PMC-ND

(1.08.09.13)

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

RECIPIENT: Arizona State University **STATE:** NM

PROJECT TITLE : Technology for Electrically Enhanced Thermochemical Hydrogen (TEETH)

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002378	DE-EE0009818	GFO-0009818-001	

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.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Arizona State University (ASU) to investigate if coupling thermochemical water splitting (TCWS) to electrically driven selective pumping of H2 via a proton conducting membrane (PCM) has advantages over the baseline solar thermochemical process.
The proposed project activities would take place at ASU in Tempe, AZ and Sandia National Laboratories (SNL) in Albuquerque, NM. ASU and SNL would design, develop, synthesize and lab test metal oxides and proton conducting membranes, and the design and testing of a benchtop water splitting apparatus utilizing these materials. ASU would also perform analysis of material and system thermodynamics, performance, and economics.

The proposed project activities would take place over 18 months and one Budget Period (BP). Thermodynamic and system analyses would be carried out to establish targets, estimate cost efficiency, and identify materials to obtain or synthesize. The materials would be mixed ionic electric conducting oxides and proton conducting ceramic powders and membranes. Once the candidate materials would be obtained or synthesized, the necessary thermodynamic, structural, chemical, and electrochemical analyses would be carried out in order to characterize the materials. Material candidates would be tested in membrane reactors and their purity would be verified. Lastly, the experiment would be validated by fabricating an improved system, including an experimental benchtop apparatus to split steam into hydrogen and oxygen using the candidate materials.

The risk of hazards such as metals, chemicals in various forms, industrial solvents, high temperatures, high voltage, and stored energy would be present during the proposed project activities. All work would occur in-lab, thus there is no risk to the public. ASU ad SNL would follow proper workplace safety and hazardous material handling and disposal practices, according to federal, state, local, and institutional regulations. Existing environmental health and safety protocols would be followed, including employee training, engineering controls and monitoring, and proper protective equipment. Small lab-scale quantities of CO2, NOx, hydrogen, and oxygen would be evacuated by a fume hood, and some may be released to the environment.

All activities would take place at existing, purpose-built facilities. There would be no modifications to or change in use of existing facilities and no ground disturbing activities outside of the field testing on previously disturbed ground which is currently utilized for this purpose. No new permits or licenses are needed.

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)
Review completed by Alex Colling on 03/04/2022

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: 3/8/2022
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