

PMC-EF2a

(2.04.02)

U.S. DEPARTMENT OF ENERGY
EERE PROJECT MANAGEMENT CENTER
NEPA DETERMINATION



RECIPIENT: Solar Junction

STATE: CA

PROJECT TITLE : Commercialization of New Lattice Matched Multi-Junction; NREL Tracking No. 10-024

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
		NREL-10-024	GO10337

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:

Description:

B3.6 Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible).

Rational for determination:

DOE funding would be used by NREL to support the Solar American Initiative (SAI) PV Technology Incubator. The program is structured to allow innovative approaches targeted at research and development of PV cells and module prototypes. The primary objective of this SAI PV Technology Incubator project would be to achieve prototype modules and pilot production to eventually service the residential, commercial, and utility market sectors of grid-tied electric power.

The subcontractor (Solar Junction) for this proposed 18-month PV Technology Incubator program would complete the development of a triple-junction solar cell incorporating GaInNAs ~1eV cell and to identify and eliminate process- and material-related issues that lead to early-life cell failures. Materials for the solar cells would be fabricated by Molecular Beam Epitaxy (MBE). The material would then be processed into individual solar cells using standard photolithography, metallization and wafer processing steps typical in the fabrication of III-V devices. The cells would be characterized by measuring their electrical and optical performance and their reliability tested by subjecting the cells to varying temperature cycles, and thermal stresses and measuring the change in electrical performance. The subcontractor's technical work for this program would be conducted under three primary task efforts: 1) development of a triple-junction solar cell with a GaInNAs bottom cell, having a bandgap of ~1eV; 2) development of an anti-reflective coating (ARC) that maximizes power transfer to a triple-junction cell with a 1-eV bottom cell; and 3) reliability and Highly Accelerated Stress Testing (HAST) of the triple-junction cells with a GaInNAs bottom layer.

The Solar Junction proposed facility for this project is an existing building with a research and development laboratory located in an industrial office park at 401 Charcot Ave, San Jose, CA 95131. Eventually, Solar Junction would renovate within their existing building envelope to include small-scale manufacturing, a fabrication line and packaging equipment. Solar Junction has occupied this facility since May 2008 and the building has a Laboratory Level B occupancy rating per the California Building Code. The laboratory is equipped with fume hoods for chemical handling, fire sprinklers and alarm system, four eyewash stations, and an emergency shower station. Chemical carts would be used to transport chemicals throughout the facility. Solar Junction has developed and implemented a Chemical Hygiene Plan, Hazard Communication Plan, and a Hazardous Waste Management Plan including responsibilities and duties, procedures for working with laboratory chemicals, chemical procurement, distribution, and storage; medical program, PPE, signage, spills and accidents, safety training, waste management program, basic procedures for working with chemicals, and independent audits. This project would be completed using industry standard methods and protocols, and conducted in accordance with all federal, state, and local regulations.

Solar Junction holds applicable all permits necessary for this proposed project, including those necessary for the planned build-out of additional small-scale manufacturing and fabrication capacity. They are a Small Quantity Generator (SQG) with the assigned EPA identification number of CAL000334233. They file California Hazardous

Material Business Plans (HMBP) and hazardous waste disposal reports with their local Certified Unified Program Agency (CUPA), County of Santa Clara Hazardous Materials Compliance Division. They also have the appropriate fire code, flammable material, etc. permits with City of San Jose. No air quality permits or industrial wastewater discharge permits are required. This project would not require any modifications to existing permits and registrations, or acquisition of new permits at the Solar Junction facility.

Addition of the anti-reflective coat (ARC) may be done at the Stanford Nanotechnology Facility, Paul G. Allen Building, 420 Via Ortega Stanford, CA. This process would involve putting down a layer of aluminum oxide within a vacuum chamber, utilizing nanometers of material, and with no hazardous materials involved. The Stanford Nanotechnology Facility is a fully permitted laboratory with the existing equipment and infrastructure to perform this task. Reliability testing of the finished solar cells would be performed at a certified test laboratory, OPS A La Carte, 990 Richard Ave., Suite 101, Santa Clara, CA. These tests would involve thermal cycling and thermal shock tests. The testing would be done in an indoor environmental chamber to cycle through temperature and mechanical stresses to determine when the cells or their wire bonds would break. There would be no toxic or hazardous materials or high voltage electricity involved in the testing, and there would be no effluents to the air or wastewater as a result of these tests.

This project comprises bench-scale research projects and a small-scale pilot project therefore the DOE has categorized this project as CX B3.6.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

Note to Specialist :

EF2A prepared by Rob Smith

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Lori Plummer / Lori Plummer Date: 6/3/2010
NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

- Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
- Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____
Field Office Manager