BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Application of the California Energy Commission for Approval of Electric Program Investment Charge Proposed 2012 through 2014 Triennial Investment Plan.	Application 12-11-001 (Filed March 13, 2008)
And Related Matters.	Application 12-11-002 Application 12-11-003 Application 12-11-004

SOUTHERN CALIFORNIA EDISON COMPANY'S (U-338-E) ANNUAL REPORT ON THE STATUS OF THE ELECTRIC PROGRAM INVESTMENT CHARGE PROGRAM

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I.

INTRODUCTION AND SUMMARY

In Ordering Paragraph 16 of Decision 12-05-037, the California Public Utilities Commission (Commission) ordered Southern California Edison Company (SCE), Pacific Gas and Electric Company, and San Diego Gas & Electric Company and the California Energy Commission, collectively known as Electric Program Investment Charge (EPIC) Administrators, to file annual reports concerning the status of their respective EPIC programs. Subsequently, in D.13-11-025, Ordering Paragraph 22, the Commission requires the EPIC Administrators to follow the outline contained in Attachment 5 when preparing the EPIC Annual Reports. In Ordering Paragraph 23 of the same Decision, the Commission requires the EPIC Administrators to provide the project information in Attachment 6 as an electronic spreadsheet. In compliance

with the Ordering Paragraphs of D.12-05-037 and D.13-11-025, SCE hereby files its annual report on the status of its EPIC activities for 2013. This is SCE's first annual report, subsequent to receiving CPUC approval of its first EPIC Triennial Investment Plan (Application 12-11-004) on November 14, 2013.

Respectfully submitted,

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February 28, 2104

EPIC ADMINISTRATOR ANNUAL REPORT

Annual Report

TABLE OF CONTENTS

1. Executive Summary

a) Overview of Programs/ Plan Highlights

Southern California Edison's Electric Program Investment Charge (EPIC) Investment Plan for technology demonstration and deployment projects, as described in application (A.) 12-11-024 proposes to enhance its Advanced Technology organization's existing smart grid efforts, an area in which SCE has significant expertise and proven success. Through Advanced Technology and to the benefit of its ratepayers, SCE was able to attract federal funding for its Tehachapi Storage Project and Irvine Smart Grid Demonstration. SCE plans to leverage its EPIC projects in a similar manner to the extent that such opportunities are available.

This EPIC Annual Report documents activities from January 1 through December 31, 2013, which provides approximately six full weeks of program operation from the approval of SCE's First Triennial Investment Plan on November 19, 2013. Consequently, the scope of activities has been limited. However, SCE has been actively implementing its EPIC program, concentrating primarily on business planning for its 15 planned projects to ensure its internal EPIC processes conform to the provisions of D.13-11-025.

Due to limited operating timeframe, SCE incurred minimal administrative costs in 2013. These administrative expenses were primarily for EPIC readiness and program/project metrics development. Moreover, SCE did not expend any EPIC project money in 2013. However, of its authorized 2012-2014 EPIC program budget, SCE did commit a total funding amount of $32,872,672.

b) Status of Programs

Table 1 below summarizes the current status of SCE's EPIC projects:

Table 1: 2012-2014 Triennial Investment Plan: 2013 Projects

1. Energy Resources Integration
• 4 Projects Funded • Total Funding Committed: $6,457,817
2. Grid Modernization and Optimization
• 6 Projects Funded • Total Funding Committed: $9,924,665
3. Customer Focused Products and Services
• 3 Projects Funded • Total Funding Committed: $6,070,190
4. Cross-Cutting/Foundational Strategies and Technologies
• 2 Projects Funded • Total Funding Committed: $10,420,000
Total Projects Funded: 15 Total Funding Committed: $32,872,672[1] *Note: Due to intrinsic variability in TD&D /R&D projects, amounts shown are subject to change*

Table 2 below summarizes SCE's 2013 administrative expenses:

Table 2: 2012-2014 Triennial Investment Plan: 2013 Administration

• Consulting (Business Readiness and Metrics Development)	Total Cost: $114,477

2. Introduction and Overview

a) Background on EPIC (General Description of EPIC)

On December 15, 2011, the Commission adopted the Phase 1 Decision[2] in Rulemaking (R.) 08-12-009, requiring that the funding levels associated with the renewables and the research, development, and demonstration portions of the PGC remain in effect through a new Commission-mandated customer surcharge: the EPIC.[3] On May 24, 2012, the Commission issued the Phase 2 Decision, D.12-05-037, which established the EPIC Program to fund applied research and development, technology demonstration and deployment, and market facilitation

1 For additional details regarding SCE's Committed Funds, please see the attached spreadsheet.
2 D.11-12-035.
3 D.11-12-035, OP2.

programs for the purpose of ratepayer benefits.[4] The Phase 2 Decision further stipulates that the EPIC will continue through 2020[5] with an annual budget of $162 million.[6] Approximately 80% of the EPIC is administered by the CEC and 20% is administered by the IOUs. Additionally, about 0.5% of the EPIC budget funds Commission oversight of the program.[7] The IOUs were also limited to only the area of Technology Demonstrations and Deployments.[8] The total budgeted amount for IOUs' Demonstrations and Deployments is $30M and the total budgeted amount for administrative activities is $3.3M. SCE was allocated 41.1% of the cost.[9]

