

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



RECIPIENT: GEORGIA INSTITUTE OF TECHNOLOGY

STATE: GA

PROJECT TITLE: Bipartisan Infrastructure Law: Photovoltaics Research and Development (PVRD)

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002582	DE-EE0010497	GFO-0010497-001	

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 the Georgia Institute of Technology (GIT) to design, fabricate, and test silver (Ag)-free Passivated Emitter and Rear Cell (PERC) and Tunnel Oxide Passivated Contacts (TOPCon) solar photovoltaic (PV) cells. The proposed project aims to replace expensive, screen-printed Ag contacts with low-cost, screen-printed copper (Cu) and/or aluminum (Al) contacts without compromising cell efficiency.

Proposed project activities would involve atmospheric Cu and alloying and non-alloying Al paste development, Cu and Al contact characterization, screen-printing and firing optimization, process development, and cell fabrication for the purpose of achieving target parameters and demonstrating 22-23% efficient Ag-free cells. The types of activities associated with the proposed project would include data analysis, computer modeling, preliminary engineering/design, and laboratory research. The proposed project would consist of two Budget Periods (BPs). BP1 would begin with device simulations to establish achievable Al and Cu contact parameters that could accomplish the cell efficiency goal. Additionally, BP1 would involve the development of the pastes, fabrication of Ag-free PERC and TOPCon cells, and characterization activities. BP2 would focus on process development, optimization activities, and further fabrication and characterization of Ag-free TOPCon cells.

Project management activities, research, and fabrication of Ag-free PERC and TOPCon cells would occur on campus at GIT in Atlanta, GA. Bert Thin Films, LLC (Louisville, KY) would be responsible for the synthesis of materials, formulation of pastes, screen-printing and firing activities, device testing, and data analysis. Characterization and additional data analysis activities would take place at the University of North Carolina at Charlotte (Charlotte, NC) in a dedicated facility for PV research. All facilities are preexisting purpose-built facilities for the type of work to be conducted for the proposed project. Facility modifications would not be required.

Proposed project activities would involve typical hazards associated with the use of hazardous chemicals, including toxic and pyrophoric gases, concentrated acids, and detergents. The use of hazardous chemicals would only occur in dedicated laboratory facilities by properly trained employees using personal protective equipment. Toxic and pyrophoric gases would be stored in self-contained gas cabinets with leak sensors and would only be used in closed systems designed specifically for these types of gases. All other chemicals would be stored in appropriate storage cabinets and associated work would occur in ventilated fume hoods or wet benches. Proper disposal methods would be utilized for all hazardous chemicals associated with proposed project activities. For example, byproducts from the

toxic and pyrophoric gases would be scrubbed in a high temperature burn box to remove all hazardous components before release. Additionally, acidic and basic chemicals would be neutralized prior to release, and solvents would be stored after use and picked up for proper disposal. Existing health, safety, and environmental policies and procedures would be followed to mitigate hazards to acceptable levels. Mitigated hazards would pose negligible risks to the public and environment. All activities would comply with existing federal, state, and local laws and regulations.

DOE has considered the scale, duration, and nature of proposed activities to determine potential impacts on resources, including those of an ecological, historical, 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.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office
NEPA review completed by Corrin MacLuckie, 06/28/2023.

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: **Andrew Montano**
NEPA Compliance Officer

Date: 6/28/2023

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: _____