PMC-ND
(1.08.09.13)

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

RECIPIENT: Princeton University **STATE:** NJ

PROJECT TITLE: Identifying impacts of process, precursors and defects in metal halide perovskite solar cells

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001840	DE-EE0008560	GFO-0008560-001	

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.
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).

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Princeton University (Princeton) to evaluate materials and fabrication techniques for producing metal halide perovskite (MHP) cells. Princeton would investigate the cause of defects in MHP cells that occur in precursor solutions and/or solid interfaces, with the goal of developing processes to mitigate MHP degradation. The project would be completed over two Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Proposed work activities under BP1 would focus on establishing links between specific defects and solar cell performance/stability. BP2 would center on the fabrication of perovskite solar cells and subsequent analysis and optimization work. Proposed project activities under both BPs would include material characterization, evaluation of chemical reactions, and defect characterization and analysis. A variety of characterization tools and techniques would be used throughout the project. These would include x-ray diffraction, spectroscopy techniques, and nuclear magnetic resonance.

All project activities would be completed in existing, purpose-built laboratory facilities. Princeton would complete design, characterization, measurements/analysis and solar cell fabrication at its laboratory facilities at its campus in Princeton, NJ. The National Renewable Energy Laboratory ('NREL' – Golden, CO) would also serve as a sub-recipient and would both fabricate and evaluate perovskite solar cells. Additionally, Princeton would utilize

equipment at Brookhaven National Laboratory (Upton, NY) and Argonne National Laboratory (Lemont, IL) to conduct specific measurements (e.g. x-ray diffraction, x-ray absorption spectroscopy). No changes in the use, mission, or operation of existing facilities would be required. Neither Princeton nor any of its project partners would need to obtain any additional permits in order to perform the work activities proposed as part of this award.

Project work would include the use and handling of metals (e.g. lead salts), oxide glasses and organic solvents. Additionally, nano-scale materials would be used and handled. All such handling would occur indoors, in laboratory settings. Any risks associated with handling project materials would be mitigated through adherence to established health and safety policies and procedures. Protocols would include the use of personal protective equipment, employee training, monitoring, and oversight. Personnel working with lead salts would also be routinely screened for lead exposure. Any inhalation risks associated with the handling of project materials, including nano-materials, would be mitigated through the use of fume hoods. Both Princeton and NREL would observe all Federal, state and local health, safety, and environmental laws and regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assisstance 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 Jonathan Hartman, 01/08/2019

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: 1/8/2019

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