SCE collaborated with the other IOUs to develop a common framework to address projects for the Technology Demonstration and Deployment funding category. SCE then conducted two public workshops and incorporated stakeholder comments into the investment plan process. The Commission ordered the EPIC Administrators to file coordinated triennial investment plans in applications covering 2012-2014 by no later than November 1, 2012.[10] SCE filed an investment plan Application,[11] which received Commission approval on November 19, 2013.[12]

b) EPIC Program Components

The Commission limited SCE's involvement in its first EPIC investment plan to only technology demonstration and deployment projects, per D.12-05-037. In the aforementioned Decision, the Commission specifically defines technology demonstration and deployment

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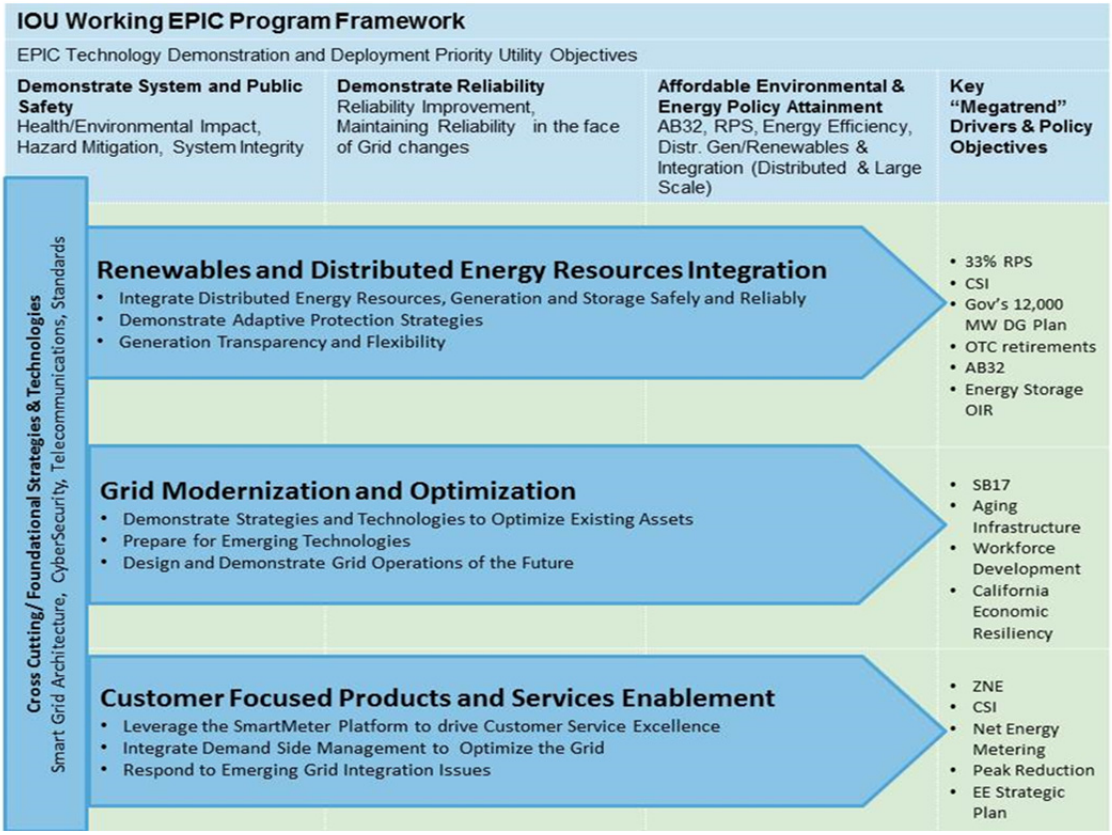
4 D.12-05-037, OP3.
5 D.12-05-037, OP1.
6 D.12-05-037, OP 7.
7 *Id*, OP5.
8 *Id.*
9 D.12-05-037, OP 7.
10 D.12-05-037, OP 11.
11 A.12-11-004.
12 D.13-11-025.

projects as the installation and operation of pre-commercial technologies or strategies at a scale sufficiently large and in conditions sufficiently reflective of anticipated actual operating environments to enable appraisal of the operational and performance characteristics and the financial risks.[13]

In accordance with the Commission's requirement for technology demonstration and deployment projects, the IOU's successfully collaborated[14] and developed a joint investment plan framework that the Commission adopted.[15] The joint framework identifies four program categories: (1) energy resources integration, (2) grid modernization and optimization, (3) customer-focused products and services, and (4) cross-cutting/foundational strategies and technologies. SCE's Investment Plan proposed projects for each of these four areas, focusing on the ultimate goals of promoting greater reliability, lowering costs, increasing safety, decreasing greenhouse gas emissions, and supporting low-emission vehicles and economic development for ratepayers. Please refer to Table 3 below.

[13] D.12-05-037, OP3.B.
[14] D.13-11-025, Finding of Fact 24.
[15] D.13-11-025, p. 48.

