end of their expected useful life were due to problems with the meter's operating system, Random Access Memory, or liquid crystal display failures. As of June 30, 2014, SCE had installed 4,985,307 AMI meters.

8. Number and percentage of advanced meters field tested at the request of customers pursuant to utility tariffs providing for such field tests, and the number of advanced meters tested measuring usage outside the Commission-mandated accuracy bands.

Metric - Meter Field Tests	Total	Percent
Number of advanced meter field tests performed at the request of customers pursuant to utility tariffs providing for such field tests	6,532	0.13%
Number of advanced meters tested measuring usage outside the Commission-mandated accuracy bands.	66	0.00%

This metric includes the number of field tests performed by SCE personnel on Advanced Metering Infrastructure (AMI) meters at the customer's request pursuant to SCE's tariffs (number of customer request tests completed 6,532), and the number of AMI meters tested that measured usage outside of the Commission-mandated accuracy bands for the reporting period (outside of accuracy bands 66). A meter that is not registering or exhibits variable accuracy is also considered outside accuracy bands and, as such, included in the total. As of June 30, 2014, SCE had installed 4,985,307 AMI meters.

9. Number and percentage of customers using a utility web-based portal to access energy usage information or to enroll in utility energy information programs or who have authorized the utility to provide a third-party with energy usage data.

Metric - Usage Info	Applicable Customer Class	Total	Percentage
Number and percentage of customers with advanced meters using a utility-administered internet or web-based portal to access energy usage information or to enroll in utility energy information programs	Unique Customers with Access to Interval Usage Data	2,261,645	45.7%
	Unique Customers that have Accessed their Interval Usage Data	675,704	13.7%
	Customers Enrolled in Energy Information Programs	689,760	13.9%

This metric reports the number of customers that have enrolled in SCE's MyAccount and have access to their interval usage data through SCE's website, and the number of customers who accessed their interval usage data during the Reporting Period. In addition, this metric reports customers enrolled in SCE's Budget Assistant Program, which provides customers with automated proactive performance notifications based on a preset monthly spending goal. This metric excludes customers accessing usage information through non-utility portals, and also excludes customer accessing cumulative usage information.

B. Plug-in Electric Vehicle Metrics

I. Number of customers enrolled in time-variant electric vehicles tariffs.

As described in its 2011 Smart Grid Deployment Plan, SCE supports four time-variant electric vehicle tariffs with the following enrollment numbers:

Metric - PEV Tariff Enrollment	Residential		Commercial	
Number of customers enrolled in time-variant electric vehicles tariffs	TOU-D-TEV	4,711	TOU-EV-3	10
	TOU-EV-1	370	TOU-EV-4	11

TOU-EV-3 and TOU-EV-4 are only available to commercial customers. This metric represents customer accounts which often charge many vehicles on a single dedicated meter (i.e., golf carts, electric trucking fleets, and electric forklifts). TOU-EV-4 is only available to customers above 20 kW and incorporates a demand charge while TOU-EV-3 does not.

C. Storage Metrics

1. MW and MWh per year of utility-owned or operated energy storage interconnected at the transmission or distribution system level. As measured at the storage device electricity output terminals.

Metric - Energy Storage	# of Facilities	Total MWs	Total MWhs/yr
MW and MWh per year of utility-owned or operated energy storage interconnected at the transmission or distribution system level. As measured at the storage device electricity output terminals	1	207 MWs	500 MWhs/yr

As of July 30, 2014, SCE's Eastwood power station – a pumped storage hydro facility located within the broader Big Creek complex – represents the only energy storage facility interconnected to either SCE's transmission or distribution system. This pumped storage hydro facility has a capacity of approximately 207 MWs and produces about 500 MWh per year.[27]

D. Grid Operations Metrics

1. The system-wide total number of minutes per year of sustained outage per customer served as reflected by the System Average Interruption Duration Index (SAIDI), Major Events Included and excluded for each year starting on July 1, 2011 through the latest year that this information is available.[28]

[27] The annual energy production of SCE's pumped hydro facility varies from year to year depending on hydrological reserves and resource dispatch requirements.

[28] Values provide for SAIDI represent a July-to-June snapshot and should not be confused with the values provided by SCE within its Annual System Reliability Report which is done on a calendar year basis.

