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Abengoa Solar Delivers Colorado's Largest Solar Thermal Plant for Federal Correctional Facility. Parabolic trough collectors reduce natural gas used to heat hot water by about 50 percent

LAKEWOOD, CO -- Abengoa Solar Inc. delivered a 23,000-square-foot solar field composed of 160 parabolic trough collector modules to a federal prison outside of Denver, Colorado in May 2010. This is the state's largest solar thermal project.

The solar field at the Federal Bureau of Prisons Correctional Facility in Englewood (FCI Englewood) reduces the consumption of natural gas used to heat hot water for inmates during a year by at least 50 percent, and will eliminate 13,000 tons of greenhouse gases emissions over the 30-year life of the system.

Ken May, Abengoa Solar Industrial Division Director said, "Solar thermal is by far the most economic way to go in carbon displacement." May, who has played a major role in the development and commercialization of parabolic trough collector technology since the 1980s, acknowledges that the interface of solar thermal systems with the project load is more complicated than interfacing PV systems with the grid. However, compared to installed PV costs in the \$5 – \$6/W range, solar thermal is less than \$1 per watt.

FCI Englewood consists of 10 rows of 16 Abengoa PT-1 parabolic concentrator modules per row. In total, the plant comprises 22,720 sq. ft. (2111 m²) of collector area situated on 1.7 acres (0.7 hectare) of land area adjacent to the prison.

The parabolic collectors track the sun continuously during the day rotating about a single axis to concentrate solar radiation onto receiver tubes located at the focal point of the parabola. A water-based antifreeze solution is pumped through the receiver tubes absorbing the solar radiation as heat that is transferred to a 16,000-gallon (60,000 liter) insulated hot water storage tank. Hot water is stored in the tank at temperatures up to 85 C (185 F). Heated water is then delivered around the clock to serve the needs of over 1,000 inmates and staff for showers, and for the facility's kitchen and laundry.

For the Englewood, CO correctional facility, Abengoa Solar Inc. designed, engineered, and installed the turn-key parabolic trough system, under contract to Johnson Controls, a global leader in delivering products, services and solutions that increase efficiency in buildings. Ed Magan, Johnson Controls Energy Solutions Project Specialist on the FCI Englewood solar field, says the project is a success. "Once the sun rises all the collectors move into place within two minutes, and the correctional facility has not needed to turn on its natural gas hot water boiler for the five months since the solar field became operational." The correctional facility uses 30.3 million Btu/day for domestic hot water and the FCI solar field at peak energy delivery produces 4 million Btu/hr (1150 kW thermal energy).

The solar system is owned and operated by FCI Englewood. The solar collectors were manufactured at Abengoa's U.S. headquarters in Lakewood, CO in accordance with ISO 9001 standards.

Abengoa has found that correctional facilities offer a sound market for commercial scale solar thermal plants. "We look for year-round users who have a 24/7 need for hot water," said Peter Thompson, Business Development Manager for Abengoa Solar. "Financing for correctional facilities is easier especially in states like Arizona and California which provide incentives for every BTU you collect," said Thompson.

May describes the potential market for large-scale solar thermal plants producing heat as "gynormous" for applications in any industry that requires heat to process their products - - with substantial financial and environmental benefits. He says "using solar technology to produce heat can save premium fuels like natural gas that are more efficiently used in producing electricity."

May and Thompson look forward to a future where commercial-scale solar thermal plants regularly supply renewable energy to the manufacture of products we use every day, from heat for pasteurizing milk to the hot water needed to clean computer chips in our cell phones.

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