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Subject: FYI To Service List in R10-12-007

### **Very Quick and Dirty Review of IOU's revised EPIC investment Plans**

The three electric IOUs and the California Energy Commission on Nov. 1 filed their 2012-2014 EPIC Investment Plans. The applications and supporting documents are now available in Proceedings

CEC                    A12-11-001

SDG&E                A12-11-002

PG&E                 A12-11-003

SCE                    A12-11-004

The applications most likely will be consolidated into a single proceeding.

The four EPIC Investment Plan applications represent a total of \$466.5 million for the 2012-2014 period, including just over \$50 million of that for Program Administration and Oversight. In addition, the CEC will be seeking approval for an additional \$50 million over two years for

the New Solar Homes Partnership, but that is separate from this analysis. That means some \$415 million will go to Applied Research, Technology & Demonstration, and Market Facilitation programs in the spending period (generally, 2013-2016). The CEC plan accounts for 80% of EPIC funding, and is quite detailed.

Utility spending is entirely in the T&D category.

There is a very heavy emphasis on Smart Grid R&D and Grid Modernization by the IOUs, and a pretty significant focus on energy storage by PG&E and SCE (see below). PG&E and SCE also want to spend significant portions of their budgets on customer service improvements.

**PG&E approximately \$49.3 million over 3 years**

PG&E identified 26 Priority Projects in three discrete categories and 8 subcategories.

Renewable Integration/Storage/Generator flexibility has about 18% of budget -- \$8.9 million

Grid Modernization/Grid Operations/Emerging Technologies has 49%, and -- \$24 million

Customer focus, including leveraging SmartMeter platform/billing flexibility/integrating customer DSM to reduce T&D costs

(i.e., with EVs and Net Zero Energy buildings) gets the other 23% -- \$11.4 million

*Of interest is that 4 specific project areas for storage were identified, and I'm going to review those further.*

**SCE sees about \$37 million for the Plan period in 4 categories:**

Facilitating Variable Energy Resources and Grid Scale Storage  
\$9 million

Grid  
Modernization  
\$7.5 million

Customer Focus (expanding SmartMeter platform capabilities)  
\$5.5 million

Cross Cutting (mostly Smart Grid architecture/Cybersecurity/Data Analytics and controls \$15 million

**SDG&E proposed spending a little over \$7.9 million in five areas:**

Smart Grid Architecture Demonstrations	\$1.5 million
Visualization and Situational Awareness	\$1.5 million
Distributed Controls and Smart Grid	\$1.65 million
Grid Support Functions for DER	\$1.67 million
Smart Distribution Circuit Demonstrations	\$1.6 million

**EPIC Investment Plans Include up to \$75 Million for Energy Storage Research and Deployment**

A preliminary estimate of EPIC program areas that are specific to Energy Storage indicates as much as \$61 million of the CEC project budget –

- Up to \$16 million for new technologies & applications for customer-side energy choices;
- About \$2 million for Storage to enable clean generation;
- Approximately \$9 million for Smart Grid storage applications;
- As much as \$31 million for Demonstration and Deployment projects; and

- About \$3 million for effective market assessments.

Also, as much as \$10 million of PG&E's funds, and \$5 million of SCE's funding could be allocated to projects that advance Energy Storage technology and/or deployment opportunities. SDG&E's plan references Storage in several areas, but it appears its proposed projects are not directed at Storage specifically but rather provide for systems to support a variety of Smart Grid technology improvements, including storage.

**Disclaimer:** None of the budgets specifically break out expected spending for Storage, and what is finally allocated will depend entirely on competitive bids and award structures. The rough estimates above derive from assessing a pro-rated share of budget figures for projects identified within defined categories in the Plans. It is also possible that priority areas that do not specifically cite Storage could elicit projects that include Storage technologies or support systems.

In any event, the EPIC plans represent a wide variety of approaches to Storage that include testing & evaluation of batteries and other technologies, communications and control systems, and direct deployment of systems for grid support services, with some additional emphasis on Electric Vehicle charging and storage deployment.

Below lists areas in EPIC Investment Plans that are most directly related to Energy Storage.

