U.S. Department of Energy
Categorical Exclusion Determination Form

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Proposed Action Title: Pioneering Railroad, Oceanic and Plane ELectrification with 1K energy storage systems PROPEL-1K and PROPEL-1K SBIR/STTR (FOA Nos. DE-FOA-0003162 and DE-FOA-0003163)

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): CA, CO, CT, GA, IL, MA, MD, MI, NY, OH, SC, TN, UT, VA

Proposed Action Description:

FIRST AMENDED PROGRAMMATIC NEPA DETERMINATION (See attached original Determination, dated May 8, 2024.) The Pioneering Railroad, Oceanic and Plane ELectrification with 1K energy storage systems Program (PROPEL-1K) seeks to develop emission-free, high-energy, and high-power energy storage solutions to electrify domestic aircraft, railroad, and ships within two project categories (A and B). Specifically, the PROPEL-1K program projects in Category A will target energy storage for electrifying regional flights by achieving greater peak power and continuous power capability with a higher cost base. Projects in Category B will aim for energy storage solutions for railroad and ship transit that require lower peak power and continuous power capability with a reduced levelized cost. If successful, PROPEL-1K will electrify regional flights, North American railroads, and vessels operating in U.S. territorial waters, and will provide energy storage technologies to achieve greater than 4 times energy density improvement compared to incumbent technologies, reducing the use of fossil fuel combustion and greenhouse gas emissions. The PROPEL-1K Program is composed of 13 small-scale research and development projects that will be conducted by universities, non-profit and for-profit entities, and small businesses. This Determination covers 6 of the 13 projects (see Attachment A for all 9 projects covered by this and the prior Determination). These 6 projects fit within the class of actions identified under the DOE Categorical Exclusions identified below. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of each project. All 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.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

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: GEOFFREY GOODE Digitally signed by GEOFFREY GOODE Date: 2024.06.12 17:05:45 -04'00' Date Determined:

(This form will be locked for editing upon signature)

Attachment A: Projects in the PROPEL-1K (FOA No. DE-FOA-0003162 and DE-FOA-0003163) Program

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
Illinois Institute of Technology (3162-1511)	**1K Rechargeable Solid-State Li-Air Battery For Decarbonizing Aviation**	**A9, B3.6, B3.15**
Georgia Tech Research Corporation (3162-1534)	**Alkali Hydroxide Triple Phase Flow Batteries (3PFB)**	**A9, B3.6**
University of Maryland, College Park (3162-1543)	**High-Energy, Rechargeable, Low-Cost Batteries for Train and Ship Electrification**	**A9, B3.6**
Wright Electric Inc. (3163-1519)	**Modular Aluminum–Air Flow Battery System**	**A9, B3.6**
Aurora Flight Sciences Corporation (3162-1547)	**Zero Emission, High Energy Density, High Efficiency Aluminum Air Energy Storage and Power Generation System**	**A9, B3.6**
Solid Energies (3162-1549)	**A Novel Class of High-Energy/Power-Density, Long-Cycle-Life, Roll-to-Roll-Processed Solid-State Lithium-Air Batteries (SSLAB) for Aviation Applications**	**A9, B3.6**
Precision Combustion, Inc. (3163-1505)	Electrochemical Microchip Paired with Energetic Fuels for MW-hr Electrified Propulsion (EMPoWEr)	A9, B3.6
And Battery Aero, Inc. (3162-1523)	HERALD - High Energy Renewable Afx eLectroDes	A9, B3.6, B3.15
Propel Aero, Inc. (3162-1525)	High Energy Redox Engine	A9, B3.6

Bold text indicates the six projects included in the First Amended CX.

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Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): CA, CO, CT, MA, MI, OH, TN

Proposed Action Description:

The Pioneering Railroad, Oceanic and Plane ELectrification with 1K energy storage systems (PROPEL-1K) Program seeks to develop emission-free, high-energy, and high-power energy storage solutions to electrify domestic aircraft, railroad, and ships within two project categories (A and B). Specifically, the PROPEL-1K program projects in Category A will target energy storage for electrifying regional flights by achieving greater peak power and continuous power capability with a higher cost base. Projects in Category B will aim for energy storage solutions for railroad and ship transit that require lower peak power and continuous power capability with a reduced levelized cost. If successful, PROPEL-1K will electrify regional flights, North American railroads, and vessels operating in U.S. territorial waters, and will provide energy storage technologies to achieve greater than 4 times energy density improvement compared to incumbent technologies, thus reducing the use of fossil fuel combustion and greenhouse gas emissions.

The PROPEL-1K Program is composed of 13 small-scale research and development projects that will be conducted by universities, non-profit and for-profit entities, and small businesses. This Determination covers 3 of the 13 projects (listed in Attachment A). All 3 projects fit within the class of actions identified under the DOE Categorical Exclusions identified below. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of each project. All 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.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

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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. On behalf of Geoffrey Goode

NEPA Compliance Officer: CHARLES CONWAY Digitally signed by CHARLES CONWAY Date: 2024.05.08 15:58:05 -04'00' Date Determined:

(This form will be locked for editing upon signature)

Attachment A: Projects in the PROPEL-1K (FOA No. DE-FOA-0003162 and DE-FOA-0003163) Program

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
Precision Combustion, Inc. (3163-1505)	Electrochemical Microchip Paired with Energetic Fuels for MW-hr Electrified Propulsion (EMPoWEr)	A9, B3.6
And Battery Aero, Inc. (3162-1523)	HERALD - High Energy Renewable Afx eLectroDes	A9, B3.6, B3.15
Propel Aero, Inc. (3162-1525)	High Energy Redox Engine	A9, B3.6