CASE STUDY
MICROGRIDS

S&C ELECTRIC COMPANY
Excellence Through Innovation

Energy Storage System Fortifies California Jail's Microgrid

S&C Featured Solution: Engineering Services

Location: Dublin, California

Customer Challenge

Santa Rita Jail is one of the United States' largest correctional facilities, spanning 113 acres near San Francisco. The jail's power infrastructure was recently upgraded to function as a microgrid using on-site generation. This microgrid system allows the facility to operate indefinitely without a connection to the local utility grid, a capability called "islanding." The jail's on-site power sources include diesel generators, fuel cells, lithium-ion batteries, and renewable resources, such as a 500-kW solar array and microturbines.

With an average daily power demand of 3 MW, Santa Rita Jail faced two major challenges. It needed a way to store excess energy produced by on-site generation during islanding to ensure microgrid stability and security. It also needed a system to help manage energy consumption charges by allowing the jail to purchase power during non-peak hours, store it, and then use it during high-cost peak demand periods.

S&C Solution

S&C engineered and commissioned a highly reliable energy storage solution. The company supplied and integrated a 2-MW energy storage system into the jail's microgrid. Originally engineered by S&C for a sodium-sulfur (NaS) battery, the system was re-engineered for a 2-MW/4-MWh lithium-ion battery by S&C's project team, which coordinated with both battery suppliers to ensure proper operation of the system. S&C provided engineering services and project management for the energy storage system and battery installation.

The energy storage system controls the charging and discharging of the large-scale battery system to help meet the jail's energy needs. When the facility is islanded from the grid, the system balances the generation sources through its energy storage and CERTS algorithm. It does this by automatically and instantly storing excess energy when the facility's on-site generation exceeds demand and dispatching stored energy to the microgrid when demand exceeds generation.

The first "green" jail in the U.S., Santa Rita Jail uses a microgrid and on-site renewable generation.

The entire microgrid is projected to save the county nearly $100,000 per year.

The energy storage system has advanced control algorithms, which allow for the jail's microgrid to island automatically when its utility source is lost. This capability ensures the intermittent renewable resources provide reliable, stable power generation for the jail for up to eight hours… ample time for utility power to be restored or to bringt diesel generators online.

Results

S&C completed engineering delivery and commissioning of the energy storage system on schedule and within budget in early 2012.

Using the energy storage system, Santa Rita Jail can now optimally manage energy use and costs. The facility can charge its 2-MW battery system using on-site renewable resources when grid electricity is more expensive. Upon receiving a signal from Chevron's Control System, the batteries can be dispatched and used during high-cost peak hours—capabilities projected to save nearly $100,000 annually. The energy storage system also bolsters the security and reliability of the jail's power infrastructure. In addition, by enabling more efficient use of on-site renewables, the system helps the facility offset the use of diesel generators… and reduce carbon emissions.

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