

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



RECIPIENT: Northwestern University

STATE: IL

PROJECT TITLE: Efficient Reversible Operation and Stability of Novel Solid Oxide Cells

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001874	DE-EE0008437	GFO-0008437-001	G08437

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 Northwestern University (Penn Northwestern) to develop and test novel Solid Oxide Cells (SOCs) specifically designed to achieve the low area specific resistance required to achieve high round trip efficiency in reversible operation at high current density. Three SOC designs would be developed, with two being down-selected for fabrication and testing, and one ultimately being down-selected for optimization and final year testing. The project would be carried out over three Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Proposed project activities include data collection/analysis, SOC design and development, SOC fabrication, computer modelling (e.g. mechanistic degradation models, cell-stack & system modelling), accelerated life testing (e.g. electrochemical and microstructural analysis), and techno-economic analysis.

All laboratory work would be performed by Northwestern at existing, purpose-built laboratory facilities at its primary campus in Evanston, IL. Colorado School of Mines (CSM) would complete computer modelling tasks and the techno-economic analysis at existing research facilities at its primary campus in Golden, CO. No experimental/laboratory work would be conducted by CSM. United Technologies Research Center (UTRC - Hartford, CT) would also contribute to the project in an advisory role. No experimental/laboratory work would be conducted at UTRCs facilities. No modifications to existing facilities would be required for this project. Additional permits, licenses or authorizations would not need to be secured.

The proposed project would involve the use and handling of various metals and industrial solvents. All such handling would occur in-lab. Any risks associated with the use of these materials would be mitigated by Northwestern through adherence to its established health and safety policies and procedures and oversight by the Office for Research Safety at Northwestern. Northwestern and all of the project partners would comply with all Federal, state and local health, safety, and environmental regulations.

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 final NEPA determination for this award

Insert the following language in the award:

If the Recipient intends to make changes to the scope or objective of this project, the Recipient is required to contact the Project Officer, identified in Block 15 of the Assistance Agreement before proceeding. The Recipient must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved. If the Recipient moves forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of a final NEPA decision, the Recipient is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share.

Note to Specialist :

Fuel Cell Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Jonathan Hartman, 10/11/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:  Electronically Signed By: Kristin Kerwin Date: 10/11/2018
NEPA Compliance Officer

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: _____ Date: _____
Field Office Manager