### **PG&E EPIC Proposals for Energy Storage and Related Programs**

Specific to Storage

*Demonstrate energy storage end uses*

*Demonstrate use of distributed energy storage for T&D cost reduction*

*Demonstrate priority scenarios from the Energy Storage Framework*

*Expand test lab and pilot facilities for new energy storage systems*

## Cite Storage

*Demonstrate Electric Vehicle as a resource to improve grid power quality and reduce customer outages*

*Leverage EPIC funds by participating in multi-utility, industry wide Research, Development and Demonstration (RD&D) programs such as Electric Power Research Institute (EPRI)*

*Demonstrate DSM for T&D cost reduction*

## **SCE EPIC Proposed Projects for Energy Storage**

*Community Energy Storage Demonstration & Controls Evaluation* - Ensuring individual unit operation in the lab and in the field to work in conjunction with a centralized controller, the specification of which will also be developed through the project.

*Megawatt-Class Containerized Energy Storage Interconnection Readiness* – Investigate anticipated and actual performance of large-scale (> 1 MW) battery systems

*Distributed Energy Storage Field Demonstration* - Deploying various distributed energy storage devices of different power and energy ratings on the distributed circuit, connected to a centralized controller capable of controlling disparate storage units in a fleet environment.

*Modeling and Simulation for Mitigating DER variability with DES* - Testing the centralized controller in a hardware in the loop environment to test the centralized controller's ability to control a fleet of devices under simulated grid conditions



*Tehachapi Wind Energy Storage Project* - Evaluate performance of 8 MW/32 MWh battery to demonstrate existing technology for new applications for the electric grid

*Transformer Load Management Analysis* – AMI Load Corrections, EVs, and Residential Energy Storage Unit Impacts

### **CEC EPIC Investment Plan Related to Energy Storage A12-11-001**

Storage is mentioned in many program priorities; these 12 proposals specifically cite storage or heavily implicate storage technologies for grid use or EV.

*S2.1 Proposed Funding Initiative: Develop Cost-Effective Metering and Telemetry to Allow Customers With Demand Response, Distributed Generation, Plug-in Electric Vehicles, and Energy Storage to Participate in California ISO Markets and/or Provide Grid Services.*

*S2.3 Proposed Funding Initiative: Demonstrate and Evaluate the Integration of Distributed Energy Resources, Including Storage and Demand Response, at the Community Scale and in Microgrids.*

*S2.4 Proposed Funding Initiative: Develop and Test Novel Technologies, Strategies, and Applications That Improve the Business Case for Customer-Side Dispatchable Distributed Resources and/or Expansion of Demand Response Capabilities.*

*S4.1 Proposed Funding Initiative: Develop Advanced Utility-Scale Thermal Energy Storage Technologies to Improve Performance of Concentrating Solar Power.*

*S7.3 Proposed Funding Initiative: Develop and Run Real-Time Scenarios to Support Operations, Including Energy Storage Utilization.*

*S8.1 Proposed Funding Initiative: Optimize Grid-Level Energy Storage Deployment With Respect to Location, Size, and Type.*

*S8.2 Proposed Funding Initiative: Develop Innovative Utility-Scale and Generation Energy Storage Technologies and Applications to Mitigate Intermittent Renewables and Meet Peak Demand.*

*S9.3 Proposed Funding Initiative: Advance the Economics and Business Case of Distributed Storage Through the Development of Second-Use EV Battery Storage Applications.*

*S9.4 Proposed Funding Initiative: Develop Advanced Technologies and Processes for Recycling Batteries Used in Distributed Storage and Plug-In Electric Vehicles.*

*S13.3 Proposed Funding Initiative: Demonstrate Technologies and Strategies to Facilitate the Integration of Intermittent Renewable Energy.*

*S14.3 Proposed Funding Initiative: Demonstrate Advanced Vehicle-to-Grid Energy Storage Technologies and Second-Use Vehicle Battery Applications.*

*S18.5 Proposed Funding Initiative: Conduct Market Analysis of Innovative Strategies to*

*Facilitate Clean Energy Storage, Demand Response, Electric Vehicles, and Renewable Energy*

**Note:** Clearly the CEC EPIC budget represents the largest and most diverse set of opportunities for Storage, and the relatively constrained IOU budget means their projects will be necessarily modest in scope. For CEC's competitively bid projects, there are requirements for 20% matching funds by participants in many categories. The IOU plans do not require matching funds, but instead seek to leverage their limited funding via coordinated administration and aligning with R&D entities such as EPRI and the CEC. Of the three IOUs, only SDG&E indicated that it may seek supplemental funding from the CEC programs.

With Regards,

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