U.S. Department of Energy
Categorical Exclusion Determination Form

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Proposed Action Title: Origen Hydrogen Inc - Engineering of Scalable Platinum-free Electrodes for Pure-Water AEM Electrolysis

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): San Carlos, CA; Columbia, SC; Albuquerque, NM

Proposed Action Description:

Funding will support the project team's small-scale research and development activities to develop platinum-free, low-cost electrodes for application in a pure-water-based anion exchange membrane (AEM) electrolyzer, in order to produce renewable hydrogen at $1/kg production cost. Specifically, the project team will (1) demonstrate a specified voltage decay rate with pure water, dry cathode and non-PGM catalysts after 300h of operation and perform a techno-economic analysis for electrolyzer stack manufacturing; (2) demonstrate a 100cm2 cell at 1.0 A/cm2 and initial voltage 1.75V and a short stack with at least 3 cells of 100 cm2; and (3) perform a stack techno-economic analysis and demonstrate a path to manufacturing of the electrolyzer stack. If successful, the team will demonstrate low-cost electrodes immune to the most common degradation pathways, while also scalable to larger active areas, for use in AEM water electrolysis. Ultimately, the team's technology employed in an anion exchange membrane electrolyzer would be a transformational change as compared to the costs of existing water electrolyzer technologies.

Project activities will be conducted at existing facilities of Origen Hydrogen (San Carlos, CA), University of South Carolina (Columbia, SC) and Pajarito Powder (Albuquerque, NM). Project tasks will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and local regulatory requirements. No modifications will be made to existing facilities to accommodate the proposed work, although certain equipment will be purchased and rented by the project team.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of 10 CFR Part 1021.

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

☑ The proposal 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 proposal that may affect the significance of the environmental effects of the proposal.

☑ The proposal 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.

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer: GEOFFREY GOODE Digitally signed by GEOFFREY GOODE Date: 2021.06.22 06:09:58 -04'00' Date Determined:

(This form will be locked for editing upon signature)