Metric - SAIDI	Year	Major Events Included	Major Events Excluded
System-wide total number of minutes per year of sustained outage per customer served as reflected by SAIDI	2001	60.00	45.71
	2002	52.29	44.95
	2003	89.26	53.37
	2004	74.93	55.30
	2005	92.26	72.57
	2006	134.39	87.21
	2007	163.15	95.89
	2008	107.48	95.43
	2009	119.18	90.70
	2010	141.20	100.25
	2011	223.42	107.98
	2012	100.45	98.23
	2013	106.17	88.08

For the years 2006- 2013, SAIDI values were calculated per the guidance of IEEE 1366 with the exception of using five years of historical data. Pursuant to IEEE 1366, days are excluded from a given year's metric if their SAIDI exceeds 2.5 times the standard deviation of the natural logarithm of daily SAIDI over the previous five year period. However, complete ODRM data did not exist prior to 2006. Therefore, excludable days for years 2006 and 2007 were both determined based on daily SAIDI data in year 2006. Excludable days for 2008 were determined based on daily SAIDI data in years 2006 and 2007. Excludable days for 2009 were determined based on daily SAIDI data in years 2006, 2007, and 2008. Excludable days for 2010 were determined based on daily SAIDI data in years 2006, 2007, 2008, and 2009. This interim approach is consistent with IEEE 1366.

Consistent with SCE’s 2013 Annual System Reliability Report, the reported SAIDI metrics data utilizes a definition of “sustained” interruption as described in IEEE Standard 1366, 2003 Edition, which is an interruption lasting longer than five minutes. Furthermore, as indicated within SCE’s 2011 Annual System Reliability Report, the 2011 windstorm in Los Angeles County occurring on November 30 and December 1, 2011 resulted in daily levels of SAIDI significantly greater than any seen in the past ten years.

2. How often the system-wide average customer was interrupted in the reporting year as reflected by the System Average Interruption Frequency Index (SAIFI), Major Events Included and Excluded for each year starting on July 1, 2011 through the latest year that this information is available. [29]

[29] Values provided for SAIFI represent a July-to-June snapshot and should not be confused with the values provided by SCE within its Annual System Reliability Report pursuant to D.96-09-045.

Metric - SAIFI	Year	Major Events Included	Major Events Excluded
How often system-wide average customer interrupted in reporting year as reflected by SAIFI	2001	1.19	0.97
	2002	1.27	1.05
	2003	1.39	1.11
	2004	1.34	1.15
	2005	1.53	1.33
	2006	1.01	0.82
	2007	1.16	0.95
	2008	1.02	0.96
	2009	0.87	0.76
	2010	1.06	0.86
	2011	1.01	0.89
	2012	0.90	0.89
	2013	0.92	0.83

For the years 2006- 2013, SAIFI values were calculated per the guidance of IEEE 1366 with the exception of using five years of historical data. Pursuant to IEEE 1366, days are excluded from a given year's metric if their SAIDI exceeds 2.5 times the standard deviation of the natural logarithm of daily SAIDI over the previous five year period. However, complete ODRM data did not exist prior to 2006. Therefore, excludable days for years 2006 and 2007 were both determined based on daily SAIDI data in year 2006. Excludable days for 2008 were determined based on daily SAIDI data in years 2006 and 2007. Excludable days for 2009 were determined based on daily SAIDI data in years 2006, 2007, and 2008. Excludable days for 2010 were determined based on daily SAIDI data in years 2006, 2007, 2008, and 2009. This interim approach is consistent with IEEE 1366.

Consistent with SCE’s 2013 Annual System Reliability Report, the reported SAIDI metrics data utilizes a definition of “sustained” interruption as described in IEEE Standard 1366, 2003 Edition, which is an interruption lasting longer than five minutes.

3. The number of momentary outages per customer system-wide per year as reflected by the Momentary Average Interruption Frequency Index (MAIFI), Major Events Included and Excluded for each year starting on July 1, 2011 through the latest year that this information is available.[30]

Metric - MAIFI	Year	Major Events Included	Major Events Excluded
Number of momentary outages per customer system-wide per year, as reflected by MAIFI, major events included and excluded	2001	1.16	1.08
	2002	1.15	1.09
	2003	1.43	1.15
	2004	1.21	1.05
	2005	1.47	1.23
	2006	1.78	1.41
	2007	1.90	1.60
	2008	1.50	1.38
	2009	1.55	1.38
	2010	1.62	1.38
	2011	1.49	1.33
	2012	1.31	1.29
	2013	1.29	1.19

For the years 2006- 2013, MAIFI values were calculated per the guidance of IEEE 1366 with the exception of using five years of historical data. Pursuant to IEEE 1366, days are excluded from a given year's metric if their SAIDI exceeds 2.5 times the standard deviation of the natural logarithm of daily SAIDI over the previous five year period. However, complete ODRM data did not exist prior to 2006. Therefore, excludable days for years 2006 and 2007 were both determined based on daily SAIDI data in year 2006. Excludable days for 2008 were determined based on daily SAIDI data in years 2006 and 2007. Excludable days for 2009 were determined based on daily SAIDI data in years 2006, 2007, and 2008. Excludable days for 2010 were determined based on daily SAIDI data in years 2006, 2007, 2008, and 2009. This interim approach is consistent with IEEE 1366.

