



U.S. Department of Energy

Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Dimensional Energy -- 3D-Printed 1000°C Silicon-Carbide Thermocatalytic CO₂ Reactor with High Carbon Conversion and Energy Efficiencies

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Ithaca, New York; Tucson, Arizona; Oak Ridge, Tennessee

Proposed Action Description:

Funding will support the project team's small-scale research and development of ceramic components for chemical reactors that can run on low-carbon electricity sources from solar, wind, and nuclear generators. Specifically, the project team will (1) design and 3D print ceramic chemical reactor components, (2) test the components under high heat for stability, durability, and scalability, and (3) combine components for testing large-scale reactors. If successful, this project would lead to the development of reactors to convert carbon dioxide into a feedstock chemical that can be processed into jet fuel, providing a low-carbon and sustainable aviation fuel to the air flight sector that accounts for nearly 3% of global annual emissions.

Project activities will be conducted at existing facilities at Dimensional Energy (Ithaca, NY), Oak Ridge National Laboratory (Tucson, AZ), and Cornell Center for Materials Research (Oak Ridge, TN) designed for the applicable activities. 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. Dimensional Energy has not obtained all necessary permits and approvals applicable to proposed actions and is prohibited from commencing applicable project work before (1) obtaining the necessary permits and approvals and (2) providing written assurances to ARPA-E of the same. Permits for site modifications to existing facilities to accommodate the proposed work have been obtained.

Categorical Exclusion(s) Applied:

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

B3.11 - Outdoor tests and experiments on materials and equipment components

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:

Approved via email

Date Determined: 05/26/2022

(This form will be locked for editing upon signature)