STATE OF CALIFORNIA

EPIC TRIENNIAL INVESTMENT PLAN 2015-17
Proposed Energy Research Initiative Questionnaire

CALIFORNIA ENERGY COMMISSION

Title of Proposed Initiative: Interconnection Best Practices for Synchronous Generator Distributed Generation Facilities

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

Applied Research and Development
X Technology Demonstration and Deployment
X 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.*

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

California Energy Commission
DOCKETED
12-EPIC-01
TN 72652
FEB 14 2014

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).

For distributed generation utilizing synchronous generators to create electricity (hydro, geothermal, and bioenergy), interconnection costs are substantially higher in PG&E territory because of the frequent requirement of Direct Transfer Trip (DTT) technology. In PG&E territory, DTT is used in many rural distributed generation applications to provide safety for line workers by preventing islanding. The DTT technology is a direct fiber optic line from a PG&E control/access point to the generating equipment that can switch the generator on and off. The installation of the infrastructure can be very costly, adding 10% to 20% to the total project budget. SCE and SDG&E do not require this technology; however, PG&E cites lack of research and differing grid configuration which prohibits them from adopting the same policies and approved equipment as SCE and SDG&E.

This lack of information and research greatly hinders the development and expansion of the distributed renewable energy market in PG&E territory and provides competitive disadvantages for hydro, geothermal, and biomass when compared to solar and wind.

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.

Acceptance and adoption of low-cost interconnection technology for projects utilizing synchronous generators will reduce costs and uncertainties of community-scale bioenergy projects, leading to higher market penetration.

Stakeholders:

Bioenergy Association of California (BAC)
State Wood Energy Team (SWET)
US Forest Service

Biomass Working Group
CalFire
Sierra Nevada Conservancy

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)?

Southern California Edison and San Diego Gas & Electric have developed protocols to limit the need for direct transfer trips. These utilities have done the research and have structured their grid such that these high-cost devices are not necessary. Insufficient research on PG&E's grid configuration is available for that utility to adopt similar technologies.

- 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. Not known
- 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.).

No other initiatives currently address the proposed technology or strategy

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 – The proposed program will primarily benefit the 250 MW of projects promoted under SB 1122 and the baseload projects promoted under SB 32, though other projects in rural areas will also be benefitted.
- Quantifiable performance improvements for the proposed technology/strategy. The most critical metric will be reduced cost for distributed generation interconnection from technologies using synchronous generators.
- Maximum market potential, if successful. The proposed technology will the 250 MW identified in the SB1122 legislation, as well as additional markets for bioenergy distributed generation developed outside of that program (40MW in the baseload category of ReMAT – SB 32).
- Number of direct jobs created in California. 1000 (using average of 4 jobs/MW for SB 1122 projects.)
- Why this research is appropriate for public funding. SB 1122 is an indication that the CA legislature believes there will be a public benefit from the development of community-scale bioenergy facilities, and that these benefits justify potential higher price for power generated from these facilities. By overcoming technical obstacles to bioenergy project implementation, this research will promote the legislature's intent as stated in SB 1122 and will reduce costs of generation, allowing for reduced power costs.

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

☐ **X** Promote greater reliability

☐ X Potential energy and cost savings

☐ X Increased safety

☐ X Societal benefits

☐ X Environmental benefits – reduction of greenhouse gases from waste materials used to generate power

☐ X GHG emissions mitigation/adaptation in the electricity sector at the lowest possible cost

☐ Low emission vehicles/transportation

☐ X Waste reduction

☐ X Economic development

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

Quantitative benefits include:

- Reduction in the capital costs of community scale bioenergy facilities and the corresponding increase in facility development;
- Increased jobs generated in rural areas from community-scale distributed generation facilities;
- Reduction in GHGs from disposal of wastes through conversion into renewable power

Qualitative benefits will include:

- Increase in forest health from promotion of forest bioenergy industry
- Increase in water quality from promotion of dairy digester industry
- Reduced landfill impacts on communities from waste diversion

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. This program will provide benefits to ratepayers by reducing costs of distributed generation facilities funded under SB 1122. It will result in improvements in environmental conditions, enhanced public and employee safety, and development of new renewable resource technologies. It will also improve operating efficiency and reliability or otherwise reduce operating costs.

The project will address section 8360 by the following:

(a) Increased use of cost-effective digital information and control technology to improve reliability, security, and efficiency of the electric grid.

(b) 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.

(c) Deployment and integration of cost-effective distributed resources and generation, including renewable resources.

(d) Develop standards for communication and interoperability of appliances and equipment connected to the electric grid, including the infrastructure serving the grid.

(e) Identification and lowering of unreasonable or unnecessary barriers to adoption of smart grid technologies, practices, and services.