Consistent with SCE’s 2013 Annual System Reliability Report, the reported MAIFI metrics data utilizes a definition of “sustained” interruption as described in IEEE Standard 1366, 2003 Edition, which is an interruption lasting longer than five minutes.

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[30] Values provided for MAIFI represent a July-to-June snapshot and should not be confused with the values provided by SCE within its Annual System Reliability Report pursuant to D.96-09-045.

4. Number and percentage of customers per year and circuits per year experiencing greater than 12 sustained outages for each year starting on July 1, 2011 through the latest year that this information is available.

Metric	Year	Customers/yr	Circuits/yr
Number of customers per year and circuits per year, experiencing greater than 12 sustained outages	2001	2,605	9
	2002	1,896	4
	2003	7,212	19
	2004	12,269	26
	2005	3,123	13
	2006	93	2
	2007	741	3
	2008	1,473	16
	2009	435	8
	2010	167	5
	2011	1,243	7
	2012	11,625	2
	2013	7	1

5. System load factor and load factor by customer class for each year starting on July 1, 2011 through the latest year that this information is available.

Metric - Load Factor	Customer Class	2012 Load Factor
System load factor and load factor by customer class	Residential	35%
	C&I < 200 kW	49%
	C&I > 200 kW	67%
	Ag & Pumping	57%
	System	53%

Load factor is defined as the average load throughout a given year divided by the peak load during that same year. This value can be calculated for an entire system or a specific customer class and is typically used as a measure of how effectively generation capacity is used. SCE calculates system load factor and load factor by customer class every year as part of its annual rate group load studies, which are leveraged for analyses in the Phase II (Rate Design) of the GRC. This process leverages statistically valid load data from over 28,000 customers, representing all classes of Edison customer, with each sampled customer exceeding 35,000 data points.[31] Load factors by customer class often reside outside of the system-wide range because of their differing load profiles, or energy consumption patterns.

6. Number of and total nameplate capacity of customer-owned or operated, grid-connected distributed generation facilities.

Metric - DG Number & Capacity	Program	# of Facilities	Total Capacity (MW)
Number of and total nameplate capacity of customer-owned or operated, utility grid-connected distributed generation facilities	CREST/WATER	57	70.5
	Re-MAT	0	0
	RSC	5	75.0
	RAM	6	40.5
	SPVP (IPP)	11	19.5
	SPVP (UOG)	11	41.0
	CSI	45,599	327.84
	SGIP	29	16.95
	TOTAL	**45,718.00**	**591.29**

SCE offers two state-mandated incentive programs, the California Solar Initiative (CSI) and the Self-Generation Incentive Program (SGIP), for customer side of the meter DG, also referred to as "onsite generation" or "self-generation." The CSI is the leading contributor to both the total number and capacity of customer-owned or operated DG facilities within SCE's service territory, with over 45,000 systems installed as of the end of the Reporting Period with a capacity of about 330 MW.

SCE also supports programs and policies related to procurement of utility-side of the meter DG, also called "wholesale" or "system-side generation" because it is intended to net export onto the electrical system on the other side of the customer meter or connect to the distribution system directly. SCE offers a renewable feed-in tariff under the Renewable Market Adjusting Tariff (Re-MAT)program which executes a power purchase agreement where SCE will pay for either the total or excess energy a customer generates through facilities not greater than 3 MW. This program accommodates all eligible renewable technologies up to a total of 112.676 MW as of September 2014. SCE's Solar Photovoltaic Program (SVPV) allows SCE, over a five year period, to build and operate no less than 91 MW of utility-owned solar photovoltaic capacity and to execute contracts up to 125 MW for generation from similar facilities owned and maintained by independent power producers (IPPs) through a competitive solicitation process.[32] This program is applicable to primarily rooftop solar PV facilities with a small portion of ground mounted facilities. During the Reporting Period, the SPVP brought 11 facilities of utility-owned generation online, with a collective capacity of 41 MW.

31 See http://asset.sce.com/Regulatory/SCE%20Load%20Profiles/hist_met.pdf for details on the method used within SCE's annual rate group load studies.

