

CERTS Smart Grid Demonstration with Renewable Energy Integration

August 2010

Fact Sheet

The Issue

Researchers at the Santa Rita Jail, in Dublin, California, are demonstrating a state-of-the-art Consortium for Electric Reliability Technology Solutions (CERTS) smart grid. The demonstration will address the integration issues for new wind power, large-scale energy storage, demand response, and solar thermal systems – with the jail’s existing solar photovoltaics, fuel cell cogeneration system, and energy efficiency initiatives.

The overall project goals include resolving the numerous issues surrounding energy independence, system reliability, highly demanding security requirements, and the jail’s stated energy management objectives.

Project Description

The experts are designing, testing, and deploying testing tools to demonstrate the commercial implementation of 11.5 kilowatt (kW) wind power, battery storage sized at 2 megawatt (MW), demand response initiatives, and solar thermal to generate up to 45,000 therms of hot water. Additionally, an effective interface to local utility grids will be demonstrated. This demonstration will enable future applications under a Renewable-Based Energy Secure Communities (RESCOs) model. Other research objectives include:

- Demonstrate smart grid integration with the jail’s existing solar photovoltaics (1.2 MW).



Santa Rita Jail, Alameda County

- Demonstrate a renewable energy integrated systems approach that is capable of obtaining at least a 15 percent reduction on the feeder circuit (peak load).
- Demonstrate smart grid integration with the jail’s centralized, high-efficiency water cooling system and distribution loop.
- Demonstrate smart grid integration with the jail’s fuel cell cogeneration system (1 MW) that powers a centralized, high-efficiency, low-nitrous oxide (NO_x) hot water boiler.
- Plan a utility grid interconnection that, during abnormal utility grid disturbances, will enable the jail’s smart grid to “island” with minimal energy load disruption until the jail’s system receives messages to resynchronize and reconnect with the utility grid.

PIER Program Objectives and Anticipated Benefits for California

The smart grid research at the Santa Rita Jail will provide California ratepayers, other smart grid implementers, and policy makers with state-of-the-art information about integration issues. Benefits include:

- Real-life demonstration of techniques and practical approaches to use for integrating multiple renewable energy resources.
- Data about a high-performing smart grid of clean energy resources.
- Information about advanced, distributed “plug-and-play” energy resources.
- Techniques for deploying smart grid battery storage and monitoring battery performance.
- Expansion of California’s portfolio of fossil-free energy options.

Project Specifics

Contract Number: PIR-08-039

Contractor: Alameda County

Contract Amount: \$1,983,555

Contract Term: July 2009 to June 2012

Match Funding:

- U.S. Department of Energy Cooperative Agreement DE-FC26-08NT002872: \$1,907,244
- Alameda County: \$372,644

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