U.S. Department of Energy
Categorical Exclusion Determination Form

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Proposed Action Title: Renewable Energy to Fuels Through Utilization of Energy-Dense Liquids (REFUEL) Program (FOA No. DE-FOA-0001562 & DE-FOA-0001563 (SBIR/STTR))

Program or Field Office: Advanced Research Projects Agency - Energy (ARPA-E)

Location(s) (City/County/State): CA, CT, DE, IL, KS, MA, MN, NC, NY, SC, UT, WA, WV

Proposed Action Description:

The REFUEL Program seeks to fund the development of scalable technologies for converting electrical energy from renewable sources into energy-dense carbon-neutral liquid fuels and back into electricity or hydrogen on demand. The REFUEL Program is composed of 16 small-scale research and development projects that will be conducted by universities, non-profit entities, for-profit entities, and federal laboratories. If successful, REFUEL technologies will accelerate the shift to domestically produced transportation fuels, improving American economic and energy security and reducing energy emissions.

All of the 16 REFUEL projects (listed in Attachment A) are covered by this Determination and fit within the class of actions identified under the DOE Categorical Exclusions identified below and do not involve any extraordinary circumstances that may affect the significance of the environmental effects of the projects. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of each project. Project tasks for all 16 projects under the REFUEL Program will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and Local regulatory requirements.

Categorical Exclusion(s) Applied:

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

B3.15 - Small-scale indoor research and development projects using nanoscale materials

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: Date Determined: 03/02/2017

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Attachment A: Projects in the REFUEL Program (FOA No. DE-FOA-0001562 & DE-FOA-0001563 (SBIR/STTR))

Prime Recipient	Project Title	Categorical Exclusion
Wichita State University	Alkaline Membrane-Based Ammonia Electrosynthesis with High Efficiency for Renewable and Scalable Liquid-Fuel Production	B3.6, B3.15
Research Triangle Institute (RTI) International	Innovative Renewable Energy-based Catalytic Ammonia Production	B3.6
SAFCell	Distributed Electrochemical Production and Conversion of Carbon-Neutral Ammonia	B3.6, B3.15
University of Minnesota	Small Scale Ammonia Synthesis Using Stranded Wind Energy	B3.6
West Virginia University	Renewable Energy to Fuels Through Plasma Catalytic Synthesis of Ammonia	B3.6
Materials & Systems Research, Inc.	Cost-effective, Intermediate-temperature Fuel Cell for Carbon-free Power Generation	B3.6
University of Delaware	Direct Ammonia Fuel Cells For Transport Applications	B3.6, B3.15
Sustainable Innovations, Inc.	Electricity From An Energy-Dense Carbon-Neutral Energy Carrier	B3.6
University of South Carolina	A Novel Hollow Fiber Membrane Reactor For High Purity H2 Generation From Thermal Catalytic NH3 Decomposition	B3.6, B3.15
Gas Technology Institute	A Novel Catalytic Membrane Reactor for DME Synthesis from Renewable Resources	B3.6, B3.15
Giner, Inc.	High-Efficiency Ammonia Production From Water And Nitrogen	B3.6, B3.15
FuelCell Energy	Protonic Ceramics for Energy Storage and Electricity Generation with Ammonia	B3.6

Attachment A: Projects in the REFUEL Program (FOA No. DE-FOA-0001562 & DE-FOA-0001563 (SBIR/STTR))

Prime Recipient	Project Title	Categorical Exclusion
Bettergy Corp.	Low Temperature Ammonia Cracking Membrane Reactor for Hydrogen Generation	B3.6, B3.15
Storagenergy Technologies, Inc.	High Rate Ammonia Synthesis By Intermediate Temperature Solid-State Alkaline Electrolyzer (ITSAE)	B3.6, B3.15
Opus 12, Inc.	Renewable Electricity-Powered Carbon Dioxide Conversion to Ethanol For Storage And Transportation	B3.6, B3.15
Molecule Works, Inc.	Novel Electrochemical Membrane Reactor for Synthesis of NH3 from Air and Water at Low Temperature and Low Pressure	B3.6, B3.15