32 The RAM component of SPVP involves procuring 284 MW DC of SPVP through RAM (256 MW AC). This 256 MW AC is subject to RAM protocols and practices. Please see D.13-05-033, Attachment 1.

SCE offers a Renewable Auction Mechanism (RAM), which is a simplified and market-based procurement mechanism for renewable DG projects up to 20 MW on the system side of the meter. As of June 30, 2014, this program has six interconnected facilities with a combined capacity of 40.5 MW; SCE is authorized to procure up to 754.4 MW. As of September 8, 2014, SCE was in the process of procuring a target of 290 MW in the fifth RAM request for proposals ("RAM 5 RFO"). With the successful completion of this RFO, which is scheduled to occur on September 30, 2014, SCE will have met its requirement of 754.4 MW and completed the RAM Program.

7. Total electricity deliveries from customer-owned or operated, grid-connected distributed generation facilities, reported by month and by ISO sub-Load Aggregation Point.

Metric - DG Electric Deliveries	Program	kWhs
Total annual electricity deliveries from customer-owned or operated, utility grid-connected DG facilities	CREST/ WATER	70,803,491
	Re-MAT	0
	RSC	113,641,541
	RAM	51,964,632
	SPVP (IPP)	64,739,411
	SPVP (UOG)	130,048,846
	NSC	30,101,575
	TOTAL	**461,299,496**

Facilities brought online under SCE's CREST/WATER, RE-MAT, RSC, RAM, SPVP, and net surplus compensation (NSC) programs together produced over 461 million kWh. This value captures only electric deliveries to the grid; it does not represent the total energy production of distributed generators in SCE's service territory. All of the energy provided by distributed generators in either the CSI or SGIP programs is "customer side of the meter," meaning that it first serves onsite customer load requirements before feeding any excess energy onto the distribution system. Customers matching this load profile have the option to subscribe under SCE's NSC rate, which pays customers who produce more kilowatt hours than they consume in a 12-month period.

8. Number and percentage of distribution circuits equipped with automation or remote control equipment, including Supervisory Control and Data Acquisition (SCADA) systems.

Metric - Circuit Automation	# of Automated Circuits	Total Circuits	% Automated
Number and percentage of distribution circuits equipped with automation or control equipment, including Supervisory Control and Data Acquisition (SCADA) systems - Reporting Start Date - July 2012	2,538	4,617	55%

As of June 30, 2013, SCE had a total of 4,617 distribution circuits in operation – 2,538 of which are automated with mid and/or tie remote control switches. This metric indicates that 55 percent of circuits can be remotely monitored and controlled through SCE's existing DMS system to protect critical distribution equipment, restore outages, and minimize customer minutes interrupted.

Appendix 1

Smart Grid Customer Engagement by Initiative

Smart Grid Engagement by Initiative. As requested by CPUC staff in its March 1, 2012 Smart Grid Workshop Report, the information presented in this appendix provides the customer engagement elements (i.e., project description, target audience, sample message, source of message, current road blocks and strategies to overcome roadblocks) for the following initiatives:

Customer Premise Devices

A. Smart Meters

B. Summer Discount Plan (PCT)

C. Near Real-Time Usage (HAN)

Online Tools

D. Integrated Audit Tool

E. Web Presentment Tools

F. Budget Assistant

G. Green Button

H. Energy Service Provider Interface

I. Mobile Outage Application

Rates and Programs

J. Save Power Day (PTR)

K. Dynamic Pricing and TOU Rates

L. PEV Time-of-Use Rates

Customer Premise Devices

A. Smart Meters

Project Description	ME&O to help customers better understand the purpose of the new smart meter, how it will benefit them, and provide answers to common questions. See A.07-07-026, as authorized by D.08-09.039, for more information about SCE's smart meter deployment.
Target Audience	Residential and small/medium non-residential customers with demands less than 200 kW.
Sample Message	"You will be receiving a new Edison SmartConnect meter. This new digital meter will enable you to access online tools and services that give you the power to easily track your energy costs and save."
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Customers may have health and privacy concerns about smart meters. • Customer may want to opt out of receiving a new meter.
Strategy to Overcome Roadblocks	The strategies outlined below are consistent with SCE's Opt-Out Phase 1 decision (D.12-04-018), and with SCE's Opt-Out Procedures provided in Advice Letter 2726-E: • Allow customers to opt-out of receiving the smart meter. • Inform residential customers that the Opt-Out Program is available using communication methods that include: ○ Information on SCE's external website (www.sce.com). ○ References to the Opt-Out Program in standard Edison SmartConnect installation letters in areas where meter deployment is still underway. ○ SCE sent a letter using Certified Mail or equivalent service that provides program information, including enrollment procedures to any customer who requested that SCE add them to the Delay List. ○ Address common customer questions online and in communication materials sent to customer. ○ Provide information in multiple languages. ○ Use variety of channels to reach customers with access issues (i.e., door hangers, letters, and outbound calling).

