



In the matter of:)	
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Advance Development of Breakthrough and)	WORKSHOP
Piezoelectric-Based Systems to Increase)	RE: Advanced Breakthrough and
Market penetration of Distributed Renewable)	Piezoelectric-Based Systems
Generation)	
_____)	

Notice of Staff Workshop

California Energy Commission staff will conduct a workshop to seek public input to identify preferred technology areas to fund applied research and development activities to advance breakthrough energy generation technologies and piezoelectric-based systems to dramatically increase efficiencies, reduce costs, and enable additional renewable resources. This workshop will help in development of scope for the proposed solicitation to increase the market penetration of distributed renewable generation. Staff is developing this solicitation to address Strategic Initiatives S3.4 and S3.5 of the 2015-2017 Electric Program Investment Charge (EPIC) Triennial Investment Plan, with an estimated funding amount of \$7,000,000.

The workshop will be held on:

Monday, September 14, 2015

10:00 a.m. - 12:00 noon

CALIFORNIA ENERGY COMMISSION

1516 Ninth Street

First Floor, Art Rosenfeld Hearing Room

Sacramento, California

Wheelchair Accessible

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Background

The purpose of this solicitation is to fund applied research and development activities to advance breakthroughs in renewable energy technologies to dramatically increase efficiencies, reduce costs, and enable additional renewable resources. The solicitation will also help to develop piezoelectric-based systems for harvesting energy to maximize efficient use of emerging energy sources in California. Awards will support development, lab-scale, and pilot-scale demonstrations of pre-commercial technologies and strategies that are designed to solve specific problems in the electricity sector. This solicitation will be a two-stage evaluation process, tentatively scheduled for release in January, 2016.

This solicitation includes two distinct applied research and development focus areas:

1) Advance Breakthroughs in Renewable Energy Technologies (S3.4):

This initiative will develop early-stage innovative electricity generation technologies and novel applications with breakthrough potential in the commercial market to take advantage of currently untapped localized resources for electricity generation. The initiative targets technology advancements that will dramatically increase energy conversion efficiencies, reduce system costs, and expand the use of potential renewable resources that are not currently utilized for electricity generation. This funding initiative will also develop novel systems and technologies to address issues on efficiency, affordability, reliability, and durability that will enable accelerated integration and deployment of renewable-based distributed generation technologies.

Minimum eligibility criteria will include:

- Technology readiness level should be from TRL2 to TRL5¹ for breakthroughs that have shown promise in the lab, but have not yet been demonstrated at pilot scale.
- Proposed technologies, once completed, must meet or exceed the latest California Air Resources Board and local air district emission standards.
- Sufficient market potential to justify the Energy Commission investment. Potential market should be equal to or greater than 100 times the initial investment.
- Proposed breakthrough technology or process must result in net generation of electricity.
- Proposed technology must have a credible purpose and a projected competitive advantage over existing commercial technology.

Possible breakthrough technologies include, but are not limited to:

- Thermoelectric power generation from waste heat.
- Thermoacoustic engines for converting heat into useful energy by using high-pressure sound waves.
- Demonstration of technology using advanced printing techniques to reduce costs and/or increase efficiency of electricity generation.
- Nanogeneration energy-harvesting technologies to enable devices to power themselves based on ambient electromagnetic, thermal, or mechanical energy. These technologies can help reduce plug-load demand using energy resources that are renewable.
- Biomimicry is the practice of designing technologies that are inspired by nature. Biomimicry applications have a large potential to enhance electricity generation, and may have widespread benefits for the energy sector. Techniques used in nature may be applied to optimize existing energy systems or develop altogether new approaches to electricity generation.

2) Develop Piezoelectric-Based Systems for Harvesting Energy (S3.5):

This initiative will advance electricity generation technologies and novel applications by taking advantage of the developments in piezoelectric materials and the availability of existing

¹ Technology Readiness Level, Department of Energy, <http://www2.lbl.gov/dir/assets/docs/TRL%20guide.pdf>

wasted mechanical energy to expand the generation of energy from otherwise untapped resources.

Piezoelectric materials generate electricity with the application of stress compared to the photovoltaic semiconductor, which generates electricity with the application of light. For instance, piezoelectric technology has been used in sonar and touchscreen phones and has been installed and tested in flooring in railway stations to generate energy from passing pedestrians in Japan, and under some highways in Israel.

This phenomenon offers a wide opportunity to harvest energy where stress or vibration is generated but is currently mostly untapped. This includes the use of piezoelectric devices to harvest power from existing roadway surfaces, train tracks, or side walk applications to cost-effectively increase renewable energy capacity and/or reduce demand-side load.

Projects supported under this funding initiative will develop, demonstrate at the pilot scale and evaluate the technology to quantify performance, durability and lifetime, and develop strategies for integrating energy storage to address expected intermittency in its power generation. The initiative will also support assessment of piezoelectric system applications to determine technical and economic feasibilities, particularly determining projected power output, lifetime and durability, costs, and marketing potentials.

Public Comment

Oral comments - Staff will accept oral comments during the workshop. Comments may be limited to 3 minutes per speaker. Any comments may become part of the public record in this proceeding.

Written comments - The Energy Commission also accepts comments by email. Please include your name and any organization name. Comments should be in a downloadable, searchable format such as Microsoft® Word (.doc) or Adobe® Acrobat® (.pdf). Please include the name of the workshop and the date in the subject line. Please send written comments to Prab Sethi, prab.sethi@energy.ca.gov by September 18, 2015.

Public Adviser and Other Commission Contacts

The Energy Commission's Public Adviser's Office provides the public assistance in participating in Energy Commission proceedings. If you want information on how to participate in this forum, please contact the Public Adviser, Alana Mathews, at PublicAdviser@energy.ca.gov or (916) 654-4489 or toll free at (800) 822-6228.

If you have a disability and require assistance to participate, please contact Lou Quiroz at lquiroz@energy.ca.gov or (916) 654-5146 at least five days in advance.

Media inquiries should be sent to the Media and Public Communications Office at mediaoffice@energy.ca.gov or (916) 654-4989.

If you have questions on the subject matter of this meeting, please contact Prab Sethi, prab.sethi@energy.ca.gov or (916) 327-1302.

Remote Attendance

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Availability of Documents

Documents and presentations for this meeting will be available online at: <http://www.energy.ca.gov/research/notices/index.html>

[DATE (of signing)]

Laurie ten Hope
Deputy Director

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