STATE OF CALIFORNIA

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

Title of Proposed Initiative: "Renewable Energy Technology Innovation Cluster in association with NASA/Jet Propulsion Laboratory"

Investment Areas (Check one or more)

X Applied Research and Development
_ Technology Demonstration and Deployment
_ Market Facilitation

Electricity System Value Chain

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

California Energy Commission
DOCKETED
12-EPIC-02
TN 72532
FEB 12 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). Technology commercialization from federal research laboratories is one of the most promising aspects of an advanced renewable energy technology industry in California. However, many promising technologies from federal laboratories, such as NASA Jet Propulsion Laboratory, are never brought to the market. In part, this is due to the complexities of work with the federal laboratories themselves, but also the disconnect between the process of technology identification and review, testing at a viable location in an interest market for the system, and associated financing of the startup and manufacturing.

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. The San Marino Ventures Group, in association with Economic Development Results, (collectively SMVG/EDR) have a well-established track record of support for advanced technology firms from NASA Jet Propulsion Laboratory (JPL), and its nearby non-IOU-located California Institute of Technology (Caltech). For the past 25 years, the principals of these firms have led the start-up of a commercialization program based at the County of Los Angeles Business Technology Center in Altadena (SCE territory). From the BTC, and the broader JPL/Caltech system, more than 200 technology firms were established and funded, many in the renewable energy technology sector. An organization of early state technology "angel" investors is headquartered at the BTC to support these efforts. As the program evolved, the program founders built strong relationships and parallel technology initiatives in the port and intermodal, water/energy, industrial real estate, transit, and marine renewables sectors for technology demonstration projects. Therefore, there is a direct pipeline established for identification of promising renewable energy technologies from NASA/JPL, support for their commercialization, and testing/deployment at industrial end-user locations.

Stakeholders: The traditional IOU-area stakeholders in previous technology initiatives undertaken from JPL and the Business Technology Center, in addition to the SMVG/EDR leaders of this initiative, are NASA/Jet Propulsion Laboratory, supported by the California Institute of Technology (non-IOU), County of Los Angeles Board of Supervisors, Pasadena Angels (headquartered at the Business Technology Center), and numerous emerging technology companies in the San Gabriel Valley (IOU area.

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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)? Some of the best renewable energy technology is being developed at JPL and nearby universities, which interface with top leaders in the field from around the world.

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. This process has resulted in many new clean tech/renewable energy technology firms including Aptera Motors, Cool Energy, Duron Energy, EI Solutions, Energy Cache, Energy Innovations, eSolar, Infinia, RayTracker, Thermata and WorldHaus. However, many more have gone out of business through the "valley of death" and in many cases, their technology and innovations have been lost to California.

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.).
DOE has extensive involvement with JPL on energy research initiatives. There are many other programs underway with research entities such as Electricore, which manages such programs for the USDOE.

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 sector can be termed "renewable energy technology commercialization". For the most part, it is made up of many small companies, who collectively are not large energy consumers.
- **Quantifiable performance improvements for the proposed technology/strategy**. Any of the firms in this category could create a break through which would dramatically affect energy use worldwide, if properly commercialized including funding.
- **Maximum market potential, if successful**. The market potential for any of these renewable energy technologies is global.
- **Number of direct jobs created in California**. The jobs stemming from the growth of technology companies at the Los Angeles County Business Technology Center, which were not exclusively renewable energy technology firms, reached 1000 in the first ten years of its operation. Approximately 40 companies had been resident there by that time.
- **Why this research is appropriate for public funding. In many cases, the core research which yields these renewable energy technologies was itself publicly-funded**. Without further investment leading to commercialization, the previous public investment will be lost or lead to significantly less results than should be realized through an effective support program such as EPIC.

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

X Promote greater reliability
_ Increased safety
_ Environmental benefits – specify
X Low emission vehicles/transportation
X Economic development
X Potential energy and cost savings
_ Societal benefits
X GHG emissions mitigation/adaptation
_ Waste reduction

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

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This initiative will harness the renewable energy technology resources of NASA JPL and its affiliated entities, help promising technologies reach the commercialization stage and follow-on markets, and grow within them.

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. 740.1. The project will offer a reasonable probability of providing benefits to ratepayers, will not unnecessarily duplicate research and support development of new resources and processes, particularly renewable resources and processes which further supply technologies, as well as to improve operating efficiency and reliability or otherwise reduce operating costs. 8360. The project will help to modernize the state's electrical transmission and distribution system smart grid and yield a smart grid through support for development of cost-effective digital information and control technology to improve reliability, security, and efficiency of the electric grid, and other smart technologies including those related to cyber security, and cost-effective advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal-storage air-conditioning.