

Development and Demonstration of a Concentrating PV System With Integrated Active Micro-Inverters

August 2010

Fact Sheet

The Issue

For California to reach its ambitious greenhouse gas reduction and electricity generation goals, the use of renewable energy technologies, including solar, must be expanded. California has some of the most promising solar resources in the nation. The current costs of most solar technologies, however, are not competitive with fossil fuels and are therefore not practical for most end uses. Further research is required to increase the efficiency of solar photovoltaic systems and to decrease the relative cost to consumers. Through innovative designs and techniques, concentrating photovoltaic (PV) systems can maximize the solar energy output from a given surface area, while using less photovoltaic material than classical flat-plate technologies.

Project Description

The proposed research project will develop a working micro-inverter for use with photovoltaic modules. This micro-inverter will serve to convert energy captured by individual modules directly into alternating current, thereby reducing the installation difficulty and cost while improving grid stability. In order to maximize the value for commercial use, this micro-inverter technology will be combined with a high-efficiency concentrating photovoltaic system and a daylighting system, which uses a pipe to efficiently channel natural daylight to the interiors of buildings. Ultimately, this project aims to produce concentrating PV prototypes and a production readiness plan that will outline the steps necessary to achieve volume manufacturing. The goal is to achieve a levelized cost of electricity of about 15 cents per kilowatt-hour for concentrating PV systems manufactured in volume production.

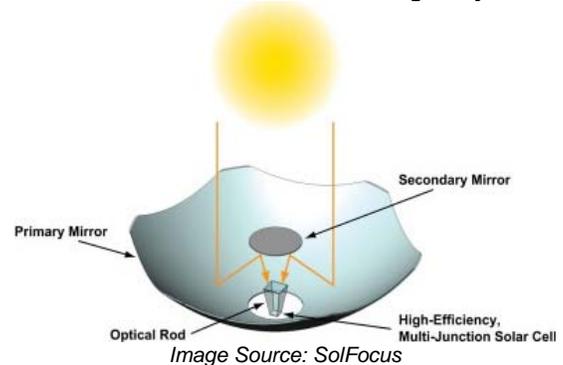
Research Benefits

This project aims to advance the deployment of photovoltaic technologies by:

- Developing and demonstrating a more efficient and cost-effective concentrating solar design that will minimize production and installation costs while maximizing energy production.
- Incorporating multiple technologies, such as a daylighting system, to enhance the value and cost-competitiveness of concentrating PV systems.
- Improving grid stability by using an active inverter capable of injecting or absorbing reactive power to or from the grid.

- Increasing plug-and-play capabilities of PV systems to reduce installation time and cost.
- Supporting the California Solar Initiative and California's Renewables Portfolio Standard goals.

Schematic of SolFocus' Concentrating PV system



Project Specifics

Contract Number: PIR-07-016

Contractor: UC Merced

Contract Amount: \$258,115.00

Contract Term: June 2008 to March 2012

Match Funding: \$327,660

For more information, please contact:

Michael Sokol
California Energy Commission
PIER Program, Renewable Energy Research
Phone: 916-651-1229
E-mail: msokol@energy.state.ca.us

Bruce Johnston
Project Director
UC Solar Technologies Institute
Phone: 209-228-2907
E-mail: bombdog@sbcglobal.net

Disclaimer

Although the Energy Commission funds this research, the recipient is responsible for it. The Commission, its employees, and the State of California make no warranty, express or implied, and assume no legal liability for this information or the research results.



Arnold Schwarzenegger Governor
California Energy Commission
Chairman Karen Douglas | Vice Chair James D. Boyd
Commissioners: Jeffrey D. Byron, Anthony Eggert, Robert B. Weisenmiller
Executive Director: Melissa Jones
Chief Deputy Director: Claudia Chandler

California Energy Commission
Public Interest Energy Research
1516 Ninth Street
Sacramento, CA 95814-5512