

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



**RECIPIENT:** Tandem PV, Inc.

**STATE:** CA

**PROJECT TITLE :** STACKED: Stability and Characterization of Hole-Transporting Layers Key to Enabling Outdoor Durability

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0003058	DE-EE0011422	GFO-0011422-001	GO11422

**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).

**B5.15 Small-scale renewable energy research and development and pilot projects**

Small-scale renewable energy research and development projects and small-scale pilot projects, provided that the projects are located within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Tandem PV, Inc. to engineer ultraviolet light hardness into critical layers of solar photovoltaic (PV) devices and increase durability under high temperatures. The proposed project would perform enhanced durability testing on tandem perovskite-silicon devices with these new layers to ensure they are stable and retain their high efficiency in outdoor conditions.

Activities associated with the proposed project would include the design, development, fabrication, accelerated and field testing of advanced semiconductor materials, perovskite cells, and perovskite-silicon solar modules. The project would also involve the development and refinement of advanced measurement techniques. Design, development, and fabrication activities would occur at Tandem PV (San Jose, CA), Oregon State University nexTC corporation (Corvallis, OR) and Northwestern University (Evanston, IL). Accelerated and field testing would occur at Tandem PV, Sandia National Laboratory (Albuquerque NM), and the National Renewable Energy Laboratory (Golden, CO). Development and refinement of advanced measurement techniques would be conducted by Tandem PV, Colorado School of Mines (Golden, CO) and the University of Washington (Seattle, WA). No change in the use, mission or operation of existing facilities would arise out of this effort.

Some outdoor solar module testing equipment would be temporarily installed at Tandem PV's facility in an existing parking lot adjacent to the building. No other physical modifications or new construction would be associated with the proposed project. The equipment would be placed on the ground without fixation and no ground disturbing activities are planned. This installation would not be visible from any location external to the facility, which is located in an industrial zone surrounded by warehouses, distribution facilities, manufacturing facilities, and petrochemical storage and distribution. Tandem PV and project participants have all applicable permits in place, and would not need additional authorizations or approvals for the proposed activities.

The proposed project would involve the use and handling of various hazardous materials, including heavy metals and industrial solvents. All such handling would occur in-lab following proper hazardous material management and disposal practices in accordance with applicable federal, state, and local environmental regulations. Certain aspects of project work may utilize nanoparticulate oxides. The oxides are purchased pre-dissolved in solution and deposited

onto substrates; at no time are the nanoparticles expected to become unbound. Existing health and safety policies and procedures would be followed, including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments.

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 7/2/2024.

## 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.

The proposed action is categorically excluded from further NEPA review.

## SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:  \_\_\_\_\_ Date: 7/9/2024  
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