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

**RECIPIENT:** SOLARCYCLE, Inc. **STATE:** TX

**PROJECT TITLE:** Maximization of Recovery of Key Materials from End-of-Life Photovoltaic Panels

| Funding Opportunity Announcement Number | Procurement Instrument Number | NEPA Control Number | CID Number |
|---|---|---|---|
| DE-FOA-0002582 | DE-EE0010495 | GFO-0010495-001 | |

**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.) |
| **B2.1 Workplace enhancements** | Modifications within or contiguous to an existing structure, in a previously disturbed or developed area, to enhance workplace habitability (including, but not limited to, installation or improvements to lighting, radiation shielding, or heating/ventilating/air conditioning and its instrumentation, and noise reduction). |
| **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 federal funding to SOLARCYCLE, Inc. (SC) to enhance photovoltaic (PV) recycling capabilities from end-of-life solar PV modules at their existing recycling facility. SC aims to achieve larger and higher quality yields of glass, silver, and silicon through laboratory techniques associated with electrochemical separation.

Proposed project activities would focus primarily on research and development (R&D) activities for the purpose of developing more effective PV recycling technology and quantifying it's commercial and environmental viability. The types of activities associated with the proposed project would include data analysis, computer modeling, preliminary engineering/design, laboratory research, and modifications to existing facilities. The proposed project would consist of two Budget Periods (BPs). BP1 would focus on establishing a baseline for recovery material specifications in which to improve upon. BP2 would involve iterative R&D to achieve recovery material specification project goals. Additional BP2 activities would include those of an intellectual, academic, and analytical nature. Such activities include the quantification of the increase in material value achieved through electrochemical separation as well as the completion of a life cycle analysis (LCA) and techno-economic analysis (TEA).

Optimization and testing of existing material recovery equipment, in addition to the procurement, optimization, and testing of lab-scale electrochemical separation equipment, would occur at SC's existing recycling facility in Odessa, TX. SC's recycling facility would require modifications in the form of installing new laboratory equipment, a lab wet

hood and a benchtop electrowinning unit. These installations would not result in structural modifications to SC's existing recycling facility. However, the new equipment would require a compressed dry air (CDA) supply via a 1-inch diameter pipe. The CDA pipe would be routed via a 400 foot (ft) long by 1 ft wide by 2 ft deep trench between two existing buildings at SC's recycling facility. The area where the trench would be dug is in an unvegetated, unpaved, previously developed area, i.e., a storage yard for the facility. The area of disturbance associated with the trench would be restored to previous conditions once buried. To improve working conditions for the project team, SC would install a heating, ventilation, and air conditioning (HVAC) system in the same building as the new equipment. This would require an HVAC condenser unit to be installed next to the building on a 3 ft by 5 ft concrete pad. Project work would be performed at facilities that are purpose-built to accommodate the type of proposed installations and testing work. No change in the use or mission of the existing SC recycling facility would arise out of this effort.

Modeling and analysis activities as well as TEA/LCA activities would occur at the National Renewable Energy Laboratory (NREL) in Golden, CO. Third-party laboratories would be utilized for material characterization activities. These laboratories have not yet been determined by the project team. However, each laboratory chosen for project work, including NREL, would be purpose-built facilities for the type of work to be conducted for the proposed project. Facility modifications to laboratories would not be required.

Project activities would involve typical hazards associated with the use of heavy, high-voltage equipment and hazardous chemicals (including concentrated acids). Heavy, high-voltage equipment would be operated by trained and experienced employees. Use of hazardous chemicals would only occur in dedicated laboratory facilities by properly trained employees using personal protective equipment (PPE). An environmental, health, and safety analysis would be performed to identify risks and to determine proper PPE, machine guarding, and other necessary controls. New hazard analyses would be performed as new risks are identified. 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. However, if during project work cultural or archaeological artifacts are encountered, the recipient shall stop work immediately and inform the DOE Project Officer of the finding. The Texas Historical Commission and applicable tribal contacts shall be consulted and a Class III: Intensive Cultural Resources Inventory shall be required prior to re-commencing project work.

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.

Include the following condition in the financial assistance agreement:

If during project work cultural or archaeological artifacts are encountered, the recipient shall stop work immediately and inform the DOE Project Officer of the finding. The Texas Historical Commission and applicable tribal contacts shall be consulted and a Class III: Intensive Cultural Resources Inventory shall be required prior to re-commencing project work.

Notes:

Solar Energy Technologies Office
This NEPA determination requires legal review of the tailored NEPA provision.
NEPA review completed by Corrin MacLuckie, 06/26/2023.

**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 Date: 6/28/2023

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