PMC-ND
(1.08.09.13)

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

RECIPIENT: Stanford University **STATE:** CA

PROJECT TITLE: Open-Air Manufacturing of Efficient Large-Area Perovskite Solar Cells to Meet Stability and Cost Targets

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002357	DE-EE0009516	GFO-0009516-001	

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.)
B3.6 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 (SU) to build on current open-air spray-based capabilities to develop fully open-air manufactured perovskite cells with scalable processing that eliminates the remaining vacuum-based processes and concomitantly improves cell stability.

Associated activities would involve the fabrication and processing of perovskite solar cells and modules with spray and plasma processing using existing processing capabilities in the Department of Materials Science and Engineering at SU (Stanford, CA). Solar cell materials and modules would be characterized using measurement tools and techniques available in various advanced characterization facilities at SU. The cells and modules would also be exposed to accelerated indoor and outdoor (dedicated rooftop site) exposures during the course of the project. Based on current project plans, all project work would occur at SU, although a potential secondary outdoor exposure facility at the National Renewable Energy Laboratory (NREL; Golden, CO) has been identified and may be considered for use if needed.

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. SU is fully compliant with all pertinent federal, state, and local environmental regulations and dedicated to proper hazardous material management and disposal practices. The fabricated solar cells would contain thin films with length scales from 5 to 500 nanometers. These thin films pose no additional potential risks in this form.

Solar cell and module fabrication would require limited quantities of chemical precursors, solvents, and compressed air. The total quantity of chemical precursors would not exceed 500 grams, the total quantity of solvents will not exceed 100 liters, and the total quantity of water would not exceed 1,000 liters. The total quantity of glass substrates used would not exceed 50 square meters, and the total quantity of polymer encapsulants would not exceed 0.1 cubic meters.

All non-hazardous waste including garbage and refuse such as clean room wipes and paper towels, glass, plastic containers, and plastic bags and any other discarded materials used in solar cell and module fabrication would be recycled or disposed of according to established SU policy. No disposition of equipment would be necessary at the conclusion of the proposed project as all work would occur in purpose-built facilities. No change in the use, mission, or operation of these facilities would arise out of project efforts. SU has all applicable permits in place, and would not need additional permits for the proposed activities.

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.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office
This NEPA determination does not require a tailored NEPA Provision.
NEPA review completed by Whitney Doss Donoghue, 6/24/2021

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 Date: 6/25/2021

NEPA Compliance Officer

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: _____ Date: _____

Field Office Manager