Table 3 Joint-IOU Demonstration & Deployment Framework



c) EPIC Program Regulatory Process

In accordance with the Commission's EPIC Phase II Decision, D.12-05-037, SCE submitted a triennial application (A.)12-11-004, November 1, 2012. During the development and execution of its Investment Plan, SCE consulted with a wide variety of stakeholders. PG&E hosted a Northern California workshop in San Francisco, August 16, 2012. SCE, on behalf of itself and SDG&E, hosted a Southern California Workshop in Westminster at SCE's Advanced Technology facility on August 17, 2012. Additionally, SCE hosted on behalf of all the IOU's a joint webinar on September, 28, 2012.

In 2013, the EPIC Administrators participated in an EPIC implementation workshop addressing metrics and program coordination. This workshop was held at the Commission on

January 18, 2013. The Commission subsequently issued a proposed decision approving the EPIC investment plans in May 2013. However, due to the passage of Senate Bill 97, codified as Public Resources Code (PRC)§ 25711.5 (a), the Commission issued a revised proposed decision in October and gave final approval in November 2013. In compliance with the requirements of EPIC, the Administrators held a joint-webinar at the California Energy Commission (CEC) on December 18, 2013, to inform stakeholders of the current status of each Administrator's respective EPIC program.

d) Coordination

The EPIC Administrators have collaborated throughout the investment plan's planning and execution. Examples of the EPIC Administrators working collaboratively during 2013 include:

- Joint summary of the Commission Workshop, held January 18, 2013; and
- Joint webinar of the current status of EPIC Programs, held December 18, 2013.

Moreover, the EPIC Administrators meet on a near-weekly basis for purposes of sharing information regarding the investment plans and projects; avoiding duplication of projects; establishing common evaluation measurement and verification protocols; and adopting a common approach to intellectual property. The administrators are in the process of developing protocols to evaluate, measure and verify the results of EPIC projects.

e) Transparent and Public Process/ CEC Solicitation Activities

During the development and execution of its Investment Plan, SCE hosted and participated in public workshops and webinars. At these public workshops,[16] SCE described its proposed program for EPIC technology demonstration and deployment projects and solicited comments from stakeholders on its proposed investment plan. Stakeholders were interested in

[16] Please refer to the section above for specific workshop and webinar dates.

EPIC avoiding duplication. In response to stakeholder input, the Energy Division requested that the IOUs conduct a "gaps" analysis to ensure proposed projects address areas beneficial to customers and avoid duplication. The IOUs directly incorporated this recommendation for a "gaps" analysis into the development of the investment plans and engaged the Electric Power Research Institute (EPRI) to conduct a "gaps" analysis. EPRI concluded that there are gaps in current demonstration and deployment projects and that the IOUs' proposed projects could fill those gaps.

At the request of the Commission, SCE established an EPIC website in December 2013, to further encourage stakeholder participation. On the SCE website, stakeholders can read an overview of EPIC, read SCE's Application, and email SCE directly concerning EPIC issues.

3. Budget

a) Authorized Budget (Table Format)

- 2012 – 2014

Table 4: 2013 Authorized EPIC Budget

2013 (Jan 1, Dec 31)	Administrative	Project Funding	Commission Regulatory Oversight Budget
SCE Program	$1.4M	$12.4M	$0.329M[17]
CEC Disbursements	$5,252,600	$0	

D.12-05-037 requires SCE to remit administrative funding to the CEC and the Commission. The utility administrators are required to submit funds to the CEC on a quarterly basis.[18] SCE remitted four quarterly payments totaling $5,252,600 to the CEC for program administrative expenses in 2013. SCE remitted the first quarter payment to the CEC of $1,153,500 on March 14, 2013. SCE remitted the second quarter payment of $1,313,150, on June 28, 2013. The first quarter amount was incorrect, so SCE made a true-up payment of

[17] Advice Letter, 2747-E, p. 6.
[18] D.12-05-037 at OP 9.

$159,650 on June 28. SCE then remitted its third quarter payment of$1,313,150 on September 19, 2013 and its fourth quarter payment of $1,313,150 on December 16, 2013. The CEC has approved of SCE's remittance payments.

Similarly, the utility administrators are required to remit oversight funding to the Commission on an annual basis beginning July 1, 2012.[19] SCE has not remitted its share of Commission program oversight expenses, because SCE has not yet received an invoice.

The Commission's Phase II Decision also approved an Administration Budget for costs above and beyond project costs. The Commission states these costs include staffing, associated general and administrative expenses and overhead, and related contracting costs to prepare the investment plans, conduct solicitations, select funding recipients and monitor and oversee the progress of projects and investments. Due to the Commission issuing approval of SCE's 2012-2014 EPIC Investment Plan application later than anticipated, SCE has incurred minimal administrative expenses. These administrative expenses were consulting fees for staffing to prepare for EPIC readiness and program/project metrics development. The Table below summarizes SCE's 2013 incurred administrative costs:

Table 5: 2012-2014 Triennial Investment Plan: 2013 Administration

• Consulting (Business Readiness and Metrics Development)	Total Cost: $114,477

SCE did not expend any EPIC project dollars in 2013, due to the aforementioned Commission approval occurring later than anticipated.

b) Commitments/ Encumbrances

As of December 31, 2013, SCE has committed $32,872,672 and encumbered $0 of its authorized 2012-2014 program budget.

