



**(This is a Request for Information only - Complete Pages 1 and 2 for each initiative)**

**Title of Proposed Initiative** (Short and concise):

*Next-Generation Controls Software to Improve the Economics of Energy Storage*

**Investment Areas** (Check one or more) – For definitions, see First Triennial Investment Plan, page 12:

- Applied Research and Development  
 Technology Demonstration and Deployment  
 Market Facilitation

**Electricity System Value Chain (Check only one):** See CPUC Decision 12-05-037, Ordering Paragraph 12.a. [http://docs.cpuc.ca.gov/PublishedDocs/WORD\\_PDF/FINAL\\_DECISION/167664.PDF](http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF).

- Grid operations/market design  
 Generation  
 Transmission  
 Distribution  
 Demand-side management

California Energy Commission

**DOCKETED**

**12-EPIC-01**

TN 72539

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**Issues and Barriers:**

Describe the issues and barriers that are impeding full market adoption of the proposed clean energy technology or strategy (such as cost, integration, or lack of information).

**Initiative Description and Purpose:**

How will this technology or strategy help address the issue/issues? Describe knowledge to be advanced to overcome critical barriers. Include the recommended funding level (minimum and maximum) for each project under this initiative.

**Stakeholders:**

Identify the stakeholders who support the initiative.

**Background and the State-of-the-Art:**

- What research development and demonstration has been done or is currently being done to advance this technology or strategy (cite past research as applicable)?
- Describe any public and/or private successes and failures the technology or strategy has encountered in its path through the energy innovation pipeline: lab-scale testing, pilot-scale testing, pre-commercial demonstration, commercial scale deployment, market research, workforce development.
- Identify other related programs and initiatives that deal with the proposed technology or strategy, such as state and federal programs or funding initiatives (DOE, ARPA-E, etc.).

**Justification:**

Describe how this technology or strategy will provide California IOU electric ratepayer benefits and provide any estimates of quantified annual savings/benefits in California, including:

- Name of sector and estimated size and energy use.
- Quantifiable performance improvements for the proposed technology/strategy.
- Maximum market potential, if successful.
- Number of direct jobs created in California.
- Why this research is appropriate for public funding.

**Ratepayer Benefits** (Check one or more):

- Promote greater reliability
- Potential energy and cost savings
- Increased safety
- Societal benefits
- Environmental benefits – specify: *Reduced emissions by enabling more renewables, replacing gas peakers*
- GHG emissions mitigation/adaptation in the electricity sector at the lowest possible cost
- Low emission vehicles/transportation
- Waste reduction
- Economic development

Describe specific benefits (qualitative and quantitative) of the proposed initiative

**Public Utilities Code Sections 740.1 and 8360:**

Please describe how this technology or strategy addresses the principles articulated in California Public Utilities Code Sections 740.1 and 8360. The California Public Utilities Code is available online at [www.leginfo.ca.gov/cgi-bin/calawquery?codesection=puc](http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=puc).

## **Next-Generation Software to Improve the Economics of Energy Storage**

Last year, the CPUC evaluated the cost-effectiveness of energy storage using methodologies developed by the Electric Power Research Institute (EPRI) and by DNV KEMA and concluded that energy storage systems can be cost-effective, especially if they deliver multiple value streams to a utility. Energy storage systems can provide a range of grid benefits including frequency regulation, peak shaving, volt/var support, reliability, and deferral of transmission and distribution upgrades. A viable business case for battery-based storage system depends on a given system's ability to combine these different benefits to deliver optimal value. Absent an ability to offer multiple benefits and switch from benefit to benefit depending on grid and market conditions, few energy storage systems can justify their current price. If systems are not cost-effective, then investor-owned utilities in California have a firm basis to postpone the deployment of energy storage systems in spite of the CALPUC energy storage goals.

Unfortunately, the existing control systems for managing utility-owned energy storage assets do not fulfill the promise implied by the EPRI and DNV KEMA studies. Running a computer simulation of a battery storage system is not the same thing as operating a real live system on the grid. It turns out that today's controls systems fail to provide utilities the ability to manage distributed energy storage systems so as to deliver maximum value. In recent months at smart grid and battery storage conferences, leaders from Duke Energy, SDG&E and PGE have all identified the lack of configurable algorithms and controls as a significant barrier to the adoption of energy storage by utilities.

The CEC should offer grants to utilities willing to deploy next generation controls technologies on existing and proposed utility-owned energy storage systems. The CEC should favor proposals that include controls that enable utilities to easily create and manage a suite of algorithms that deliver maximum value from energy storage systems and that can be easily managed from a utility's existing Supervisory Control and Data Acquisition (SCADA) systems.

By helping utilities acquire next generation controls and proving them in the field, the CEC can accelerate the performance and adoption of energy storage systems. Several utilities have expressed interest in partnering on projects to improve controls and algorithms for energy storage. Public funding is appropriate for this purpose because it lowers the cost and therefore mitigates the risk for utilities to deploy new software. There is a saying that every utility wants to be the first to be second in deploying a new technology. EPIC funding can help some California utilities go first with new and better approaches to controlling energy storage.

Submitted by:

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