

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



RECIPIENT: First Solar, Inc

STATE: CA

PROJECT TITLE : High-Performance Tandem Modules Based on Wide-bandgap FAPbI₃ Perovskites and Narrow-bandgap Cl(G)S Bottom Cells

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0003058	DE-EE0011420	GFO-0011420-001	GO11420

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, Inc. (FS) to design, develop, fabricate, and field test a tandem solar photovoltaic (PV) technology that uses a top-module based on metal halide perovskite and a bottom-module based on copper indium gallium selenide.

Project work would be conducted by FS at three of their existing research and development (R&D) locations: California Technology Center (CTC; Santa Clara, CA), Perrysburg Tera (PGT; Perrysburg, OH), and European Technology Center (ETC; Uppsala, Sweden). Process development, fabrication, and indoor testing of thin-film materials and solar cells of substrate size up to 10 centimeters (cm) by 10 cm would take place at CTC and ETC. Integration of developed materials, module fabrication on approximately 500 square cm glass substrate, and indoor accelerated/outdoor testing would occur at PGT. A qualified third-party contractor would be selected to conduct further laboratory-based validation testing on the mini-modules.

Other project work would be performed by subrecipients: the National Renewable Energy Lab (NREL; Golden, CO), Georgia Institute of Technology (GIT; Atlanta, GA), and Heliosynergy (Golden, CO). NREL activities would include the design, development, and fabrication of metal halide perovskite solar cells. GIT activities would include electrochemical measurements. Heliosynergy activities would include consultation and modeling support for process development. In addition to outdoor testing at PGT, field testing of a few dozen R&D prototype solar cells (not full-sized commercial products) would be performed at the Perovskite PV Accelerator for Commercializing Technologies center, which is jointly run by NREL and Sandia National Laboratories (Albuquerque, NM). All such testing would use existing sites already purposed for this activity.

No change in the use, mission or operation of existing facilities would arise out of the proposed bench-scale research. Project participants have all applicable permits in place and would not need additional permits for the proposed activities. The proposed project would involve the use and handling of various hazardous materials, including heavy metals of known toxicity and organic compounds. All such handling would occur in-lab following established hazardous material management and disposal practices in accordance with applicable environmental regulations. Project workers at each location would adhere to existing health and safety policies and procedures, including but not limited to engineering controls, employee training, personal protective equipment, and security/access control.

DOE has considered the scale, duration, and nature of the proposed activities to determine potential impacts on

sensitive resources, including those of a biological, ecological, cultural, and socioeconomic nature. DOE does not anticipate impacts on these resources which would be considered significant or require DOE to consult with other agencies or stakeholders.

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 (SETO)
Review completed by Whitney Donoghue on 10/8/2024.

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.

DOE has determined that work to be carried out outside of the United States, its territories and possessions is exempt from further review pursuant to Section 5.1.1 of the DOE Final Guidelines for Implementation of Executive Order 12114; "Environmental Effects Abroad of Major Federal Actions."

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____

 **Andrew Montano**
NEPA Compliance Officer

Date: 10/9/2024

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: _____