NREL and SDG&E Collaboration to Support SDG&E Grid and Storage Efforts

Cooperative Research and Development Final Report

CRADA Number: CRD-14-562

NREL Technical Contact: Murali Baggu

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In accordance with Requirements set forth in Article X: REPORTS AND PUBLICATIONS A.(2), of the CRADA agreement, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

Parties to the Agreement: San Diego Gas and Electric Company

CRADA Number: CRD-14-562

CRADA Title: NREL and SDG&E Collaboration to Support SDG&E Grid and Storage Efforts

Joint Work Statement Funding Table Showing DOE Commitment:

Estimated Costs	NREL Shared Resources
Year 1	$300,000 .00
TOTAL	$300,000.00

Abstract of CRADA Work:

This project will enable effective utilization of high penetration of photovoltaics (PV) in islanded microgrids, increasing overall system efficiency, decreased fuel costs and resiliency of the overall system to help meet the SunShot goals of enhancing system integration methods to increase penetration of PV. National Renewable Energy Laboratory (NREL) will collaborate with San Diego Gas & Electric (SDG&E) to provide research and testing support to address their needs in energy storage sizing and placement, Integrated Test Facility (ITF) development, Real Time Digital Simulator (RTDS) Modeling and simulation support at ITF, Visualization and Virtual connection to Energy Systems Integration Facility (ESIF), and microgrid simulation and testing areas. Specifically in this project a real microgrid scenario with high penetration of PV (existing in SDG&E territory) is tested in the ESIF laboratory. Multiple control cases for firming PV using storage in a microgrid scenario will be investigated and tested in the laboratory setup.

Summary of Research Results:

In this project NREL developed tools to address SDG&E's needs in energy storage evaluation, cost benefit analysis and performance testing. NREL also established virtual connection between NREL's ESIF and SDG&E's ITF. The developed tools will identify optimal dispatch strategy to operate energy storage, analyze the technical impact on the feeders and to calculate the associated cost-benefit of energy storage on SDG&E distribution feeders. Specifically, cost-benefit/alternatives analysis and a cost benefit tool were developed to calculate the cost and benefits of existing and future battery energy storage systems (BESS) on SDG&E's distribution feeders. Apart from the optimal dispatch strategy, technical analysis and the cost benefit analysis, NREL also developed a standard procedure for battery storage performance testing and

established a virtual connection between the RTDS at NREL's ESIF facility and the RTDS at SDG&E's ITF facility, enabling integrated experiments for future SDG&E needs.

Subject Inventions Listing:

None

Report Date:

22 November 2016

Responsible Technical Contact at Alliance/NREL:

Murali Baggu

Name and Email Address of POC at Company:

Andy Friedl, P.E., AFriedl@SEUContractor.com

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