[19] *Id.* at OP 10.

c) Dollars spent on in-house activities

As of December 31, 2013, SCE on in-house activities has spent $0.

d) Fund shifting above 5% between program areas (discuss pending fund shifting requests and /or approvals)

As of December 31, 2013, SCE does not have any pending fund shifting requests and/or approvals.

e) Uncommitted/unencumbered funds

As of December 31, 2013, SCE has $2,687,328 in uncommitted/unencumbered funds.

4. Projects

a) High level summary [Table or bullet list by strategic objective/IOU categories): number of projects funded, total funding]

- SCE did not expend any EPIC project dollars in 2013. However, SCE did commit a total funding amount of $32,872,672 for EPIC projects. Please see Table 6 below for additional details:

Table 6: 2012-2014 Triennial Investment Plan: 2013 Projects

1. Energy Resources Integration
• 4 Projects Funded • Total Funding Committed: $6,457,817
2. Grid Modernization and Optimization
• 6 Projects Funded • Total Funding Committed: $9,924,665
3. Customer Focused Products and Services
• 3 Projects Funded • Total Funding Committed: $6,070,190
4. Cross-Cutting/Foundational Strategies and Technologies
• 2 Projects Funded • Total Funding Committed: $10,420,000
Total Projects Funded: 15 Total Funding Committed: $32,872,672 *Note: Due to intrinsic variability in TD&D /R&D projects, amounts shown are subject to change*

b) Project Status Report

Please refer to the spreadsheet which is being separately and concurrently submitted with this Annual Report. That Excel spreadsheet is being submitted separately for ease of reference, and its contents are hereby incorporated into this Annual Report by reference.

c) Description of Projects:

(i) Investment Plan Period

(ii) Assignment to Value Chain

(iii) Objective

(iv) Scope

(v) Deliverables

(vi) Metrics

(vii) Schedule

(viii) EPIC Funds Encumbered

(ix) EPIC Funds Spent

(x) Partners (if applicable)

(xi) Match Funding (if applicable)

(xii) Match Funding Split (if applicable)

(xiii) Funding Mechanism (if applicable)

(xiv) Treatment of Intellectual Property (if applicable)

(xv) Status Update

SCE's projects have been consolidated since filing the EPIC 2012-2014 Investment Plan Application (A.)12-11-004. Projects were consolidated for the following reasons: 1) Cost savings as systems engineering and specifications development work leveraged across multiple projects; 2) Opportunity to increase potential benefits and value due to more holistic and integrated

demonstration projects; and 3) Synergies between multiple projects result in consolidation and reduce risk of duplicative work.

1. Regional Grid Optimization

<table>
<tr><td colspan="2">Investment Plan Period:
1st Triennial Plan (2012-2014)</td><td colspan="2">Assignment to value Chain:
Grid Operation/Market Design</td></tr>
<tr><td colspan="4">Objective & Scope:
The project will demonstrate, evaluate, analyze and propose options that address the impacts of Distributed Energy Resources (DER) penetration and increased adoption of Distributed Generation (DG) owned by consumers on all segments/aspects of SCE's grid – transmission, distribution and overall "reliable" power delivery cost to SCE customers (all tiers). This demonstration project is in effect the next step to the ISGD project. Therefore, this analysis will focus on the effects of introducing emerging and innovative technology into the utility and consumer end of the grid, predominantly the commercial and industrial customers with the ability to generate power with self-owned and operated renewable energy sources, but connected to the grid for "reliability" and "stability" operational reasons. This scenario introduces the need for the utility (SCE) to assess discriminative technology focus necessary for stabilizing the grid with increased DG adoption, and more importantly, consider possible economic models that would help SCE adopt to the changing regulatory policy and GRC structures.</td></tr>
<tr><td colspan="4">Deliverables:
TBD</td></tr>
<tr><td colspan="4">Metrics:
TBD</td></tr>
<tr><td colspan="4">Schedule:
TBD</td></tr>
<tr><td colspan="2">EPIC Funds Encumbered:
$0</td><td colspan="2">EPIC Funds Spent:
$0</td></tr>
<tr><td colspan="4">Partners:
Caltech University</td></tr>
<tr><td>Match Funding:
TBD</td><td>Match Funding split:
TBD</td><td colspan="2">Funding Mechanism:
TBD</td></tr>
<tr><td colspan="4">Treatment of Intellectual Property
TBD</td></tr>
<tr><td colspan="4">Status Update
N/A</td></tr>
</table>

2. Regulatory Mandates: Submetering Enablement Demonstration

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Demand-Side Management	
Objective & Scope: On November 14, 2013, the Commission voted to approve the revised Proposed Decision (PD) Modifying the Requirements for the Development of a Plug-In Electric Vehicle Submetering Protocol set forth in D.11-07-029. The investor-owned utilities (IOUs) are to implement a two phased pilot beginning in May 2014, with funding for both phases provided by the EPIC. This project, Phase I of the pilot will (1) evaluate the demand for Single Customer of Record submetering, (2) estimate billing integration costs, (3) estimate communication costs, and (4) evaluate customer experience. IOU's and external stakeholders will finalize the temporary metering requirements, develop a template format used to report submetered, time-variant energy data, register Submeter Meter Data Management Agents and develop a Customer Enrollment Form, and finalize MDMA Performance Requirements. The IOUs will also solicit a 3rd party evaluator to evaluate customer experience.		
Deliverables: TBD		
Metrics: TBD		
Schedule: TBD		
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0	
Partners: TBD		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property TBD		
Status Update N/A		

