California Energy Commission
Public Interest Energy Research (PIER) Program
Industrial/Agriculture/Water End-Use

Solar-Assisted Technology Provides Heat for California Industries

Research Powers the Future
PIER Industrial/Agriculture/Water End-Use
http://www.energy.ca.gov/research/iaw/index.html

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Fact Sheet

The Issue

Solar thermal technology focuses the Sun's rays to heat water, and is a promising renewable resource for California's industrial sector. Commercially available solar water heating reflectors exhibit good efficiency characteristics at lower temperatures (176°F/80°C), but heat losses mean their efficiencies fall off rapidly at higher temperatures (212°F/100°C). The highest end of the solar thermal temperature range (392°F/200°C to more than 1200°F/650°C) uses expensive technologies such as: parabolic troughs, compact linear Fresnel reflectors (CLFR), and power towers for large-scale power generation installations.

However, the temperature spectrum between about 212°F/100°C and 392°F/200°C has been largely neglected by the existing market and will be uniquely addressed by this technology.

Project Description

The Gas Technology Institute, SAB Miller, and H2Go will demonstrate a pilot solar thermal installation utilizing medium temperature non-tracking solar collectors (XCPC technology). The technology will be demonstrated at the SAB Miller brewing facility in Irwindale, California. The solar thermal installation will drive key industrial process heat applications at the facility – displacing natural gas and electricity use. It is anticipated that the integrated solar thermal application(s) will be replicable in other plants and similar settings across California and elsewhere, improving energy efficiency, reducing greenhouse gas emissions, and benefiting Californians.

10 kilowatt XCPC Test Loop
Photo credit: Regents of the University of California

The project will bridge the proven XCPC solar thermal technology with appropriate industrial applications to replace fossil fuels with clean and cost-effective solar energy.

Objectives of the project are to:

- Prove the feasibility and safety of implementing medium temperature solar energy to meet a variety of industrial needs.
- Prove the possibility of installing a medium temperature solar thermal system at a cost less than $0.38 per watt.
- Prove that the XCPC solar thermal technology can achieve a cost of energy at less than $0.032 per kilowatt hour.

Anticipated Benefits for California

There are an estimated 163,000 commercial and industrial boilers in the United States with a total fuel input demand of 2.7 trillion British thermal units per hour. Many of these boilers are about 40 years old and are suitable for solar thermal/gas hybrid retrofits. If only 5 percent of the total commercial/industrial boilers were augmented with 20 percent solar/thermal heat input, it would mean the installation of almost 16 million square meters of collector area and reduction of 270,000 therms per year and generation of 7.9 million kilowatt-hours per year.

Using this innovative concentrating solar thermal system will provide the following public benefits to California:

- Environmental value
- Natural gas displacement
- Electric peak demand reduction
- Electrical grid relief
- Job creation in the renewable energy industry

Project Specifics

Grant Agreement Number: PIR-10-002
Contractor: Gas Technology Institute
City/County: Des Plaines, IL
Amount: $ 399,973
Cofunding: $ 564,483 (Cash & in-kind services)
Term: July 2011 to August 2013

For more information, please contact:

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