

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



RECIPIENT: GE Global Research

STATE: NY

PROJECT TITLE : Scaled Solid Oxide Co-Electrolysis for Low Cost Syngas Synthesis from Nuclear Energy

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001817	DE-EE0010874	GFO-0010874-001	GO10874

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 General Electric (GE) Global Research (GE Research) to design and fabricate a 50-kilowatt (kW) solid oxide co-electrolysis (SOCC) prototype stack for incorporation into Idaho National Laboratory's (INL's) simulated nuclear test bed. The award aims to further advance the SOCC technology to produce low-cost syngas from nuclear heat and electricity.

Award activities would include data analysis, computer modeling, preliminary engineering/design, and laboratory research. GE Research (Niskayuna, NY) would utilize their existing research and development facility to test small scale cells and materials, fabricate cell structures, coat cells with active ceramic layers using thermal spray processing, and design, fabricate, and test the 50 kW SOCC stack. GE Gas Power (Schenectady, NY) would provide the thermal spray booths and processing space for coating cells as well as perform downstream quality control and processing testing steps in their manufacturing facility. Lastly, INL (Idaho Falls, ID) would conduct the final testing of the GE-produced 50 kW SOCC stack in a simulated nuclear environment.

All award work would occur indoors. However, all three award participants propose facility modifications at their sites. GE Research proposes equipment installations such as printing equipment, ovens, and furnaces; the installation of new electrical conduits that would run from the existing electrical panels to inside the building; lab upgrades including removing work benches, installing new ventilation trunks, and modifying lab lighting; and siting of carbon dioxide (CO₂) dewars indoors to accommodate for the larger tests. GE Gas Power facility modifications include altering the part handling equipment within the existing thermal spray booth to mount the substrates as well as co-locating processing, annealing, and printing equipment with the thermal spray booth to produce cells in high volume. Modifications to the existing test bed would occur at INL to accommodate the GE-produced 50 kW SOCC stack. Additional modifications at INL include adding CO₂ dewars in an adjacent lab space, updating high current power supply and safety equipment for the generated carbon monoxide (CO), and modifying the test bed plumbing to couple to the GE-produced 50 kW SOCC stack. All facilities are preexisting purpose-built facilities for the type of work to be conducted for this award. No change in the use, mission, or operations of these facilities nor any permit modifications or new permits are proposed. All proposed facility modifications are detailed above.

Award activities would involve typical hazards associated with the handling and use of hazardous materials, operation of potentially hazardous equipment, and site-specific environmental hazards. Specifically, the award proposes the use and handling of industrial solvents, acids, hydrogen (H₂), and CO as well as ceramic and metal powders. GE labs also

include hazards associated with wiring and installing high voltage equipment, operating equipment producing high temperatures, and radiation hazards associated with the operation of x-ray and lasers. All handling of these materials would occur in lab and follow established environmental, health, and safety protocols. Additionally, the GE Research lab is equipped with a toxic gas monitoring system and has a dedicated emergency response team in case of an emergency. Hazards at INL include the operation of a large-scale electrolysis system which would generate high temperatures, use high temperature steam, use/creation of high volumes of hazardous gases such as H₂ and CO, and involvement of hazardous voltages. The team at INL has established safety protocols for working with these hazards and would follow all federal, state, and local regulations. All equipment associated with the award would be installed and operated following standard operating procedures along with a Lockout/Tagout section which details the mitigations for all safety risks associated with each piece of equipment.

DOE has considered the scale, duration, and nature of proposed activities to determine potential impacts on resources, including those of an ecological, historical, cultural, and socioeconomic nature. DOE does not anticipate impacts on these resources which would be considered significant or require DOE to consult with other agencies or stakeholders.

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:

Hydrogen and Fuel Cell Technologies Office
NEPA review completed by Corrin MacLuckie, 10/05/2023.

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:


NEPA Compliance Officer

Date: 10/5/2023

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: _____