3. Distribution Planning Tool

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Distribution
Objective & Scope: This project involves the creation, validation, and functional	

demonstration of an SCE distribution system model that will address the future system architecture that accommodates distributed generation (primarily solar photovoltaic), plug-in electric vehicles, energy storage, customer programs (demand response, energy efficiency), etc. The modeling software to be used allows for implementation of advanced controls (smart charging, advanced inverters, etc) using the GridLAB-D engine. These controls will enable interaction of a residential energy module and a power flow module. Combining these two modules in GridLAB-D enables the evaluation of various technologies from an end-use customer perspective as well as a utility perspective, allowing full evaluation from substation bank to customer. This capability that does not exist today. The completed model will help SCE demonstrate, communicate, and better respond to technical, customer, and market challenges as the distribution system architecture evolves.	
Deliverables: • Grid LAB-D user interface • SCE circuit model • Updated GridLAB-D to handle Cyme 7 database • Base cases & benchmark • Specifications for test cases from stakeholders • Created test cases • Periodic updates/meetings with stakeholders • Executed test cases • Final report out	
Metrics: 2a. Hours worked in California and money spent in California for each project 3a. Maintain / Reduce operations and maintenance costs 3c. Reduction in electrical losses in the transmission and distribution system 4a. GHG emissions reductions (MMTCO2e) 7b. Increased use of cost-effective digital information and control technology to improve reliability, security, and efficiency of the electric grid (PU Code § 8360) 7c. Dynamic optimization of grid operations and resources, including appropriate consideration for asset management and utilization of related grid operations and resources, with cost-effective full cyber security (PU Code § 8360)	
Schedule: January 2014 – December 2015	
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0
Partners:	

TBD		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property TBD		
Status Update N/A		

4. Beyond the Meter: Customer Device Communications, Unification and Demonstration (Phase II)

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Demand-Side Management	
Objective & Scope: This project intends to enable advanced control of customer-owned emerging technology. Specifically this project will target electric vehicle charging equipment, residential energy storage units, and solar inverters that leverage open standards-based communications. Ultimately, the project's goal is to demonstrate the use of modern communications (internet based or other) technology to enable advanced control functions of emerging customer technologies. Once complete, SCE would gain the knowledge to prepare for anticipated greater customer adoption. SCE will develop and deliver a report on its findings.		
Deliverables: TBD		
Metrics: TBD		
Schedule: TBD		
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0	
Partners: TBD		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property TBD		
Status Update N/A		

5. Portable End-to-End Test System

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Transmission
Objective & Scope: End-to-end transmission line relay testing has become essential for operations and safety. SCE test technicians currently test relay protection equipment during commissioning and routing testing. Existing tools provide a limited number of scenarios (disturbances) for test, and focus on testing protection elements; not testing a system. This project will demonstrate a robust portable end-to-end toolset (PETS) that addresses: 1) relay protection equipment, 2) communications, and 3) provides a pass/fail grade based on the results of automated testing using numerous simulated disturbances. PETS will employ portable Real-Time Digital Simulators (RTDS's) in substations at each end of the transmission line being tested. Tests will be documented using a scripting procedure used in the RTDS lab today; ensuring all test scenarios are properly evaluated.	
Deliverables: TBD	
Metrics: TBD	
Schedule: TBD	
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0
Partners: TBD	

Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property TBD		
Status Update N/A		

6. Voltage and VAR Control of SCE Transmission System

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Transmission
Objective & Scope: This project involves the demonstration of software and hardware products that will enable automated substation volt/var control. In partnership with Washington State University (WSU), SCE will demonstrate a Substation Level Voltage Control (SLVC) unit working with a transmission control center Supervisory Central Voltage Coordinator (SCVC) unit to monitor and control substation	

voltage. The scope of this project includes systems engineering, test, and demonstration of the hardware and software that could be operationally employed to manage substation voltage.

Deliverables:

- Controller software code for Automated Substation Volt/VAR Control Unit
- RSCAD model to test the control algorithm on RTDS
- Design specification
- Construction documents: drawings, cable schedule, and bill of material
- Monitoring console software and hardware
- Field deployment
- Controller operation monitoring and adjustment
- Interim report on the conceptual design and mathematical formulation for Supervisory Central Voltage Coordinator
- Solution technique
- Simulations and validate with real data
- Supervisory control and optimal reactive power flow algorithm
- Deployment
- Advanced Volt/VAR Control (AVVC) experimentation
- AVVC final report and closeout

Metrics:

2a. Hours worked in California and money spent in California for each project
3a. Maintain / Reduce operations and maintenance costs
3c. Reduction in electrical losses in the transmission and distribution system
3d. Number of operations of various existing equipment types (such as voltage regulation) before and after adoption of a new smart grid component, as an indicator of possible equipment life extensions from reduced wear and tear
4a. GHG emissions reductions (MMTCO2e)
7b. Increased use of cost-effective digital information and control technology to improve reliability, security, and efficiency of the electric grid (PU Code § 8360)
7c. Dynamic optimization of grid operations and resources, including appropriate consideration for asset management and utilization of related grid operations and resources, with cost-effective full cyber security (PU Code § 8360)

