



# **Scoping Workshop for Two EPIC Smart Grid Applied Research & Development Solicitations**

Energy Systems Research Office  
Energy Research and Development Division  
California Energy Commission  
December 10, 2014



# Agenda

- **EPIC Background**
- **Developing the Smart Grid of 2020:  
Clean, Safe, and Highly Intelligent**
  - Draft Solicitation
  - Public Comment
- **Developing Technology Improvements  
for a Flexible and Responsive Electricity  
Grid**
  - Draft Solicitation
  - Public Comment
- **Open Discussion and Closing Comments**
- **Adjourn**



## Background

- The Electric Program Investment Charge (EPIC) is funded by an electricity ratepayer surcharge established by the California Public Utilities Commission (CPUC) in 2011
- The purpose of EPIC is to benefit the ratepayers of three electric investor-owned utilities\*
- EPIC funds clean energy technology projects that promote greater electricity reliability, lower costs, and increased safety.
- Funded projects must lead to technological advancement and breakthroughs to overcome the barriers that prevent the achievement of the state's statutory energy goals.
- Annual program funds total \$162 million per year with 80% administered by the California Energy Commission.

\* Pacific Gas and Electric Co., San Diego Gas and Electric Co., and Southern California Edison



# Policy Drivers to meet the State's Energy Goals

- Laws and Regulations:
  - AB 32 (Global Warming Solutions Act)
  - SB X1-2 (Renewable Portfolio Standard)
  - AB 2514 (Energy Storage)
  - AB 327 (Distribution Resource Plans)
  - CPUC Rule 21
- Policies/Plans
  - Governor Brown's Clean Energy Jobs Plan
  - Integrated Energy Policy Report
  - CPUC Decision 13-10-040 (Energy Storage Procurement)



# Developing the Smart Grid of 2020: Clean, Safe, and Highly Intelligent

- Applied research and development
- Technologies, tools, and strategies for the modern distribution system that will help to efficiently and reliably integrate distributed and renewable generation into California's electric grid.
- Meet the Governor's goal of 20 gigawatts of renewable generation by 2020.



# Developing the Smart Grid of 2020: Clean, Safe, and Highly Intelligent

## Funding Groups

**Group 1:** Smart Grid Operation and Management Practices

**Group 2:** Distribution Automation Enhancements

**Group 3:** Bi-Directional Distribution Equipment and Technologies



## **Group 1: Smart Grid Operation and Management Practices**

**(\$500,000 - \$1,000,000 per award)**

### **Funded Activities Include:**

- Developing operation methods to make use of DER to provide system inertia and frequency response to provide increased resiliency.
- Determining practical applications for synchrophasor technology for the distribution system.
- Developing best practices and applications in data analytics. Examples may include a pilot test with the utilities and/or the California Independent System Operator.
- Distribution system outage management and communication methods with equipment, field personnel, and/or customers.



## **Group 2: Distribution Automation Enhancements**

**(\$500,000 - \$1,500,000 per award)**

### **Funded Activities Include:**

- Use of smart meters for distribution automation functions such as automatic reconfiguration of feeder equipment settings in response to power flows. Volt/VAR control, etc.
- Developing controls for all of the functions within energy-smart communities and microgrids, including smart inverters and smart meters, to handle renewable intermittency issues on distribution circuits.
- Coordinating distributed generation control between operators and energy aggregators.





## **Group 3: Bi-Directional Distribution Equipment, Devices, and Technologies**

**(\$500,000 - \$1,500,000 per award)**

### **Funded Activities Include:**

- Developing equipment, devices, sensors, and technologies to manage overloading flows, increase distribution circuit capacities, improve resiliency and enable bi-directionality.
- Developing power protection schemes for the bi-directional flows in the distribution system.
- Developing technologies for phase balancing and phase identification of loads.