B. Summer Discount Plan (with PCT enabling technology)

Project Description	ME&O to educate and enroll customers in SCE's Summer Discount Plan (SDP) program which transitioned from a reliability program to a price responsive program. In 2012, ME&O efforts educated existing SDP customers on program changes (due to the transition to a price responsive program) and enrolled Orange County customers as part of SCE's 2012 Summer Readiness effort. In 2013, ME&O educated and enrolled a limited number of customers in SDP with PCT enabling technology. See D.11-11-002 (A.10-06-017) and D.12-04-045 (A.11-03-001) for more information about the SDP program.
Target Audience	In 2012, residential customers who are enrolled in SDP, and residential customers with central air conditioning in Orange County and who are not enrolled in SDP. In 2013, residential customers with central air conditioning who are not enrolled in SDP.
Sample Message	In 2012, communications discussed program changes around the transition, such as, "while we've made some changes to the program, you'll still enjoy great savings while helping the environment too." Communications also included "additional energy events due to high energy price levels" and the communication of "override options." In 2013, marketing messages for SDP with PCT-enabling technology, such as, "Receive a free smart thermostat, and save up to $200 dollars on your electricity bills by enrolling on the SDP plan."
Source of Message	Utility
Current Customer Engagement Road Block(s)	Customer awareness/understanding of the program.
Strategy to Overcome Roadblocks	Customers were actively solicited throughout the summer of 2013 and 490 were engaged and enrolled out of the target 500 in SDP-ET. These participants are now part of the HAN pilot and will be used to develop best practices to deliver Demand Response for the Residential Market using the HAN.

C. Near Real-Time Usage (HAN)

Project Description	ME&O to educate customers regarding near real-time usage data which will provide a customer's current usage provided on an approximately 12-second delay.
Target Audience	Residential and small/medium non-residential customers with demands less than 200 kW.
Sample Message	SCE has not yet developed sample messaging for this service.[33] In SCE's Smart Meter HAN Implementation Plan (AL-2662-E, November 29, 2011), SCE indicated that this service will not be widely available until the 2014 to 2015 timeframe.
Source of Message	Utility and third parties that leverage the data for energy service offerings.
Current Customer Engagement Road Block(s)	Road blocks to customer engagement will be identified as part of the marketing plan development. Road blocks may include customer confusion on where to obtain devices and which devices are compatible with SCE's meter.
Strategy to Overcome Roadblocks	Strategies to overcome road blocks will be identified as part of the marketing plan development and feedback from customers. Potential strategies to overcome roadblocks may include certain Commission requirements, such as listing devices that have passed compatibility testing, and communicating which smart grid standards customers should look for in a device. SCE also works with third-party retailers who offer HAN devices that are compatible with SCE's smart meters.

[33] On a limited basis, SCE has provided customers on its Edison SmartConnect Field Trials education regarding device set-up, registration, and capabilities.

Online Tools

D. Integrated Audit Tool

Project Description	ME&O to generate participation in SCE's online integrated audit tool, Home Energy Advisor (for residential customers) and the Business Energy Advisor (for business customers). Upon completion of an integrated survey (audit), customers will receive customized DSM recommendations that will help customers better manage their energy usage.
Target Audience	Residential and small business customers.
Sample Message	Answer some questions to get an analysis of your energy use, along with customized recommendations for how to save and where to start. Then, let the tool work for you by tracking your progress, updating your actions and seeing the savings.
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Only available online. • Customers who previously took the online Home Energy Efficiency Survey may not see the benefit of using this new tool.
Strategy to Overcome Roadblocks	• Developing a mail component for the integrated audit. • Emphasizing the benefits of the new tool in marketing materials.

E. Web Presentment Tools

Project Description	ME&O to educate customers about online tools that provide interval energy usage and billing data that enable customers to make better energy management decisions. Online tools include: estimated bill-to-date, projected next bill, and interval data charts. See SCE Advice 2693-E[34] for more information about these tools.
Target Audience	Residential and small/medium non-residential customers with demands less than 200 kW who have a smart meter that is measuring interval data for billing purposes.
Sample Message	"Online tools can help you take control of your energy bills."
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Customers need internet access to take full advantage of the tools. • Lack of awareness of these new tools.
Strategy to Overcome Roadblocks	• Customers who do not have internet access can obtain information on their interval energy usage and billing data through the call center. • Bundle tools with other relevant products, rates and services, such as TOU rates. • Integrate relevant information into appropriate marketing materials.

