

BEFORE THE CALIFORNIA ENERGY COMMISSION

In the Matter of Preparation of the
2011 Integrated Energy Policy Report (2011 IEPR)

JOINT COMMITTEE WORKSHOP
RE: Natural Gas

Docket No. 11-IEP-1K

DOCKET

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DATE Oct. 11 2011

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**2011 IEPR – NATURAL GAS MARKET ASSESSMENT
REFERENCE CASE AND SCENARIO RESULTS**

**COMMENTS OF BRIGHTSOURCE ENERGY, INC. ON THE DRAFT
2011 NATURAL GAS MARKET ASSESSMENT: OUTLOOK**

BrightSource Energy, Inc. (“BrightSource”) appreciates this opportunity to submit comments on the draft 2011 Natural Gas Market Assessment: Outlook (“Draft Natural Gas Report”). In general, the Energy Commission’s staff appears to have done fine work in this assessment of the natural gas market, and should be commended for their efforts. In one specific area, however, the Draft Natural Gas Report and its underlying scenarios and modeling do not provide sufficient analyses; given the significant contribution of thermal enhanced oil recovery (“TEOR”) to California’s natural gas demand, and the availability of solar thermal technology to reduce that demand, the final report would present an incomplete picture of California’s natural gas use if the role of solar TEOR is not explicitly considered.

The Energy Commission’s data shows that historically, California TEOR has taken up between 12% and 22% of the entire state’s natural gas consumption.¹ The Draft

¹ California Energy Almanac, “Historical Natural Gas Demand 1990-2005,” *available at* http://energyalmanac.ca.gov/naturalgas/historical_demand_summary.xls

Natural Gas Report, in Figure 19, shows the projected impact of the six basic scenarios on TEOR, indicating how basic pricing, demand and supply factors can be expected to affect TEOR natural gas usage. However, the report does not examine the potential for displacement of natural gas for TEOR by solar thermal- derived steam (“Solar-to-Steam”). Solar-to-Steam technology has the potential to substantially reduce the quantity of natural gas used for TEOR over the time period addressed by the study.

On October 3, 2011, the world’s largest Solar-to-Steam TEOR facility commenced operations in Coalinga, California. This facility was built by BrightSource Energy for Chevron Technology Ventures, a division of Chevron U.S.A., using BrightSource’s proprietary LPT solar thermal technology. Chevron’s Coalinga field, one of the oldest oil fields in the nation still in operation, first began producing oil in the 1890s. Because the heavy crude produced at the field does not flow readily, steam is injected into the heavy-oil reservoirs to heat the crude, making it easier to bring to the surface. The steam used for oil recovery at the Coalinga field has traditionally been generated by burning natural gas.

The new 29 megawatt-thermal Solar-to-Steam facility in Coalinga will use the sun in place of natural gas to generate steam for TEOR use. BrightSource’s LPT solar thermal energy system uses a field of tracking mirrors, known as heliostats, that are controlled by proprietary software to concentrate sunlight onto a tower-mounted solar boiler. This new 100-acre facility deploys 3,822 heliostats, each consisting of two 10x7-foot mirrors mounted to a six-foot steel pole, which focus solar energy on a high-temperature, high-pressure steam boiler located at the top of a 327-foot tall tower. The steam produced by the facility is then pumped deep into the sub-surface oil reservoir in

order to heat the area, increasing the pressure of the reservoir and reducing the viscosity of the oil, making it easier to bring to the surface. To conserve water use, the steam is then cooled and recirculated in a closed loop system.

According to the U.S. Department of Energy, while only 10% of a reservoir's oil is typically recovered primary methods, and 20% to 40% can be recovered through secondary methods, enhanced oil recovery methods allow extraction of 30% to 60% of the reservoir's oil.² Over 40% of the oil produced nationally through enhanced oil recovery is derived from TEOR, and most of the oil extracted through TEOR is produced in California.³

TEOR can be used to prolong the useful life of older domestic oil fields, making efficient use of their reservoirs and lessening pressure on "greenfield" production. Solar thermal accomplishes TEOR objectives with zero carbon or other emissions, and is a significant source of jobs and economic opportunities. Solar thermal provides a clean, abundant and economically-attractive TEOR fuel source, particularly when natural gas prices (including carbon or emissions costs) are high, or for the many heavy-oil fields in located in remote locations where natural gas is not always available, but where there is high-quality insolation. In short, solar TEOR can reduce natural gas demand, extending natural gas supplies and reserves for use in other applications, and should be expressly considered as a factor in the Energy Commission's final report.

BrightSource again appreciates the Energy Commission staff's effort on the Draft Natural Gas Report. We ask that the staff and the Commission revise the report to show,

² U.S. Dep't. of Energy, "Enhanced Oil Recovery / CO₂ Injection," *available at* <http://fossil.energy.gov/programs/oilgas/eor/>

³ *Id.*

as a sensitivity case, the potential change in TEOR natural gas demand through Solar-to-Steam displacement. We thank you for this opportunity to provide our comments.

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Respectfully submitted,

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