

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Michigan State University**STATE:** MI**PROJECT TITLE :** Solid State Solar Thermochemical Fuel (sofuel) for long duration storage

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002064	DE-EE0008992		

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.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Michigan State University (MSU) to develop and test a Solid State Solar Thermochemical Fuel ("SoFuel") technology that provides an option to store solar energy at room temperature for long durations.

The types of activities associated with the proposed project would include data analysis, computer modeling, and laboratory research and development (R&D). High temperature measurements of metal oxide thermophysical properties and reaction kinetics would be conducted in dedicated engineering facilities at MSU (Lansing, MI). In-lab activities would be facilitated by the design, fabrication, and operation of new bench-scale equipment. Vendor supplied components would be assembled to prototype a kW size SoFuel reactor facility. The experimental apparatus would be used to develop control algorithms and, ultimately, produce approximately 5 kg of charged SoFuel for final performance validation at Oregon State University (OSU; Columbus, OH). A project partner would use the sample to heat an existing laboratory furnace to specified conditions.

Metal oxide measurements and experimental production of SoFuel (reduced magnesium manganese oxide material) would use approximately 100 kg of magnesium manganese oxide pellets and consume approximately 500 L of water for cooling during reactor operations. No hazardous materials would be employed during this process. The proposed project is expected to generate approximately 25 kg of excess magnesium manganese oxide and 150 kg of other non-hazardous solid waste. Disposal of these materials would be handled by the MSU Waste Management Division. At the conclusion of the proposed project, the prototype SoFuel facility would be disassembled and its components would be retained for future R&D.

The proposed project would involve the operation of equipment at temperatures exceeding 1000 degrees C. Appropriate precautions would be taken to ensure that exposed surfaces are highly insulated and all project personnel would receive environmental health and safety training. All work would be conducted in existing, fully-permitted facilities that were purpose-built to accommodate the nature and scale of proposed research, including the engineering and temporary installation of new laboratory equipment. No change in the use, mission, or operation of existing facilities would arise out of this effort.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office
 This NEPA determination does not require a tailored NEPA Provision.
 NEPA review completed by Whitney Doss Donoghue, 01/17/2020

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 Date: 1/21/2020
 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