[34] Advice 2693-E is pending disposition from the Commission.

F. Budget Assistant

Project Description	ME&O to educate customers regarding SCE's Budget Assistant tool which allows customers to easily monitor energy usage and costs. ME&O will be used to educate, inform and enroll customers by communicating that Budget Assistant helps eliminate end of the month bill surprises by providing alert notifications. See SCE Advice 2693-E for more information about this tool.
Target Audience	Most residential and small/medium non-residential customers with demands less than 200 kW, including customers enrolled in the following schedules: D, D-CARE, D-FERA, TOU-D-T, GS-1, and GS-2.
Sample Message	"Manage and control your electricity costs when you set a monthly spending goal and get updated with weekly email, text or voice message alerts – eliminating any end-of-the-month bill surprises."
Source of Message	Utility
Current Customer Engagement Road Block(s)	Customers must enroll in the program to receive alerts.
Strategy to Overcome Roadblocks	Simplify enrollment process by providing multiple response channels, including: online, mail, and phone (inbound and outbound).

G. Green Button

Project Description	Green Button is a White House initiative to allow customers greater access to their usage data via a “Green Button” on sce.com. Green Button will allow customers to download up to thirteen months of historical interval usage data in a data format that is standard across utilities.
Target Audience	Residential and small/medium non-residential customers with demands less than 200 kW.
Sample Message	Green Button icon and “Download My Data” message provided on SCE.com.
Source of Message	Pending CPUC approval, the messaging source is expected to be third parties that leverage Green Button data for their energy service offerings.
Current Customer Engagement Road Block(s)	SCE will provide the Green Button data, but does not market or offer any services that will use the Green Button data beyond providing the Green Button icon and “Download My Data” messaging on SCE.com.
Strategy to Overcome Roadblocks	Third parties, CPUC, and IOUs should monitor national Green Button developments, continue discussions with the U.S. Department of Energy, and respond as appropriate.

H. Energy Service Provider Interface (ESPI)

Project Description	ME&O to provide third parties access to individual customer's smart meter usage data via the utility's "backhaul" when authorized by the customer, and in a common data format consistent with the ongoing national Smart Grid standards efforts. See A.12-03-004[35] for more information about SCE's proposed effort. The White House's Green Button Connect initiative will run on the ESPI platform.
Target Audience	Upon initial deployment, ESPI will be for residential and small/medium non-residential customers with demands less than 200 kW. The ESPI platform will be available for large non-residential customers at a later time (the specific date is to be determined).
Sample Message	SCE will provide customer usage data to authorized third parties. These third parties will market such services to residential and small business customers, and will develop messaging consistent with their energy service offerings.
Source of Message	Third parties that leverage ESPI for their energy service offerings.
Current Customer Engagement Road Block(s)	The majority of engagement with customers regarding the use of this service will come from the third parties that offer energy management services that can leverage ESPI. SCE expects its ESPI platform to be available in Summer 2014. Thus, at this time, the majority of the roadblocks relate to the lack of clarity around processes, timing, tariff rules and other aspects.
Strategy to Overcome Roadblocks	Pursuant to D.13-09-025, SCE will file an Advice Letter providing key details about the ESPI Platform.

[35] A.12-03-004 was approved by D.13-09-025 on September 23, 2013.

I. Mobile Outage Application

Project Description	ME&O to educate customers on a new mobile application that customers can download to their smart phones for free. This application reports outage status and allows customers to report outages. See SCE.com for more information about this application.
Target Audience	Customers who use a smart phone.
Sample Message	"SCE has a new power outage app you can download and install for your Android phone or iPhone. If you experience a power outage or see a downed power line, use the app via your phone's web connection to contact SCE and report the issue. You can also use the app to view a map of outage locations, and find out when your service may be restored."
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Customer must have a smart phone to access the application. • Lack of customer awareness of this new tool.
Strategy to Overcome Roadblocks	• Customers without a smart phone can continue to call or go online to report an outage. • Integrate educational materials regarding this new tool in appropriate marketing materials and sce.com.

