

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



RECIPIENT: Tandem PV, Inc.

STATE: CA

PROJECT TITLE: Manufacturing 1 x 2m Tandem Modules

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
	DE-EE0009527	GFO-0009527-003	G09527

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.)

B3.11 Outdoor tests and experiments on materials and equipment components

Outdoor tests and experiments for the development, quality assurance, or reliability of materials and equipment (including, but not limited to, weapon system components) under controlled conditions. Covered actions include, but are not limited to, burn tests (such as tests of electric cable fire resistance or the combustion characteristics of fuels), impact tests (such as pneumatic ejector tests using earthen embankments or concrete slabs designated and routinely used for that purpose), or drop, puncture, water-immersion, or thermal tests. Covered actions would not involve source, special nuclear, or byproduct materials, except encapsulated sources manufactured to applicable standards that contain source, special nuclear, or byproduct materials may be used for nondestructive actions such as detector/sensor development and testing and first responder field training.

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 Tandem PV, Inc. (TPV) to design, develop, fabricate, and test advanced perovskite/silicon (Si) solar photovoltaic (PV) panels. The aim of the proposed project is to demonstrate prototype product efficiency, durability, and projected cost structure, leverage existing Si module production infrastructure, and familiarize candidate commercialization partners with the advanced technology.

An initial NEPA Determination (GFO-0009527-001; CXs A9, B3.6; 08/19/2021) reviewed project activities associated with Tasks 1-12, Tasks 14-20, and Tasks 22-24 and restricted Task 13 "Intermediate Indoor and Outdoor Durability Testing" and Task 21 "Final Indoor and Outdoor Durability Testing" pending further NEPA review. The locations and facilities for testing had not yet been selected. A second NEPA Determination (GFO-0009527-002; CXs A9, B3.6; 04/05/2022) reviewed an additional location for some of the previously reviewed tasks; Task 13 and Task 21 remained conditioned upon NEPA completion. At this time, TPV has identified all test sites and there is enough information available for DOE to conduct a meaningful review of project activities associated with Task 13 and Task 21.

Task 13 and Task 21 would involve indoor accelerated and outdoor testing of the project's advanced panels under varied loading conditions. Selected test sites include facilities reviewed under the existing NEPA determinations for this award: TPV (San Jose, CA), Fenning Laboratory at the University of California, San Diego (La Jolla, CA), FOM Technologies, Inc./University of Washington Clean Energy Institute (Seattle, WA), and Hanwha Q Cells (Bitterfeld-Wolfen, Germany). The facilities in which project work would continue to occur are designed for the type of research being proposed; therefore, no physical modifications, ground disturbance, or new permits and/or authorizations would be necessary to complete remaining project tasks. No change in the use, mission, or operation of existing facilities would arise out of this effort. The facilities have all applicable permits in place and would not need additional permits

for the proposed activities.

Of the aforementioned test sites, only the Recipient's facility would require the installation of new equipment to accommodate outdoor testing. TPV would procure and set up a non-penetrative rooftop rack to accommodate the panels being tested. The rack would be low profile (less than 6 feet [ft] off the surface) and occupy an area of less than 10x10 ft.

The Perovskite PV Accelerator for Commercializing Technologies "PACT" program run jointly by Sandia National Laboratories (SNL) and the National Renewable Energy Laboratory would provide 3rd party testing of the panels. Accelerated and field testing would occur at SNL (Albuquerque, NM). Under the technical oversight of SNL, field testing would also be performed by three of the DOE Regional Test Centers (RTCs) for Emerging Solar Technologies: Michigan RTC (Houghton, MI), Nevada RTC (Henderson, NV), and Florida RTC (Cocoa, FL). Each site is equipped with established, ready-to-use test stands for outdoor testing of solar panels.

A handling protocol for the panels would be shared with each testing facility to prevent breakage and ensure the safety and health of project personnel, who would use personal protective equipment to minimize risks. The fabricated panels to be provided for testing are lead-swabbed on external surfaces and sharp glass edges are ground. At the conclusion of the proposed tasks, all panels in testing would either continue under the purview of a separate arrangement with the respective project partner(s) or be returned to TPV for proper disposal according to pertinent federal, state, and local environmental regulations.

Based on the nature of the selected test sites and types of activities proposed, DOE does not anticipate any impacts to resources of concern due to the completion of Task 13 and Task 21. 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)
Reviewed completed by Whitney Donoghue on 04/13/2023.

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.

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: _____



Electronically Signed By: **Andrew Montano**

NEPA Compliance Officer

Date: 4/18/2023

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: _____