

PMC-ND

(1.08.09.13)

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

**RECIPIENT:**Dauskardt/Stanford University**STATE:** CA

PROJECT TITLE: Accelerated Scaling to Rapid Open-Air Fabrication of Durable Perovskite Solar Modules

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001840	DE-EE0008559	GFO-0008559-001	

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), 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 U.S. Department of Energy (DOE) is proposing to provide federal funding to Stanford University to design, develop, and test an ultra-fast and scalable open-air spray-plasma route for the rapid manufacture of fully-encapsulated and thermomechanically reliable perovskite modules in order to mitigate processing barriers to commercial deployment of perovskite technology.

The types of activities associated with the proposed project include data analysis, computer modeling, preliminary design/engineering, laboratory research, and field testing. Specifically, the project involves the fabrication, processing, and testing of perovskite solar cells and modules using existing capabilities at Stanford (Stanford, CA). Cells and modules would be fabricated and undergo accelerated indoor and outdoor (rooftop) exposures at the Department of Materials Science and Engineering. Short-term and temporary field testing would not require any major physical modifications to the building or permanent equipment installations; cells would be mounted on testing racks for a three-month duration then removed for analyses in advanced characterization laboratories on campus. No change in the use, mission or operation of existing facilities would arise out of project-related efforts. The Recipient has all applicable permits in place, and would not need additional permits for the proposed activities.

Based on current project plans, all work would occur at Stanford University. However, a potential secondary outdoor exposure facility would be considered as needed throughout the course of testing activities. The secondary site has

been identified as the National Center for Photovoltaics located at the National Renewable Energy Laboratory (NREL; Golden, CO). Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

Proposed solar cell and module fabrication activities would be limited in scale. The quantities of chemical precursors, solvents, and water consumed by the project would not exceed approximately 500 g, 100 L, and 1,000 L, respectively. The total quantity of glass substrates and polymer encapsulants produced would not exceed approximately 50 square meters and 0.1 cubic meters, respectively.

The proposed project would involve the use and handling of various hazardous materials, including metals and laboratory grade solvents. All such handling would occur in-lab at purpose-built research facilities in full compliance with Federal, state, and local environmental regulations. Stanford is dedicated to proper hazardous material management practices to mitigate potential health and safety hazards. Fabricated solar cells would contain thin films with thickness length scales from 5 to 500 nanometer; however, these thin films pose no additional potential hazards and would be handled and disposed of according to established procedures. Standard types and amounts of non-hazardous laboratory waste (e.g. clean room wipes, gloves, plastic and glass containers) and any other spent materials used in solar cell and module fabrication would be recycled or disposed of following established waste management policy and systems already in place for campus facilities. No disposition of equipment would be required at the conclusion of the proposed project.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assistance agreement:

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

Notes:

Solar Energy Technologies Office
This NEPA determination requires a tailored NEPA Provision.
NEPA review completed by Whitney Doss, 11/21/2018

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further 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: 11/26/2018

FIELD OFFICE MANAGER DETERMINATION

- Field Office Manager review not required
- Field Office Manager review required

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

Field Office Manager's Signature: _____

Field Office Manager

Date: _____