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ENERGY SERVICES

Pierce College

Solar Photovoltaic & Microturbine Cogeneration Project

About the Los Angeles Community College District (LACCD)

Pierce College is part of the Los Angeles Community College District (LACCD), the largest community college district in the United States, covering an area of more than 882 square miles. The District's nine colleges serve 36 cities and communities.

In 2002, the LACCD Board of Trustees made a firm commitment to renewable power and sustainable building practices. Plans included a district-wide policy to incorporate LEED-certified "green building" standards into the construction of 40 green buildings. In 2006, LACCD announced a plan to be the nation's first community college district to generate all of its own power through ambitious solar projects at its campuses.

The Opportunity

Pierce College is a comprehensive college in Woodland Hills, CA, with more than 100 disciplines being taught to more than 18,000 students each semester. As part of the Los Angeles Community College District (LACCD), Pierce College is a leader in energy efficiency and sought to generate clean electricity by developing a solar energy program. Both Pierce College and the LACCD have made a firm commitment to renewable power and sustainable building practices.

The Partnership

Pierce College partnered with OpTerra Energy Services to plan and install a 191-kWh on-site solar photovoltaic generation system and a 360-kWh cogeneration system comprised of six 60–kWh microturbines. The contract also included the design and installation of an efficient heat recovery system that captures waste energy from four previously installed 30-kWh microturbines to heat the College's outdoor pool.

The solar generation system is based on an innovative carport structure designed and manufactured by PowerLight Corporation. Covering 20,000 square feet of the College's parking lot, the solar array provides power to the campus by converting sunlight directly into electricity, while providing shade and overhead protection for 80 vehicles. The natural gas-fueled microturbine cogeneration system produces electricity for the campus and recovers waste energy that is used to chill water for campus air conditioning. This system also provides backup generation capacity in the event of an outage on the local utility system.

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Program Highlights

- Installed protected parking for 80 vehicles, generating enough solar power to heat the outdoor pool, air-condition the campus and still reduce electricity use by 30%
- Clean solar power replaced purchased electricity, which had emitted 13,000 tons of CO2
- Solar upgrades avoid emissions equivalent to planting 3,700 acres of trees or removing more than 2,600 cars from the roadways of Los Angeles

The Technical Scope

- Installed 191-kWh PowerLight solar electric system comprised of 1,274 photovoltaic tiles
- Installed 360-kWh cogeneration system comprised of six 60-kWh natural gas–fueled Capstone microturbines
- Equipped 110-ton absorption chiller, in conjunction with cogeneration system, to provide air conditioning to lower campus
- Added hot water heat exchanger to existing four 30-kWh Capstone microturbines to provide heat to outdoor pool

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The solar generation and microturbine cogeneration systems generate about 4.4 million kWh per year – enough energy to power approximately 600 homes. The project cost was offset by state and municipal rebates, and the balance was paid with funding from Proposition A.

The Impact

As a result of the performance contract and rebates, the College was able to retain capital funds that now can be applied towards the College's educational program and other critical needs. In addition, the solar generation and microturbine systems reduce the College's electricity purchases by about 30% and its energy costs by about $180,000 annually. They also reduce the College's demand for purchased power during peak periods by about 25%. The heat recovery system, in addition to heating the pool, enhances the efficiency of the microturbine system.

By reducing Pierce College's purchase of utility-generated electricity, the solar photovoltaic and cogeneration systems spare the environment from thousands of tons of emissions, such as nitrogen oxides, sulfur dioxide and carbon dioxide, that contribute to smog, acid rain and global climate change. Over their 30-year operating life, the systems will displace power that would have been produced by conventional power plants, and will thereby help prevent emissions of 13,000 tons of CO2. These avoided emissions are equivalent to planting 3,700 acres of trees or removing more than 2,600 cars from the roadways of Los Angeles.