PMC-ND
(1.08.09.13)

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

RECIPIENT: FAS Holdings Group, LLC **STATE:** TX

PROJECT TITLE: Manufacturing 27%-efficient perovskite/silicon tandem photovoltaic cells using slot die coating at >5000 wafers per hour

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002357	DE-EE0009526	GFO-0009526-001	

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.)
B1.31 Installation or relocation of machinery and equipment	Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.
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 funding to FAS Holdings Group to develop a coating process for the manufacture of perovskite/silicon tandem solar photovoltaic (PV) cells. A specialized slot die coating system would be fabricated and tested for performance. The project would be completed over three Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Proposed project activities would include conceptual design work, data analysis, coating process development, material synthesis, coating equipment assembly/installation, performance testing, and material characterization. Material synthesis would consist of the iterated development and synthesis of perovskite ink formulations. The formulations would be used to coat silicon wafer samples. The coating process to be developed and tested as part of the project would be performed utilizing a slot die coater, which would be custom built for the project (described below). Approximately 6,500 wafers would be coated over the life of the project.

The coating system would consist of two modules, arranged in a contained assembly line. Each module would include a cabinet for power electronics and vacuum system, a deposition spray nozzle, a conveyor belt, simple metrology tools, and cabinets to load and unload wafers. The integrated coating system would measure approximately 105” x 75” x 50”. The system would be assembled by FAS Holdings Group and submitted to verification testing at its manufacturing facility in Dallas, TX. Once verification testing has been completed, the

system would be transported and installed at the laboratory facilities of project partner Arizona State University (ASU) at its campus in Tempe, AZ. No facility modifications would be required for installation of the system. The system would be connected to existing facility infrastructure, as required (e.g., electrical, exhaust system, vacuum pumps, etc.). The coated wafers would be characterized and the process would be optimized iteratively.

All project work would be coordinated by FAS Holdings Group. FAS Holdings Group would perform conceptual design work, equipment fabrication, and verification testing at its manufacturing facility in Dallas, TX. Coating system performance testing would be performed by ASU at its laboratory facilities in Tempe, AZ. Perovskite ink synthesis would be performed by project partner Texas State University in San Marcos, TX. The inks would be synthesized and shipped to ASU for use in performance testing. No physical modifications to existing facilities, ground disturbance, or changes to the use, mission, or operation of existing facilities would be required. No additional permits or authorizations would be required.

Project work would involve the use and handling of industrial chemicals, potentially hazardous compounds (e.g., lead-based materials), and reactive gases. All such handling would be performed in controlled laboratory environments that work with these materials as part of their regular course of business. Potential hazards would be mitigated through adherence to established institutional health and safety policies and procedures. All personnel would be trained appropriately for the tasks to be performed. Engineering controls would be adhered to, including the use of gloveboxes and other safety equipment, where applicable. Waste materials would be disposed of by a qualified third part waste management service provider. FAS Holdings Group and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations.

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 Jonathan Hartman, 06/22/2021

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: 6/23/2021

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