Schedule:

January 2014 – December 2016

EPIC Funds Encumbered:	**EPIC Funds Spent:**
$0	$0

Partners: Washington State University		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property TBD		
Status Update N/A		

7. Superconducting Transformer (SCX) Demonstration

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Distribution
Objective & Scope: SCE will support this $21M American Reinvestment and Recovery Act (ARRA) Superconducting Transformer (SCX) project by providing technical expertise and installing and operating the transformer at SCE's MacArthur substation. The SCX prime contractor is SuperPower Inc. (SPI), teamed with SPX Transformer Solutions (SPX) {formerly Waukesha Electric Systems}. SCE has provided two letters of commitment for SCX. The SCX project will develop a 28 MVA High Temperature Superconducting, Fault Current Limiting (HTS-FCL) transformer. The transformer is expected to be installed in 2015. SCE is supporting this project and is not an ARRA grant sub-recipient. SCE is being reimbursed for its effort by EPIC. SCE's participation in this project was previously approved under the now defunct California Energy Commission's PIER program.	
Deliverables: • Site construction • Installation and commissioning of the SCX at MacArthur • Operation and data collection • Removal of SCX and supporting idle equipment and structures • Post operation autopsy (if required)	
Metrics: 2a. Hours worked in California and money spent in California for each project 3a. Maintain / Reduce operations and maintenance costs 3b. Maintain / Reduce capital costs 3c. Reduction in electrical losses in the transmission and distribution system 4a. GHG emissions reductions (MMTCO2e) 10a. Description or documentation of funding or contributions committed by others	

Schedule: January 2014 – August 2017		
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0	
Partners: SuperPower Inc.; SPX Transformer Solutions		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property TBD		
Status Update N/A		

8. State Estimation Using Phasor Measurement Technologies

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Grid Operation/Market Design	
Objective & Scope: Accurate, timely power system state estimation data is essential for understanding system health and providing the basis for corrective action that could avoid failures and outages. This project will demonstrate the utility of improved state estimation using Phasor Measurement Unit (PMU) data in concert with existing systems. Enhancements to static state estimation will be investigated using two approaches: 1) by using GPS time to synchronize PMU data with Supervisory Control and Data Acquisition (SCADA) system data; 2) by augmenting SCE's existing conventional state estimator with a PMU based Linear State Estimator (LSE). This project will be performed in partnership with Virginia Tech University.		
Deliverables: TBD		
Metrics: TBD		
Schedule: TBD		
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0	
Partners: Virginia Tech University		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property		

TBD
Status Update N/A

9. Wide-Area Reliability Management & Control

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Grid Operation/Market Design	
Objective & Scope: With the planned wind and solar portfolio of 33% penetration, a review of the integration strategy implemented in the SCE bulk system is needed. The basic premise for the integration strategy is that a failure in one area of the grid should not result in failures elsewhere. The approach is to minimize failures with well designed, maintained, operated and coordinated power grids. New technologies can provide coordinated wide-area monitoring, protection, and control systems with pattern recognition and advance warning capabilities. This project will demonstrate new technologies to manage transmission system control devices to prevent cascading outages and maintain system integrity.		
Deliverables: TBD		
Metrics: TBD		
Schedule: TBD		
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0	
Partners: Iowa State University		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property TBD		
Status Update N/A		

10. Distributed Optimized Storage (DOS)

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Distribution
Objective & Scope: This field pilot will demonstrate end-to-end integration of multiple energy storage devices on a distribution circuit/feeder to provide a	

turn-key solution that can cost-effectively be considered for SCE's distribution system, where identified feeders can benefit from grid optimization and variable energy resources (VER) integration. To accomplish this, the project team will first identify distribution system feeders where multiple energy storage devices can be operated centrally. Once a feeder is selected, the energy storage devices will be deployed and tested to demonstrate seamless utility integration, control, and operation of these devices using a single centralized controller. At the end of the project, SCE will have established clear methodologies for identifying feeders that can benefit from distributed energy storage devices and will have established necessary standards-based hardware and control function requirements for grid optimization and renewables integration with distributed energy storage devices.

Deliverables:

- Target feeder models
- Selected feeders for the project
- Requirement development for solution
- RFP for all devices
- Procurement of all devices
- Evaluation of centralized controller and representative energy storage devices
- Test platform readiness for protection evaluation
- Testing of various energy storage footprints for protection
- Engagement of all expected SCE departments for deployment
- Procurement of M&V equipment
- Deployment of M&V Equipment and energy storage devices and centralized controller
- M&V complete and final report

Metrics:

1c. Avoided procurement and generation costs
1i. Nameplate capacity (MW) of grid-connected energy storage
2a. Hours worked in California and money spent in California for each project
3b. Maintain / Reduce capital costs
5f. Reduced flicker and other power quality differences
5i. Increase in the number of nodes in the power system at monitoring points
6a. Benefits in energy storage sizing through device operation optimization
6b. Benefits in distributed energy storage deployment vs. centralized energy storage deployment
7a. Description of the issues, project(s), and the results or outcomes
7b. Increased use of cost-effective digital information and control technology to improve reliability, security, and efficiency of the

electric grid (PU Code § 8360) 7c. Dynamic optimization of grid operations and resources, including appropriate consideration for asset management and utilization of related grid operations and resources, with cost-effective full cyber security (PU Code § 8360)		
Schedule: January 2014 – December 2016		
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0	
Partners: TBD		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property TBD		
Status Update N/A		

