



Concentrating Solar Power Hybrid System Study

Cooperative Research and Development Final Report

CRADA Number: CRD-13-506

NREL Technical Contact: Craig Turchi

**NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC**

This report is available at no cost from the National Renewable Energy
Laboratory (NREL) at www.nrel.gov/publications.

CRADA Report
NREL/TP-5500-62766
September 2014

Contract No. DE-AC36-08GO28308

NOTICE

The submitted manuscript has been offered by an employee of the Alliance for Sustainable Energy, LLC (Alliance), a contractor of the US Government under Contract No. DE-AC36-08GO28308. Accordingly, the US Government and Alliance retain a nonexclusive royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for US Government purposes.

This report was prepared as an account of work sponsored by an agency of the United States government. Neither the United States government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States government or any agency thereof.

This report is available at no cost from the National Renewable Energy Laboratory (NREL) at www.nrel.gov/publications.

Available electronically at <http://www.osti.gov/scitech>

Available for a processing fee to U.S. Department of Energy and its contractors, in paper, from:

U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831-0062
phone: 865.576.8401
fax: 865.576.5728
email: <mailto:reports@adonis.osti.gov>

Available for sale to the public, in paper, from:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
phone: 800.553.6847
fax: 703.605.6900
email: orders@ntis.fedworld.gov
online ordering: <http://www.ntis.gov/help/ordermethods.aspx>

Cover Photos: (left to right) photo by Pat Corkery, NREL 16416, photo from SunEdison, NREL 17423, photo by Pat Corkery, NREL 16560, photo by Dennis Schroeder, NREL 17613, photo by Dean Armstrong, NREL 17436, photo by Pat Corkery, NREL 17721.

Cooperative Research and Development Final Report

In accordance with Requirements set forth in Article XI.A(3) of the CRADA document, 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.

CRADA Number: CRD-13-506

CRADA Title: Concentrating Solar Power Hybrid System Study

Parties to the Agreement: GE Global Research

Joint Work Statement Funding Table Showing DOE Commitment:

Estimated Costs	NREL Shared Resources
Year 1	\$139,000
Year 2	\$00.00
Year 3	\$00.00
TOTALS	\$139,000.00

Abstract of CRADA Work:

The purpose of this Project Task Statement (PTS) is to collaboratively leverage the collective resources at General Electric Global Research (GEGRC) and the National Renewable Energy Laboratory (NREL) in the areas of concentrating solar power hybrid systems to advance state-of-the-art concentrating solar and conventional power generation system integration.

Summary of Research Results:

This project was a collaborative effort between GEGRC and NREL to develop a state-of-the-art model of a representative integrated solar combined cycle (ISCC) power plant. Simulation models were developed by GEGRC and NREL in two different software packages and the results were cross-checked. The chosen integration scheme extracts high-pressure feedwater from a combined cycle plant’s heat recovery steam generator (HRSG) and sends that water to a solar power-tower facility that returns high-pressure, solar-generated steam to the HRSG. The team performed a series of operating scenarios to map the performance space of the selected design under varying ambient weather and solar generation conditions. The resulting model was incorporated in NREL’s System Advisor Model to allow users the ability to estimate annual performance of a representative ISCC system.

Subject Inventions Listing: None.

Report Date: March 18, 2014

Responsible Technical Contact at Alliance/NREL: Craig Turchi

This document contains NO confidential, protectable, or proprietary information.