PMC-ND
(1.08.09.13)

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION

RECIPIENT: Board of Trustees of the Leland Stanford Junior University **STATE:** CA

PROJECT TITLE : PVMI Bay Area Photovoltaic Consortium

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-000259	DE-EE0004946	GFO-0004946-001	GO4946

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:

A9 Information gathering, analysis, and dissemination	Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)
B3.15 Small-scale indoor research and development projects using nanoscale materials	Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification activities would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible).
B3.6 Small-scale research and development, laboratory operations, and pilot projects	Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The Bay Area Photovoltaic Consortium (BAPVC) is a unique partnership joining universities, industry, and the US Government with the mission of developing advanced technologies to deliver high-performance photovoltaic (PV) modules at low-cost. The Department of Energy has provided funding to establish the BAPVC to develop materials, device structures and processes necessary to design and implement manufacturing methods to achieve cost effective photovoltaic modules in large volume production. DOE completed a NEPA review for the initial funding of BAPVC (GFO-0004946-001, CX A9, 6/28/2011) and for subsequent subawards to national laboratories and universities. This NEPA review applies to the most recent round of selected subawards (32 in total). DOE has reviewed abstracts from each of the following sub-recipients.

1. UC Berkeley: "High Voc Solar Absorbers; the Missing Link for High-Efficiency, Spectral-Splitting, Solar Cells"
2. Massachusetts Institute of Technology (MIT): "Design principles for silicon-based multijunctions"
3. Stanford University: "Upgrading conventional solar cells to tandems using high band gap perovskite semiconductors"
4. Stanford University: "Improving the Long-Term Stability of Perovskite Solar Cells"
5. Rochester Institute of Technology (RIT): "Highly mismatched GaSb-GaAs thin film multijunction solar cells"
6. Stanford University: "Spatially-Engineered Delamination Layers for Epitaxial Liftoff of Photovoltaic Devices"
7. Stanford University: "Fast and Scalable Deposition of Crystalline MoOx for Si and III-V Photovoltaics"
8. Stanford University: "High efficiency ultra-thin film multi-junction solar cells"
9. Lawrence Berkeley National Laboratory (LBNL): "p-Type Transparent Conductors"
10. Stanford University: "Optimal Integration of Transparent Electrodes and Photon Management"
11. Lawrence Berkeley National Laboratory (LBNL): "Perfect Transparent Conductors for Full Spectrum Photovoltaics"
12. Massachusetts Institute of Technology (MIT): "Defect identification and mitigation in high-lifetime silicon materials: growth, processing, reliability"
13. National Renewable Energy Laboratory (NREL): "Evaluation of Flash Annealing for High Efficiency Cell

Fabrication on Low-Cost n-CZ wafers"
14. California Institute of Technology (Caltech): "Thin Si HIT Cells with High Performance Metasurface Light Trapping and Passivation"
15. University of Texas, Austin: "Exfoliated Si MIS Cells"
16. UC Berkeley: "A high-resolution, low-cost gravure printed bus bar and transparent conductor technology"
17. SLAC National Accelerator Laboratory: "Advanced Materials Characterization"
18. University of Oregon: "Identifying Problem Areas in thin-film PV: Exploiting the Spatial Sensitivity of TPC/TPI"
19. University of Utah: "Laser Processing to Improve CdTe Thin Film Photovoltaics Efficiency and Manufacturing"
20. Purdue University: "Integrated Approach to Fundamental Challenges in High-Performance Thin-Film Photovoltaics"
21. University of Washington: "Development of Multicolor Lock-in PL Method"
22. Colorado School of Mines: "Accelerating Development of CdTe Solar Cells"
23. University of South Florida: "Laser Processing of CdTe: Efficiency, Manufacturing, & Stability"
24. Lawrence Berkeley National Laboratory (LBNL): "Grain Boundary Engineering in Solution-Processed CdTe films"
25. Arizona State University: "High-efficiency CdTe/MgCdTe double-heterostructure solar cells"
26. Purdue University: "A Multiscale, electro-thermal-optical Reliability Framework for PID and Soiling"
27. University of Toledo: "High Sensitivity Mapping of Stress via Anisotropic Optics for Improved PV Manufacturing"
28. National Renewable Energy Laboratory (NREL): "Improving the Speed and Calibration of Water Vapor Transmission Rate Measurements"
29. Lawrence Berkeley National Laboratory (LBNL): "Synthesis, testing, and in--operando reliability characterization of novel composite barrier layers"
30. UC Santa Cruz: "Understanding and Improving Durability of Organic Photovoltaic Materials"
31. Lawrence Berkeley National Laboratory (LBNL): "Scalable hybrid polymer--nanocrystal barrier layer encapsulants"

32. Case Western Reserve University: "Predicting the Impacts of Interconnect Metallization on Real-World PV Performance"

This NEPA determination applies to the expenditure of federal funds by the above selected universities and national labs. Each national lab has a NEPA compliance program. Sub-award activities may be subject to additional NEPA review by the cognizant NEPA Compliance Officer at the individual labs.

The activities to be completed under the sub-awards may include information gathering, analysis, and dissemination, small-scale indoor research and development projects using nanoscale materials, and small-scale research and development in conventional laboratories. All activities would be conducted in existing offices and operational laboratories and would be in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. CX A9, B3.15 and B3.6 apply.

Sub-award activities are limited to analysis and laboratory scale research and development. This NEPA determination does not apply to any demonstration activities. Should any of the sub-awards propose to complete demonstration activities in conjunction with the DOE funded projects, additional NEPA review will be required prior to authorization of DOE funding. Additionally, any future BAPVC sub-awards will be subject to additional NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If you intend to make changes to the scope or objective of your project you are required to contact the Project Officer identified in Block 11 of the Notice of Financial Assistance Award before proceeding. You must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved.

Note to Specialist :

Solar Energy Technology Program
Kristin KErwin 3/2/2015
This NEPA determination requires a tailored NEPA Provision. Please include language to the effect of the following in the award term:

Sub-award activities are limited to analysis and laboratory scale research and development. This NEPA determination does not apply to any demonstration activities. Should any of the sub-awards propose to complete demonstration activities in conjunction with the DOE funded projects, additional NEPA review will be required prior to authorization of DOE funding. Additionally, any future BAPVC sub-awards will be subject to additional NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin NEPA Compliance Officer Date: 3/20/2015

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