PMC-ND
(1.08.09.13)

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

RECIPIENT: First Solar **STATE:** CA

PROJECT TITLE: High –Throughput and –Yield Process using In-line Metrology for Sheet-to-Sheet Manufacturing of Perovskite Modules (with 3600 cm2 Active Area)

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002357	DE-EE0009528	GFO-0009528-001	

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 First Solar to design and develop a manufacturable fabrication process for perovskite solar photovoltaic (PV) modules. The proposed project would consist of three Budget Periods during which devices and modules would be fabricated at various scales from lab-size (5x5 cm2) to mini-modules (10x10 cm2) to prototype modules (60x60 cm2) for testing purposes.

Proposed project activities include data analysis, computer modeling, process development, and the synthesis, fabrication, and characterization (indoor accelerated/outdoor testing) of perovskite-based solar cells, minimodules, and modules. Synthesis, fabrication, and characterization activities as well as outdoor testing would take place at the First Solar California Technology Center (CTC; Santa Clara, CA). Additional synthesis, fabrication, and indoor characterization activities would be undertaken by subrecipients the University of Washington Clean Energy Testbeds (UW; Seattle, WA), the University of Toledo (UT; Toledo, OH), and the National Renewable Energy Laboratory (NREL; Golden, CO). Outdoor testing may also be conducted at NREL.

The proposed project would involve the use and handling of bench-scale quantities of various hazardous materials, including lead iodide and organic solvents. All such handling would occur in-lab and First Solar, UW, UT, and NREL are dedicated to proper hazardous material handling and disposal practices. All hazardous materials would be managed in accordance with pertinent federal, state, and local environmental regulations. In addition, FS, UW, UT, and NREL have health/industrial hygiene and safety policies in place to ensure compliance with applicable regulations, including but not limited to engineering controls, employee training, personal protective equipment, and security/access control.

Small quantities of non-hazardous waste including glass and mixed recyclables would be generated during fabrication activities. All solid waste that is not recyclable would be transported off-site for disposal at a licensed municipal landfill. The equipment and materials used for the proposed project would be retained for future research. Cells and modules submitted to outdoor testing would be returned to First Solar at the end of the testing period for

further characterization and recycling/disposal at the end of their lifetime.

All project activities would occur at research and development facilities that are purpose-built for the type of activities being proposed; therefore, no adverse impacts to sensitive resources are expected as a result of the proposed activities at any project location. No change in the use, mission, or operation of existing facilities would arise out of this effort. The project 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, 5/28/2021

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: 5/28/2021

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