

Energy Sector Division Oil & Gas

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Siemens to supply 123-MW steam turbine-generator set for solar thermal power plant in California

Siemens Energy has been awarded an order to supply the largest ever fully solar-powered steam turbine-generator set for the first commercial solar tower power plant project to break ground in the U.S. The purchaser is BrightSource Energy, Inc., a developer of utility-scale solar power plants. The 123-megawatt (MW) steam turbine-generator set will be operated at BrightSource's Ivanpah Solar Complex in Southern California's Mojave Desert.

Siemens will supply a reheat SST-900 industrial steam turbine, which was specially adapted to meet solar technology requirements, for BrightSource's first 100-MW plant at its Ivanpah Solar Power Complex. This type of turbine offers very high efficiency under varying operating conditions. With maximum steam data similar to conventional fossil-fired plants, the SST-900 design also allows for flexible operation with load swings and frequent starting and stopping. The units are shipped fully assembled to shorten the installation time. The turbine will be manufactured in Sweden, and the generator in Germany, and both are scheduled to be delivered to the site in early 2011. The plant is expected to be operational and supplying clean solar energy to more than 35,000 households in the fourth quarter of 2011.

"Among renewables, solar energy is expected to show the highest growth rate over the long term," said Markus Tacke, CEO of the Siemens Energy Oil & Gas Division's Industrial Applications, Steam Turbines business unit. "Our extensive experience in optimizing our steam turbines for solar thermal applications has placed us in a leading position to help customers provide clean solar power." Solar power is an important part of Siemens environmental portfolio, which accounted for company revenues totaling EUR19 billion in 2008.

Siemens is the market leader for steam turbines for solar thermal power plants and has already secured orders for more than 45 specially adapted steam turbines, covering the power output range from 1.5 MW up to 123 MW. Siemens received an order to supply a 19-MW industrial steam

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turbine for the Solar Tres tower power plant in Spain in October of this year, having already supplied some forty modules for parabolic trough plants in the Spanish south.

The Ivanpah Solar Complex will consist of three concentrating solar thermal power plants that are each based on power tower and heliostat mirror technology. Power tower technology will be used to harness concentrated solar thermal energy emanating off heliostat mirrors arranged in asymmetrical arcs around the tower. Each mirror tracks the sun throughout the day with a reflecting surface area of 75.6 square feet. The receiver located at the top of the power tower will convert water to superheated steam at temperatures that exceed 550 degrees C. The pressurized steam will then power the Siemens steam turbine, with excess passing back to the boiler to reheat the steam before it passes the low pressure turbine. The reheat enhances overall power plant efficiency.

The **Siemens Energy Sector** is the world's leading supplier of a complete spectrum of products, services and solutions for the generation, transmission and distribution of power and for the extraction, conversion and transport of oil and gas. In fiscal 2008 (ended September 30), the Energy Sector had revenues of approximately EUR22.6 billion and received new orders totaling approximately EUR33.4 billion and posted a profit of EUR1.4 billion. On September 30, 2008, the Energy Sector had a work force of approximately 83,500. Further information is available at: www.siemens.com/energy.