

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Sundog Solar Technology**STATE:** CO

PROJECT TITLE: Development of a Front-Surface CSP Reflector Using Ultra-Barrier Technology

| | | | |
|--|--------------------------------------|----------------------------|-------------------|
| Funding Opportunity Announcement Number | Procurement Instrument Number | NEPA Control Number | CID Number |
| DE-FOA-0001840 | DE-EE0008528 | GFO-0008528-001 | |

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.)

B3.15 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).

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 Sundog Solar Technology (SST) to design and demonstrate a front-surface concentrated solar power (CSP) reflector that has high reflectance and abrasion resistance, yet is flexible enough to be manufactured using high-volume roll-to-roll equipment.

The project would involve development of readily scalable processes for the production of the proposed "ultra-barrier" solar reflector such that this technology is directly transferable to commercial manufacturing equipment. Scope of work would be limited to engineering analysis, spreadsheet based cost-modeling, preliminary design/engineering, and document preparation in addition to small-scale indoor research and development (R&D). Project tasks would be based primarily at R&D laboratories, in which associated activities would consist of a variety of vacuum deposition experiments and multiple iterations of fabricating/testing specimens of thin film reflector material (up to approximately 6 inch x 6 inch) to assure reproducibility. Short trial runs using 62-inch web wide roll-to-roll manufacturing equipment to replicate the preferred processes would be performed for comparison with results obtained in-lab. If scale-up is validated, the project would culminate in a pilot-run demonstration using full-scale roll-to-roll manufacturing equipment to fabricate a single roll of the advanced reflector (approximately 60 inch wide x 100 feet long, wound onto a 3 inch diameter plastic core) for subsequent sampling and verification of key material characteristics.

SST (Arvada; CO) would conduct engineering analysis and reflector design, and would also perform some testing/measurement activities. Helicon Thin Film Systems (HTFS; Tucson, AZ) would design, fabricate, measure, and test small reflector specimens. SST and HTFS each operate facilities dedicated to these types of solar power R&D activities. Erickson Int'l (Las Vegas, NV) would fabricate larger trial run specimens as well as complete the pilot-run of the advanced reflector on existing equipment at their industrial coating and metallizing facility. At least ten laboratory-scale reflector specimens would be submitted to the National Renewable Energy Laboratory for testing, and a portion (approximately 10 feet long by 5 feet wide) of the advanced reflector pilot roll would be provided to NREL for final results verification, the rest would be retained by Sundog Solar Technology to enable future research.

The proposed project would involve the use and handling of small quantities of solvents and solvent-based coatings, in addition to small amounts of silica nanoparticles contained in liquid/solution form. Because the nanoparticles are pre-mixed by 3rd party suppliers into resins and solvents before being provided to project participants, they are not considered to pose an inhalation risk. During solvent and coating operations, the handling of potentially hazardous chemicals would be contained to vent hoods with solvent recapture equipment per standard operating procedures. Volumes of solvents consumed would be less than one gallon at the two R&D sites and less than 10 gallons at the manufacturing facility. Project personnel would adhere to corporate Environmental Health and Safety policies and procedures that have already been established at these locations in compliance with applicable Federal, state, and local regulations. The project would not generate additional wastes beyond those normally encountered in the routine operations of a materials laboratory.

The facilities in which project work would occur were purpose-built for the types of activities being proposed; therefore, no physical modifications or new permits would be necessary. No change in the use, mission, or operation of existing facilities would arise out of this effort. Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assistance agreement:

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.

Notes:

Solar Energy Technologies Office
This NEPA determination requires a tailored NEPA Provision.
NEPA review completed by Whitney Doss, 3/15/2019

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: 3/18/2019
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