PMC-ND
(1.08.09.13)

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

RECIPIENT: Arizona State University **STATE:** AZ

PROJECT TITLE: A new class of tandems: Optically coupled III-V/silicon module with outdoor efficiency exceeding 30%

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001387	DE-EE0007368	GFO-0007368-001	

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.)
B3.6 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.
B3.11 Outdoor tests and experiments on materials and equipment components	Outdoor tests and experiments for the development, quality assurance, or reliability of materials and equipment (including, but not limited to, weapon system components) under controlled conditions. Covered actions include, but are not limited to, burn tests (such as tests of electric cable fire resistance or the combustion characteristics of fuels), impact tests (such as pneumatic ejector tests using earthen embankments or concrete slabs designated and routinely used for that purpose), or drop, puncture, water-immersion, or thermal tests. Covered actions would not involve source, special nuclear, or byproduct materials, except encapsulated sources manufactured to applicable standards that contain source, special nuclear, or byproduct materials may be used for nondestructive actions such as detector/sensor development and testing and first responder field training.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Arizona State University (ASU) to demonstrate a 30%-efficient, tandem photovoltaic (PV) prototype module that will bring the levelized cost of energy (LCOE) of utility-scale PV down to $0.03/kWh. Proposed activities would include design, fabrication, in-lab verification, and field testing of a PV module.

Design and fabrication activities would occur at the Solar Power Laboratory on campus at Arizona State University in Tempe, AZ. The facility in which lab work would occur is purpose-built for the type of activities being proposed and would not need additional permits for the proposed activities.

Field testing would be performed on campus at the University of Arizona in Tucson, AZ in a dedicated, outdoor, solar power measurement facility in a retired swimming pool. The PVMirror prototype to be field tested would have an active area of 15.6 cm x 15.6 cm—the size of one six-inch silicon solar cell. Testing would involve mounting the module(s) in the bottom of the swimming pool in the position of both the mirror (receiving global irradiance) and the receiver (receiving only direct irradiance) in order to measure efficiency. Then the receiver would be illuminated by the reference silver mirror to determine the power gain when using a PVMirror. No ground disturbance would be necessary nor would there be any need for modification to existing facilities or construction of new facilities. The facility has all applicable permits in place, and no change in the use, mission or operation of existing facilities would arise out of this effort.

The proposed project would involve research in a semiconductor fabrication laboratory with potentially hazardous acids, bases, and semiconductor process gases. University health and safety policies would be strictly adhered to and safety and hazardous materials training courses would be required. Solar cells and prototypes would be disposed of according to university solid waste procedures for research samples i.e. recycling or landfill disposal. This project would use fume hoods for handling of the aforementioned acids and vacuum systems during the deposition of thin films of amorphous silicon, indium tin oxide, and silver. Hazardous acids and bases would be disposed of by the MacroTechnology Works facility at ASU which is equipped with an industrial waste processing plant to neutralize acids. Acids would arrive at this plant via industrial waste drains in the labs, and would then be neutralized. This disposal method is in accordance with all federal, state, and local regulations.

Based on review of the project information and the above analysis, DOE has determined the proposed project would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined that this project is consistent with actions outlined in DOE categorical exclusions A9 "Information gathering, analysis, and dissemination", B3.11 "Outdoor Tests" and B3.6 "Small-scale research and development, laboratory operations, and pilot projects" and is therefore categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If the Recipient intends to make changes to the scope or objective of this project, the Recipient is required to contact the Project Officer, identified in Block 15 of the Assistance Agreement before proceeding. The Recipient must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved. If the Recipient moves forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of a final NEPA decision, the Recipient is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share.

Note to Specialist :

Solar Energy Technology Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Rebecca McCord 04/14/2016

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Lori Gray / Lori Gray / Date: 4/14/2016

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