

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



RECIPIENT: West Virginia University

STATE: WV

PROJECT TITLE: Intermediate Temperature Proton-Conducting Solid Oxide Electrolysis Cells with Improved Performance and Durability

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001647	DE-EE0008378	GFO-0008378-001	GO8378

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), 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 West Virginia University (WVU) to develop an intermediate temperature ($T = 600^{\circ}\text{C}$) proton-conducting solid oxide electrolysis cell (IT H-SOEC). The cell would include a water-splitting functional layer involving a conformal coating of electro-catalyst/electrolyte matrixes. The project would also seek to identify highly active, triple-conducting electrocatalysts and to develop conformal coating methods for depositing these catalysts into composite anode functional layers.

The proposed project is divided into three Budget Periods, with a Go/No-Go decision point between each Budget Period. This NEPA review is for Budget Period 1 (Tasks 1-3) only. Subsequent Budget Periods will be reviewed if and at which time a "Go" decision is made by DOE and project activities are defined.

Proposed project activities would include computer modelling (e.g. reaction simulations, compositional characterization, etc.), development of X-ray photoelectron spectroscopy (E-XPS), anode and cathode synthesis and characterization, development of a thin-film fabrication process, High-Throughput Screening (HTS) of anode electrocatalysts, H-Electrolyte development and optimization, coating catalyst optimization, and assembly/testing of a short stack electrolysis cell. Fabrication and characterization would be carried out at its Engineering Research Building in Morgantown, WV. WVU's project partner, Colorado School of Mines (CSM), would conduct HTS, coating and characterization activities at its Mechanical Engineering Department in Golden, Colorado. Additionally, a combinatorial deposition process would be developed in collaboration with HydroGEN partners, including the National Renewable Energy Laboratory and potentially, other national laboratories, depending on the negotiation of consortia participation with DOE.

In all cases, fabrication and testing activities would be conducted at existing, purpose built laboratory facilities. No change in the use, mission, or operation of existing facilities would result from any of the proposed project activities. Neither WVU nor any of its project partners would need to obtain any additional permits in order to realize the work activities proposed as part of this award. WVU would oversee all work activities.

Various industrial solvents would be used, including oxides, nitrates, ethanol, and aqueous solvents. WVU and CSM would use a combined total of approximately 25 kg of industrial chemicals, 1,200 gal. of water, 36,000 cu. ft. of Nitrogen gas, and 20,000 cu. ft. of Hydrogen. Both institutions have health, safety and environmental policies and procedures that would be adhered to, which would help to mitigate any risks associated with the handling of these materials. Oversight of these protocols would be managed by the Environmental, Health and Safety Office of each institution, respectively.

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.

Based on the review of the proposal, DOE has determined the proposal fits within the class of action(s) and the integral elements of Appendix B to Subpart D of 10 CFR 1021 outlined in the DOE categorical exclusion(s) selected above. DOE has also determined that: (1) there are no extraordinary circumstances (as defined by 10 CFR 1021.410(2)) related to the proposal that may affect the significance of the environmental effects of the proposal; (2) the proposal has not been segmented to meet the definition of a categorical exclusion; and (3) the proposal is not connected to other actions with potentially significant impacts, related to other proposals with cumulatively significant actions, or an improper interim action. This proposal is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a conditional NEPA determination for this award, and funding for certain tasks under this award is contingent upon the final NEPA determination.

Insert the following language in the award:

You are restricted from taking any action using federal funds, which would have an adverse affect on the environment or limit the choice of reasonable alternatives prior to DOE/NNSA providing either a NEPA clearance or a final NEPA decision regarding the project.

Prohibited actions include:

[Budget Period 2](#)

[Budget Period 3](#)

This restriction does not preclude you from:

[Budget Period 1 Tasks and Sub-Tasks](#)

If you move forward with activities that are not authorized for federal funding by the DOE Contracting Officer in advance of the final NEPA decision, you are doing so at risk of not receiving federal funding and such costs may not be recognized as allowable cost share.

Insert the following language in the award:

You are required to:

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.

Note to Specialist :

[Fuel Cell Technologies Office](#)

[This NEPA Determination requires a tailored NEPA Provision.](#)

[NEPA review completed by Jonathan Hartman, 7/25/2018](#)

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:



Casey Strickland

NEPA Compliance Officer

Date: **7/25/2018**

FIELD OFFICE MANAGER DETERMINATION

☐ Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

- ☐ Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
- ☐ Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature:

Field Office Manager

Date: