

National Renewable Energy Laboratory Offer of Services to Support FY13 Alternative Energy Initiatives

Topic 2: Energy Storage

The National Renewable Energy Laboratory (NREL) offers to provide credible, cost leveraged testing to validate the performance and resiliency of your proposed storage technology under [NEXWC Alternative Energy Initiatives BAA](#). Testing at NREL can simulate conditions and address risks not possible or appropriate during the field demonstration. We offer this risk-reduction capability at a reasonable cost as provided in the cost and schedule summary below.

NREL Energy Storage Test Facilities and Capabilities:

NREL's unique capabilities for development, testing, and validation of a variety of energy storage technologies are valuable tools for technology developers and system integrators. NREL's Energy Systems Integration Facility (ESIF) offers energy storage component and integrated system testing leveraging PV simulation and grid simulation (AC and DC buses) up to 1 MW. As a Technical User Facility, ESIF costs associated with basic operations and maintenance are paid by DOE. If larger systems are contemplated, NREL's Controllable Grid Interface facility offers grid simulation from 1 to 7.5MW and potential for interconnection to operating wind turbines. NREL power electronics/controls, subject matter experts, and established testing procedures are available to support the following activities:



1. **Essential testing** including operation and performance characterization testing, grid interconnection standard testing (excerpts of UL 1741 / IEEE 1547), as well as testing under abnormal grid conditions.
2. **Advanced testing** beyond the essential testing to characterize functionality such as VAR control, voltage ride-through, frequency response, and dynamic system controls response, specialized performance related testing, and fault testing. ESIF's integrated environmental chamber (30' x 12' x 18') can simulate a variety of climate zones including those in Hawaii, Guam, and Washington.
3. NREL also offers **expert technical support** of the testing in energy storage modeling, analysis, system design; development and troubleshooting.

Activity	Approximate Cost*
1. Essential testing with report	4 weeks = \$175k
2. Advanced testing with report	\$25k per week, 2 week minimum
3. Expert Technical Support	\$10k per week

Relevant NREL Experience

NREL has worked closely with multiple divisions within the Navy including NAS Office, OPNAV, CNIC, NAVFAC-HQ, NAVFAC-PAC, NEXWC, and NAVFAC-HI, developing a detailed understanding of energy issues and infrastructure at Naval installations, particularly in HI and Guam. NREL has conducted energy assessments for Naval facilities in Hawaii, Guam, and Washington State, and we have performed more detailed on-site assessments at the Navy’s highest priority sites within that region. NREL is actively demonstrating a variety of newly-commercialized energy storage and controls, renewable energy, and energy efficiency technologies with NAVFAC in Hawaii and Guam. In that role, NREL has teamed with NAVFAC and energy technology developers to select technologies for demonstration, supervise technology development and acceptance testing, monitor system performance, document final results, and prepare high performance technologies for transition and market adoption.

NREL has the facilities, expertise and field experience to help our partners successfully demonstrate their energy storage technology solutions.

Contact Information

To include NREL as part of your energy storage project initial proposal, please use the information and budgetary figures above. If you have questions please contact Jeff Dominick at (303) 275-3170 or Jeffrey.dominick@nrel.gov .

*These figures are estimates only and are based on prior NREL experience. Actual costs would be negotiated based on the specific technology and testing requirements. As a Federally-Funded Research and Development Center, NREL is required to comply with federal cost principles and DOE requirements as outlined in the NREL Management and Operating contract.