PMC-ND
(1.08.09.13)

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

RECIPIENT: University of Louisville Research Foundation **STATE:** KY

PROJECT TITLE: Roll-to-Roll Manufacturing of Continuous Perovskite Modules

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001840	DE-EE0008752	GFO-0008752-001	

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 the University of Louisville Research Foundation (ULRF) to develop and test radiative annealing techniques for manufacturing thin films for perovskite solar cells in a roll-to-roll platform.

The types of activities associated with the proposed project would include data analysis, stakeholder engagement, preliminary design/engineering, and laboratory research and development (R&D). Roll-to-roll studies of perovskite solar cell manufacture to include: ink formulation; deposition, characterization, and radiative annealing of thin films; and, materials testing using optical and electrical techniques would occur at the ULRF Conn Center for Renewable Energy Research (Louisville, KY). Additional ink formulation as well as the synthesis and functionalization of metal oxide nanoparticles would occur at various other chemical research facilities on campus. The National Renewable Energy Laboratory (NREL; Golden, CO) would contribute additional roll-to-roll manufacturing studies and sample testing.

The proposed project would involve the use and handling of bench-scale quantities of various hazardous materials, including metals and flammable industrial solvents. All such handling would occur in-lab and ULRF is dedicated to proper hazardous material handling and disposal practices. Project participants would follow established University

Department of Environmental Health and Safety (DEHS) health and safety procedures, including employee training and the use of personal protective equipment (PPE). All hazardous materials would be managed in accordance with Federal, state, and local environmental regulations.

Certain formulations utilized by the proposed project would involve metal oxide nanoparticles suspended in organic solvents. While not considered an inhalation risk in this form, any nanoscale-containing materials used and handled by the project would be treated as hazardous to comply with DEHS policy. All chemical and hazardous wastes generated by project activities would be properly stored and disposed of with DEHS assistance at University-contracted, licensed off-site waste processing facilities.

Non-hazardous solid waste from routine laboratory operations (e.g. glassware and plastics), as well as small-sized solar cell samples fabricated by the project and no longer needed for future research, would be recycled or disposed of via existing collection services. No equipment would require decommissioning at the conclusion of the proposed project since all work would be conducted entirely within fully-equipped R&D facilities that were designed and permitted for the types of activities being proposed. No change in the use, mission, or operation of existing facilities would arise out of these efforts.

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.

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 does not require a tailored NEPA provision. Include the standard DOE lab language in the NEPA provision.
NEPA review completed by Whitney Doss, 5/14/2019

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 Date: 5/17/2019

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

- [x] 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