## **Developing the Smart Grid of 2020: Clean, Safe, and Highly Intelligent**

### **Questions about the Draft Solicitation**

1. Do the sample projects described in Attachment 13 give a clear understanding of the types of projects that would qualify under each Funding Group?
2. Should any particular research areas be given higher priority and/or greater funding allocation? Why?
3. Are there any applied research topic areas missing that meet the purpose this solicitation? If so, which areas?
4. If the research areas are duplicative of other research or programs, please specify how they are duplicative.



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**Lunch Break**



# Developing Technology Improvements for a Flexible and Responsive Electricity Grid

- Applied research and development
- Operational tools, models, and simulations for improved grid resource planning
- Meet the Governor's goal of 20 gigawatts of renewable generation by 2020



# Developing Technology Improvements for a Flexible and Responsive Electricity Grid

## Targeted Research Categories

**Category 1:** Characterize the Generation Fleet of 2020 to 2030 for Grid Operators and Planners

**Category 2:** Develop and Run Real-Time Scenarios for Support Operations, Including Energy Storage Utilization

**Category 3:** Develop Interoperability Test Tools and Procedures to Validate Smart Grid Equipment Integration into the Grid



## **Category 1: Characterize the Generation Fleet of 2020 to 2030 for Grid Operators and Planners**

**(\$750,000 maximum per award; \$750,000 available)**

### **Types of Research:**

- Evaluate the generation portfolio mix to minimize future costs subject to energy balance requirements, reserve and load following requirements, and emissions limits.
- Develop software and modeling tools to evaluate a resource portfolio's ability to meet reliability-related constraints, accounting for variable energy generation resources and costs.
- Quantify the ability of the portfolio including generation, demand response, and storage resources to meet capability and flexible capacity requirements and to provide frequency response and system inertia.
- Develop models of future resource configurations for use by the Energy Commission, CPUC, CAISO, IOUs, and other stakeholders.



## **Category 2: Develop and Run Real-Time Scenarios for Support Operations, Including Energy Storage Utilization**

**(\$500,000 maximum per award; \$2,000,000 available)**

### **Types of Research:**

- Provide grid operators with real-time assessments of grid conditions and reliability thresholds for frequency response and system inertia.
- Develop models and tools with real-time and automation capability to improve smart grid operations.
- Determine the cost-effective granularity for grid visibility and control.



## **Category 3: Develop Interoperability Test Tools and Procedures to Validate New Subsystem Integration into the Grid**

**(\$1,000,000 maximum per award; \$2,250,000 available)**

### **Types of Research:**

- Develop test procedures, algorithms, and protocols to validate the integration of emerging smart grid equipment.
- Execute test plans to validate the safety, interoperability, and security features of customer-side and grid-connected equipment.
- Projects must include stakeholder meetings to get input on test plans and evaluate test results.





# Developing Technology Improvements for a Flexible and Responsive Electricity Grid

## Questions about the Draft Solicitation

1. Does the types of research described in Section B, “Project Requirements,” give a clear understanding of the projects that would qualify under each Targeted Research Category?
2. Should any particular research areas be given higher priority and/or greater funding allocation? Why?
3. Are there any applied research topic areas missing that meet the purpose this solicitation? If so, which areas?
4. If the research areas are duplicative of other research or programs, please specify how they are duplicative.



## Other Information

- **Documents from today's workshop:**  
[www.energy.ca.gov/research/epic/documents/index.html#12102014](http://www.energy.ca.gov/research/epic/documents/index.html#12102014)
- **Sign up for the Listserver by selecting "Opportunity:"**  
[www.energy.ca.gov/listservers/](http://www.energy.ca.gov/listservers/)
- **Information on EPIC:**  
[www.energy.ca.gov/research/epic/index.html](http://www.energy.ca.gov/research/epic/index.html)
- **Information on EPIC solicitations:**  
[www.energy.ca.gov/contracts/epic.html](http://www.energy.ca.gov/contracts/epic.html)



# Closing Comments

Please send all comments via email to:

Consuelo Sichon

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**Deadline to submit comments is  
5:00 PM PDT on December 11, 2014!**