



NREL + RAYTHEON

NREL has partnered with Raytheon Company, Primus Power, and Advanced Energy to successfully demonstrate an advanced microgrid system that draws on batteries and solar photovoltaic (PV) energy for its power. The demonstration will lead to a pilot system to be installed at the Marine Corps Air Station (MCAS) Miramar, designed to power one building for at least 72 hours.

R&D STRATEGY

NREL delivered a test environment for Raytheon's microgrid power and control system that closely reflected the planned installation at MCAS Miramar. The ESIF microgrid installation mimicked the planned microgrid using two 100-kW AE100TX solar inverters; a 1,600-A microgrid switch; a 540-kVA bi-directional grid simulator; two solar simulator DC power supplies to simulate the Miramar PV array at power; a 1,000-VDC battery simulator power supply; and a 200-kW load bank.

Using this setup, NREL was able to simulate the battery working at full power, replicate a variable solar energy supply over time, and re-create the loads on the system based on the actual loads measured at MCAS Miramar. The simulated microgrid was tested in both grid-connected and off-grid or "islanded" modes, and the efficacy of the microgrid controller was evaluated in managing PV output power and battery charging and discharging to maximize the use of solar power.

IMPACT

The NREL team was able to demonstrate the actual performance of the MCAS Miramar installation and refine its operation prior to it being installed in the field, greatly reducing the risk of investing in the system. Using this pilot system's technology, the fielded microgrid at MCAS Miramar will be able to maintain power to base facilities under many adverse conditions—including loss of the local power grid.



Raytheon and its project partners worked with NREL engineers to perform system-level testing of a simulated microgrid in the ESIF. The actual microgrid will be installed at MCAS Miramar in 2015.

Photo by Dennis Schroeder, NREL 32580

Partner with NREL at the ESIF

User facility access to the ESIF is awarded through the review and approval of user proposals, depending on the scientific merit, suitability of the user facilities, and the appropriateness of the work to DOE objectives, and includes a signed user agreement for the facility.

For more information, please visit:

www.nrel.gov/esi/working_with.html

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PARTNERSHIPS

The Energy Systems Integration Facility (ESIF) at the National Renewable Energy Laboratory (NREL) provides the R&D capabilities needed for private industry, academia, government, and public entities to collaborate on utility-scale solutions for integrating renewable energy and other efficiency technologies into our energy systems.

To learn more about the ESIF, visit: www.nrel.gov/esif.

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NREL/FS-5C00-63974 • April 2015

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