

PMC-ND  
(1.08.09.13)

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

**RECIPIENT:** Silicon Valley Materials Technology Corp.**STATE:** PA

**PROJECT TITLE:** Improvement of screen-printable metallization paste for low-cost silicon solar cells utilizing silver coated copper powders

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002243	DE-EE0009333	GFO-0009333-001	

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.

**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).

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Silicon Valley Materials Technology (SVMT) to develop a novel process for the formulation of photovoltaic (PV) metallization paste, with reduced silver content. Specifically, a cavitation process would be applied to paste synthesis. The project would be completed over three Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP. This NEPA Determination is applicable to all three BPs.

Proposed project activities would consist of powder synthesis, paste formulation, solar PV cell fabrication, material characterization, computer modeling/analysis, PV module assembly, and performance testing. Powder synthesis and paste formulation would occur utilizing industry standard laboratory equipment. Solar PV cell fabrication would be performed utilizing paste formulations developed as part of the project. Approximately 1,500 solar PV cells would be fabricated using standardized screen printing techniques. Solar PV cells would then be incorporated into approximately eight (8) mini-modules (i.e., 4-cell modules measuring approximately 27"x 27") and two (2) full scale modules (i.e., 60-cell modules measuring approximately 66"x40"). These modules would be utilized for outdoor testing at a dedicated outdoor solar testing site. For outdoor testing, modules would be incorporated into existing assemblies. No ground disturbance would be required. Outdoor testing would be performed at the AzRISE solar testing site operated by University of Arizona in Tucson, AZ. Additional testing may be performed at a dedicated

solar test site in Washington state. This site would be identified after the project has commenced.

SVMT would coordinate all project activities and perform data analysis, material synthesis, and material characterization at its laboratory facility in Stowe, PA. Applied Cavitation would formulate and characterize pastes at its laboratory and manufacturing facility in Goleta, CA. University of North Carolina (UNC) would perform solar PV cell fabrication, PV cell characterization, and solar PV module assembly at laboratory facilities at its campus in Charlotte, NC. Additional PV cell characterization would be performed by Nanolab Technologies and EAG Laboratories, at their facilities in Milpitas, CA and Sunnyvale, CA, respectively.

Commercial off-the-shelf mixing and air-handling equipment would be procured and installed at SVMT's facility in Stowe, PA. Installation would consist solely of placing the equipment and connecting it via standard electrical connections. No physical modification to existing facilities, ground disturbance, or changes to the use, mission, or operation of existing facilities would be required. No additional permits or authorizations would be required.

Project work would involve the use and handling of metal powders and chemical solvents. Nanoscale materials would be also be produced during material synthesis processes. All such handling would be performed in purpose-built laboratory facilities where with these materials are used as a regular course of business. Potential hazards would be mitigated through adherence to established institutional health and safety policies and procedures. All staff would use appropriate personal protective equipment. Powders containing nanomaterials would be consumed as part of paste synthesis. Laboratory work would be performed under fume hoods, when applicable. Spent materials would be disposed of by qualified waste management companies. SVMT and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations.

## NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office

This NEPA determination does not require a tailored NEPA provision.

Review completed by Jonathan Hartman, 03/12/2021

## 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: Kristin Kerwin

NEPA Compliance Officer

Date: 3/16/2021

**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: \_\_\_\_\_