Rates and Programs

J. Save Power Day (Peak Time Rebate)

Project Description	ME&O to educate customers on the Save Power Day (SPD) program and alerts, including the Save Power Day Incentive Plus (Peak Time Rebate with Enabling Technology) program. Customers do not need to enroll to receive incentives; however, they must enroll in SPD Incentive Alerts (phone, text, or email alerts) to receive a notification when a SPD event will be called. ME&O will educate customers about SPD Incentive Plus which provides a $1.25/kWh rebate for those who enroll and have a registered HAN device (SPD rebates for customers without a registered HAN device is $0.75/kWh). Event notifications are sent to the HAN device in a text message. See sce.com for more information about the SPD program.
Target Audience	Residential customers with a smart meter that is measuring interval data for billing purposes.
Sample Message	"Sign up for an Alert and receive advanced notification of a Save Power Day event." Messaging for SPD with Enabling Technology is in development.
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Customer confusion regarding the differences between Save Power Day events and statewide Flex Alerts. • Lack of awareness and understanding regarding what Save Power Day events and/or alerts represent. • Customers (not enrolled in My Account) need to sign up to receive an alert. • Customers must have a registered HAN device to participate in Save Power Day Incentive Plus
Strategy to Overcome Roadblocks	• Continue communications to generate awareness and understanding. • Continue communications to help customers recognize and understand the difference between a Save Power Day and

	Flex Alert. • Create communication to help customers understand the impact Save Power Day event s have to their Demand Response program • Customers on who sign up for My Account are automatically are signed up to receive SPD alerts. • Listing SPD Incentive Plus as an available program for enrollment within the HAN device self-registration SCE.com webpages.

K. Mandatory / Default Dynamic Pricing and Time-of-Use Rates

Project Description	ME&O campaign will introduce small business customers to mandatory TOU rates and dynamic pricing, including default Summer Advantage Incentive (i.e., Critical Peak Pricing (CPP)).
Target Audience	Small/medium business customers with demands less than 200 kW.
Sample Message	"Shifting your electricity usage from peak periods gives you a chance to lower your annual energy costs, without reducing the overall amount of electricity you use. With TOU rate options, your cost varies based on when you use electricity or the Summer Advantage Incentive (i.e., CPP) may be beneficial to you, if you can shift usage to off-peak times during Demand Response program events."
Source of Message	Utility
Current Customer Engagement Road Block(s)	Lack of customer awareness and understanding of time-variant and dynamic pricing rates.
Strategy to Overcome Roadblocks	• Integrate message into relevant marketing efforts. • Use multiple channels and languages to reach customers. • Promote energy information tools available online that provide interval energy data to help customers better understand and manage their energy usage. • Implement online rate analysis tool to assist customers in making decisions on rate options. • Provide a pro-active bill impact and rate analysis to all affected customers being moved to mandatory time-of-use rates to encourage use of the self-service tools and increase customer engagement with making well informed decisions.

L. PEV Time-of-Use Rates

Project Description	ME&O to educate customers on PEV rate options, environmental benefits, charging levels, and other aspects of PEVs. Materials encourage customers to contact the utility prior to taking delivery of a PEV which will better inform the customer and start the process for SCE to check the distribution infrastructure for safe and reliable charging. See SCE.com for more information about PEV TOU rates.
Target Audience	Customers who have notified SCE of their interest in purchasing a PEV, customers who have notified SCE of their interest in providing a charging station(s) (i.e., fleet, workplace, commercial and multifamily dwelling charging), auto dealers, manufacturers, electricians, and installers.
Sample Message	“Charge smart with SCE’s rates (TOU), tools and resources. SCE can help make charging your new PEV simple, safe and economical.” BEVs and PHEVs travelling on electricity produce essentially no air pollution, even considering power plant emissions. These vehicles contribute to a cleaner, greener commute and lower your personal carbon footprint due to reduced greenhouse gas emissions.
Source of Message	Utility and third parties
Current Customer Engagement Road Block(s)	• Customers do not think about contacting the utility prior to purchasing and/or taking delivery of their new PEV. • Dealers have some apprehension to introducing the role of the utility during the sales process.
Strategy to Overcome Roadblocks	• Conduct online advertising to generate awareness of the role of the utility and PEVs. • Utilities to perform education and outreach activities to PEV dealers.

