Case Study

Santa Rita Jail Fuel Cell Power Plant
County of Alameda
California

Background
Alameda County’s Santa Rita Jail is the third largest county detention facility in California and the fifth largest in the nation. It holds approximately 4,000 inmates and consumes more energy than any other county government building. Alameda County wanted to reduce its peak electricity demand and improve the security and reliability of power supply at the Jail. This was the third major project undertaken by the County aimed at improving efficiency and employing sustainable energy sources at the Santa Rita Jail. Previously, the County had completed comprehensive energy retrofits and improvements and had installed the nation’s largest rooftop solar power system (1.2 megawatt) at the Jail.

Solution
Fuel cells are among the cleanest, most reliable sources of power generation, providing continuous high-quality power 24 hours a day, with ultra-low emissions and quiet operation. In addition, the exhaust heat byproduct can be used for combined heat and power (CHP) applications using hot water, steam or chilled water to heat or cool buildings. The Santa Rita Jail fuel cell is the first megawatt-class fuel cell cogeneration plant in California and one of the largest in the United States.

PROJECT FEATURES
- First megawatt-class fuel cell in California
- Ultra-clean, ultra-low emissions, quiet operation
- Involves no combustion
- Heat recovery cogeneration increases efficiency by capturing exhaust heat for water and space heating inside the Jail
- Reduces power purchases by 80% during peak-demand summer months

FuelCell Energy manufactured the DFC1500 fuel cell and integrated all of its components within the power plant. Chevron Energy Solutions developed and constructed the project, ensuring that all utility interconnection points were integrated with the fuel cell and the rest of the Jail’s infrastructure. Chevron ES also designed the heat exchanger equipment, which captures exhaust heat for water and space heating at the Jail.

The project involved careful planning and management of utility interconnection applications and construction targets in order to meet financial incentive requirements. All
non-fuel cell infrastructure had to be complete before the arrival of the fuel cell equipment at the project site. This work included the concrete equipment pad, underground piping for gas and water lines, and high voltage electrical service. Chevron Energy Solutions managed all activities associated with obtaining funding through PG&E’s Self-Generation Incentive Program. On-site training for operations and maintenance personnel was also provided as part of the contract.

The fuel cell’s performance is continuously monitored through UtilityVision®, Chevron Energy Solutions’ web-based energy tracking and reporting system, which offers County and Jail staff immediate access to all fuel cell output information including electricity production, waste heat recovery, and fuel consumption.

Benefits
This project benefits Alameda County and the surrounding region by reducing grid power purchases from conventional, combustion-engine power plants. Cogeneration equipment increases the plant’s efficiency by capturing exhaust heat for water and space heating inside the Jail.

Combined with the previously installed rooftop solar power array and energy efficiency upgrades, this installation will reduce power purchases by as much as 80% during peak-demand summer months. This translates to avoided greenhouse gas emissions of 3,200 tons annually, equivalent to planting approximately 900 acres of trees.

The project will save county taxpayers more than $260,000 per year.