

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** Proton Energy Systems**STATE:** CT**PROJECT****TITLE:**

Advanced Electrode Manufacturing to Enable Low Cost PEM Electrolysis

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001874	DE-EE0008638	GFO-0008638-001	GO8638

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 Proton Energy Systems (PES) to develop a novel roll-to-roll manufacturing run of membrane electrode assemblies (MEAs). The project would seek to reduce manufacturing costs and improve device performance/stability, as compared to existing technologies. A pilot scale device would be designed, fabricated, and tested. The project would be completed over two Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Project work under BP1 would focus on subscale MEA development. Proposed activities would include ink development for coating catalyst layers, definition of coating parameters (e.g. feed rates, line speeds, and drying protocols), material characterization, bench-scale electrode fabrication, half-cell MEA testing, and MEA integration (e.g. combination of anode and cathode electrodes). BP2 would focus on process scale-up and completion of pilot trials. Proposed activities would include electrode optimization, down selections of the coating technique, process parameters, and final electrode concept, optimized MEA integration, scaled-up coating tests using an 86 cm² platform, and incorporation of electrodes onto MEAs via direct deposition on the membrane, or lamination from a carrier

Catalyst ink development, deposition, membrane processing, cell assembly, and electrochemical performance

testing would be performed at PES' manufacturing/laboratory facility in Wallingford, CT. Material characterization and scale-up of coating activities would be performed at the National Renewable Energy Laboratory ('NREL' – Golden, CO), Oak Ridge National Laboratory ('ORNL' – Oak Ridge, TN, and Kodak (Rochester, New York). General Motors (GM) would also serve as a consultant and provide guidance on development of roll-to-roll coating processes. Activities performed by GM would be limited to desk work (e.g. analysis and reporting).

All project activities would be performed by PES and its project partners at existing, purpose-built facilities that regularly perform work similar to that included in this project. No laboratory/manufacturing activities would be performed at any GM locations. No physical modifications to existing facilities, ground disturbing activities, or changes in the use, mission, or operation of existing facilities would be required for this project. Likewise, no additional permits or authorizations would need to be obtained.

Project work would include the use and handling of volatile organic compounds (VOCs), flammable catalyst materials, strong acids and processes with mechanical and chemical hazards. Risks associated with the completion of project activities would be mitigated through compliance with established health and safety policies and procedures. Protocols would include safety assessments and monitoring, adherence to hazard communication, emergency response, and hazardous waste operations plans, engineering controls, personnel training, and the use of personal protective equipment (PPE). Chemicals would be properly labeled, stored, and handled at all project locations. Gases would be ventilated through a gas management system. All hazardous materials would be managed in accordance with federal, state, and local environmental, health and safety regulations.

Catalysts containing nanoparticles would also be handled. Associated risks (e.g. respiratory hazards, flammability hazards, and toxicity hazards) would be reduced, as the nanomaterials used for this project tend to aggregate to form sub-micron size agglomerates, which are less hazardous than nano-sized particles (1-100 nm). Associated risks would also be reduced through established engineering controls, administrative controls, and the use of proper PPE. Protocols would include the use of fume hoods to prevent inhalation, mixing nanomaterials with an aqueous solvent to mitigate flammability and respiratory hazards, and adherence to established cleanup procedures. Residual nanomaterials would be treated prior to disposal.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assistance agreement:

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.

Notes:

Fuel Cell Technologies Office
NEPA review completed by Jonathan Hartman, 05/10/2019

This NEPA determination does not require a tailored NEPA Provision. Please include the standard DOE laboratory language in the award.

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: _____



Casey Strickland

NEPA Compliance Officer

Date: 5/10/2019

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: _____