Pilot and Demonstration Programs. In addition to the initiatives described above, SCE has launched or will commence various Customer Empowerment pilots and demonstration projects. Generally, SCE will provide these pilots to a limited target audience for a limited duration and SCE will not provide ME&O to its general customer population. However, these efforts are expected to provide SCE with an improved assessment of potential messaging, customer engagement roadblocks, and potential strategies to overcome such roadblocks. Information regarding specific SCE Customer Empowerment efforts is provided below:

- **Irvine Smart Grid Demonstration (ISGD).** The objective of SCE's ISGD project is to verify, quantify, and validate the feasibility of integrating Smart Grid technologies. This project will deploy various technologies that represent the future of an integrated electric distribution system that is expected to be more reliable, secure, economic, efficient, safe, and environmentally friendly than those in general use today. The project will showcase advanced technologies necessary to support the smarter, more robust electricity infrastructure that will be critical as the country begins to rely on greater amounts of renewable generation, to use electricity as a fuel for vehicles, and recruit consumers to become active participants in the energy supply chain. To accomplish these objectives, ISGD encompasses four key areas addressing a broad set of requirements: (1) energy smart customer devices, (2) year 2020 distribution system, (3) secure energy network, (4) workforce of the future.

- **Edison SmartConnect Field Trials – Interim HAN Solution.** The purpose of this effort is to implement back office processes and system functionality to enable customer HAN device registration over SCE's AMI network. Participation in this effort was limited to 500 eligible residential Edison SmartConnect program ready customers in 2012. Participating customers received a free IHD device which received near real-time energy information, daily cost/price HAN text messages, and Save Power Day Incentive Plus event notifications. ME&O is provided by the utility. SCE is providing this service on a pilot basis in 2012, and this service is not expected to be widely available until 2014. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after this effort is complete. This effort is part of the Edison SmartConnect Field Trials.

- **Edison SmartConnect Field Trials – HAN Third Party Limited Launch.** The purpose of this effort is to promote HAN-enabled energy information displays and SCE's Save Power Days Program through retail and service providers to residential customers. SCE and third party retailers will focus their on ease-of-use and bill savings, and will be provided by SCE and the third parties. This pilot is expected to be launched in the fourth quarter of 2012 and will likely continue into the first quarter of 2013. Customer engagement roadblocks and strategies to overcome roadblocks will be evaluated after the pilot program is complete. This effort is part of the Edison SmartConnect Field Trials.

- **Edison SmartConnect Field Trials – HAN Real-Time Cost Pilot.** The purpose of this pilot is to provide near-real time cost information in a "dollars-per-hour" format, and to qualitatively assess behavioral impacts of residential customers. The messaging will be provided by the utility. This service has been provided on a pilot basis since 2012, and is not expected to be widely available until 2014. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete. This effort is part of the Edison SmartConnect Field Trials.

- **Edison SmartConnect Field Trials – HAN with Load Control.** The purpose of this pilot is to evaluate the technology and processes before offering this potion to SCE's residential customers. See Section III for more information. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

- **Edison SmartConnect Field Trials – Long Beach Field Trial.** The purpose of this pilot is to evaluate customer interaction with two different IHD devices. See Section III for more information. Customer education was provided by SCE. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

- **Home Battery Pilot.** The Home Battery Pilot will provide residential energy storage units (RESUs) in a limited number of customer locations to assess the technology's performance. See Section III for more information. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

- **Smart Charging PEV Pilot.** The purpose of this pilot is to evaluate PEV DSM programs that target overall system demands along with programs that target local distribution infrastructure such as transformers and service entrances. See Section III for more information. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

- **Work Place Charging PEV Pilot.** The Work Place Charging PEV Pilot will test, monitor, and analyze the impacts of PEV workplace charging at SCE facilities. See Section III for more information. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

Conceptual Projects. In its Deployment Plan, SCE identified certain conceptual projects. These projects include ALCS Release 3, PEV Metrology, Subtractive Billing, and On-Going Customer System Enhancements. As these projects are conceptual in nature, SCE has not yet developed any ME&O plans (e.g., target audience, sample messages, source of message, strategies to overcome roadblocks). SCE will reevaluate its ME&O approach (if any) once the projects advance from the conceptual stage.

Infrastructure Projects. Certain projects identified in SCE's Customer Empowerment Baseline and Roadmap Summary[36] provide the necessary supporting infrastructure which enables SCE's Smart Grid enabled DSM programs and services. Generally, these projects are not customer facing and, as such, SCE does not expect to provide specific ME&O to support these efforts. Such efforts include Load Control System Enhancements, PEV Metering Capital Requirements (2nd Meter for PEV), Dynamic Pricing System, Alerts and Notifications System, PEV Support Systems, DR System Enhancements, and HAN Support Systems.

[36] See SCE's Smart Grid Deployment Plan, page 107.

Appendix 2

Description of Baseline Regions

Map of Baseline Regions