11. Outage Management and Customer Voltage Data Analytics Demonstration

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Grid Operation/Market Design
Objective & Scope: Voltage data and customer energy usage data from the Smart Meter network can be collected and leveraged for a range of initiatives focused on achieving operational benefits for Transmission & Distribution. Before a full implementation of this new approach can be considered, a Pilot project will be conducted to understand how voltage and consumption data can be best collected, stored, and integrated with T&D applications to provide analytics and visualization capabilities. Further, Smart Meter outage and restoration event (time stamp) data can be leveraged to improve customer outage duration and frequency calculations. Various stakeholders in T&D have identified business needs to pursue more effective and efficient ways of calculating SAIDI (System Average Interruption Duration Index), SAIFI (System Average Interruption Frequency Index), and MAIFI (Momentary Average Interruption Frequency Index) for internal and external reporting. Before a full implementation of this new approach can be considered, a Pilot project will be conducted to understand the feasibility and value of providing smart meter data inputs and enhanced methodology for calculating the Indexes. The Pilot will focus on a limited geography (SCE District or Region) to obtain the Smart Meter inputs to calculate the Indexes and compare that number with the current	

methodologies to identify any anomalies. A hybrid approach using the Smart Meter-based input data combined with a better comprehensive electric connectivity model obtained from GIS may provide a more efficient and effective way of calculating the Indexes. Additionally, an effort to evaluate the accuracy of the Transformer Load Mapping data will be carried out.		
Deliverables: TBD		
Metrics: TBD		
Schedule: TBD		
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0	
Partners: TBD		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property TBD		
Status Update N/A		

12. SA-3 Phase III Demonstration

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Transmission
Objective & Scope: This project is intended to apply the findings from the Substation Automation Three (SA-3) Phase II (Irvine Smart Grid Demonstration) project to demonstrate real solutions to automation problems faced by SCE today. The project will demonstrate two standards-based automation solutions (sub-projects) as follows: Subproject 1 (Bulk Electric System) will address issues unique to transmission substations including the integration of centrally managed critical cyber security (CCS) systems and NERC CIP compliance; Subproject 2 (Hybrid) will address the integration of SA-3 capabilities with SAS and SA-2 legacy systems. Furthermore, as part of the systems engineering the SA-3 technical team will demonstrate two automation tools as follows: Subproject 3 (Intelligent Alarming) will allow substation operators to pin-point root cause issues by analyzing the various scenarios and implement an intelligent alarming system that can identify the source of the problem and give operators only the relevant information needed to	

make informed decisions; and Subproject 4 (Real Time Digital Simulator (RTDS) Mobile Testing) will explore the benefits of an automated testing using a mobile RTDS unit, and propose test methodologies that can be implemented into the factory acceptance testing (FAT) and site acceptance testing (SAT) testing process.		
Deliverables: TBD		
Metrics: TBD		
Schedule: TBD		
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0	
Partners: TBD		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property: TBD		
Status Update: N/A		

13. Next-Generation Distribution Automation

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Distribution
Objective & Scope: SCE's current distribution automation scheme often relies on human intervention that can take several minutes (or longer during storm conditions) to isolate faults, is only capable of automatically restoring power to half of the customers on the affected circuit, and needs to be replaced due to assets nearing the end of their lifecycle. In addition, the self-healing circuit being demonstrated as part of the Irvine Smart Grid Demonstration is unique to the two participating circuits and may not be easily applied elsewhere. As a result, the Next-Generation Distribution Automation project intends to demonstrate a cost-effective advanced automation solution that can be applied to the majority of SCE's distribution circuits. This solution will utilize automated switching devices combined with the latest protection and wireless communication technologies to enable detection and isolation of faults before the substation circuit breaker is opened, so that at least 2/3 of the circuit load can be restored quickly. This will improve reliability and reduce customer minutes of interruption. The system will also have directional power flow	

sensing to help SCE better manage distributed energy resources on the distribution system. At the end of the project, SCE will provide reports on the field demonstrations and recommend next steps for new standards for next-generation distribution automation.
Deliverables: • Engineering specifications • Selected vendors • Procured materials • Report on lab testing • Report on field pilot • Measurement and verification • Final report with recommendations on standards for next-generation distribution automation
Metrics: 5a. Outage number, frequency and duration reductions 5c. Forecast accuracy improvement 5d. Public safety improvement and hazard exposure reduction 5e. Utility worker safety improvement and hazard exposure reduction 5i. Increase in the number of nodes in the power system at monitoring points
Schedule: February 2014 – December 2016

EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0

Partners: TBD

Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD

Treatment of Intellectual Property: TBD
Status Update: N/A

14. Enhanced Infrastructure Technology Evaluation

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Distribution
Objective & Scope: At the request of Distribution Apparatus Engineering (DAE) group's lead Civil Engineer, Advanced Technology (AT) will investigate, pilot, and come up with recommendations for enhanced infrastructure technologies. The project will focus on evaluating advanced: distribution sectional poles (hybrid, coatings, etc.),	

concealed communications on assets, vault monitoring systems (temperature, water, etc.), and vault ventilation systems. Funding is required to investigate the problem, engineering, pilot alternatives, and come up with recommendations. DAE sees the need for poles that can withstand fires and have a better life cycle cost, and provide installation efficiencies when compared to existing wood pole replacements. Due to increased city restrictions, there is a need for more concealed communications on our assets such as streetlights (e.g., on the ISGD project, the City of Irvine wouldn't allow SCE to install repeaters on streetlights due to aesthetics). DAE also sees the need for technologies that may minimize premature vault change-outs (avg. replacement cost is ~$250K). At present, DAE does not have the necessary real-time vault data to sufficiently address the increasing vault deterioration issue nor do we utilize a hardened ventilation system that would help this issue by removing the excess heat out of the vaults (blowers last ~ 2 years, need better bearings for blower motors, etc.).		
Deliverables: TBD		
Metrics: TBD		
Schedule: TBD		
EPIC Funds Encumbered: $0	**EPIC Funds Spent:** $0	
Partners: TBD		
Match Funding: TBD	**Match Funding split:** TBD	**Funding Mechanism:** TBD
Treatment of Intellectual Property: TBD		
Status Update: N/A		

15. Dynamic Line Rating Demonstration

Investment Plan Period: 1st Triennial Plan (2012-2014)	**Assignment to value Chain:** Transmission
Objective & Scope: Transmission line owners apply fixed thermal rating limits for power transmission lines. These limits are based on conservative assumptions of wind speed, ambient temperature and solar radiation. These limits are established to ensure compliance with safety codes, maintain the integrity of line materials and ensure	

<table>
<tr><td colspan="3">network reliability. Monitored transmission lines can be more fully utilized to improve network efficiency. Line tension is directly related to average conductor temperature. The tension of a power line is directly related to the current rating of the line. This project will demonstrate two different dynamic line rating solutions: 1) SMARTLINE from Valley Group; and 2) CAT-1. SMARTLINE will demonstrate a Lindsey Manufacturing developed solution to monitor conductor clearance and temperature in real-time. CAT-1 will monitor the tension of transmission lines in real-time to calculate a dynamic daily rating. A successful solution will allow SCE to perform real-time calculations in order to determine dynamic daily rating of transmission lines, thus increasing transmission line capacity.</td></tr>
<tr><td colspan="3">Deliverables:
TBD</td></tr>
<tr><td colspan="3">Metrics:
TBD</td></tr>
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TBD</td></tr>
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$0</td></tr>
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TBD</td></tr>
<tr><td>Match Funding:
TBD</td><td>Match Funding split:
TBD</td><td>Funding Mechanism:
TBD</td></tr>
<tr><td colspan="3">Treatment of Intellectual Property:
TBD</td></tr>
<tr><td colspan="3">Status Update:
N/A</td></tr>
</table>

5. Conclusion

a) Key results for the year for SCE's EPIC programs

During 2013, the key highlight for SCE was receiving Commission approval of its 2012-2014 Investment Plan Application, November 19, 2014.[20] While SCE did not expend any EPIC project money in 2013 due to the Commission's approval occurring later than anticipated, SCE did commit $32,872,672 of its authorized 2012-2014 EPIC program budget. SCE is positioned to begin implementing its EPIC Program, now that the Commission has given approval.

Another important result for SCE during 2013 was continuing the open dialogue with stakeholders. SCE participated in two stakeholder engagements during the year. The first engagement was a Commission workshop addressing metrics and program coordination on January 18, 2013. The EPIC Administrators also held a joint-webinar at the CEC on December 18, 2013, to inform stakeholders of the current status of each Administrator's respective EPIC program. SCE appreciated stakeholders' comments and directly incorporated the comments into the EPIC Investment Plan's process.

b) Next Steps for EPIC Investment Plan (stakeholder workshops etc.)

SCE's next steps for EPIC will be to continue its program implementation. A key planned highlight for SCE will be the issuance of a Request for Proposals (RFPs) for specialty engineering and technical services (SETS). The SETS competitive procurement will establish contract vehicles, with teams composed of diverse business entities and large vendors, for efficient solicitation and competitive award of task orders. The SETS will support SCE's overall EPIC program to execute a variety of potential projects.

[20] D.13-11-025, OP8.

Importantly, SCE will also continue its open dialogue with stakeholders by participating in two planned engagements. The IOU's held a joint webinar on February 21, 2014. For the second engagement, SCE plans to host a southern California EPIC workshop March 21, 2014 at its Advanced Technology facility. SCE looks forward to receiving stakeholder input and incorporating it into the 2015-2017 EPIC Investment Plan process.

c) Issues that may have major impact on progress in projects, if any.

SCE has experienced some challenges implementing its EPIC Program. In particular, the procurement and intellectual property aspects of EPIC have been the most difficult to implement. Moreover, the Commission's language limiting third parties from intellectual property could significantly dampen industry interest in SCE's Request for Proposals (RFP) for specialty engineering and technical services.

SCE will bring up these EPIC Implementation issues, such as procurement and intellectual property with the Commission and stakeholders for further discussion at the EPIC Workshop scheduled for March 21, 2014.