# U.S. Department of Energy
## Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Innovative Natural-gas Technologies for Efficiency Gain in Reliable and Affordable Thermochemical Electricity-generation (INTEGRATE) (FOA No. DE-FOA-0001797) Program

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

Location(s) (City/County/State): CA; CO; CT; IL; MA; NH; NY; OH; SC; TN; WA; WI

Proposed Action Description:

The INTEGRATE Program (hereinafter "Program") seeks to fund the development of natural gas fueled, distributed, ultra-high efficiency electrical generation systems that can generate electricity at greater than 70% efficiency while keeping system costs competitive at commercial scales of 100kW or greater. If successful, technologies developed under this Program could enable a revolutionary new class of electrical generation systems with applications for commercial and industrial power customers across the economy. INTEGRATE technologies have the potential to save $3 billion in fuel costs; eliminate 1 quadrillion BTU of primary energy required to generate and distribute electricity; and increase grid resilience and reliability during power outages.

The Program is composed of 8 small-scale research and development projects that will be conducted by universities, non-profit entities, for-profit entities, and federal laboratories. All 8 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. 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: [signature] Date Determined: 05/21/2018

(This form will be locked for editing upon signature)

## Attachment A: Projects in the INTEGRATE (FOA No. DE-FOA-0001797) Program

| Prime Recipient (Control No.) | Sub-Recipients | Project Title | Categorical Exclusion |
|---|---|---|---|
| **Colorado School of Mines (1797-1521)** | Air Squared, Kohler Power Systems, Colorado State University | High Efficiency, Low Cost & Robust Hybrid SOFC/IC Engine Power Generator | A9; B3.6 |
| **FuelCell Energy, Inc. (1797-1531)** | University of California-Irvine, Fuelcell Energy-Calgary | Adaptive SOFC for Ultra High Efficiency Power Systems | A9; B3.6 |
| **Nexceris, LLC (1797-1532)** | AltaSim Technologies | Advanced Solid Oxide Fuel Cell Stack for Hybrid Power Systems | A9; B3.6 |
| **Oak Ridge National Laboratory (1797-1512)** | University of South Carolina | A Natural-gas Based High Efficiency Combined Thermo-chemical Affordable Reactor-nectar | A9; B3.6; B3.15 |
| **Saint-Gobain Ceramics & Plastics (1797-1524)** | Brayton Energy LLC, Precision Combustion Inc. | Super High-efficiency Integrated Fuel-cell and Turbo-machinery – SHIFT | A9; B3.6 |
| **SUNY University at Stony Brook (1797-1518)** | Nexceris LLC, Czero Engineering, Brookhaven National Laboratory | Hybrid Electrochemistry - Advanced Combustion for High-efficiency Distributed Power (HE-ACED) | A9; B3.6 |
| **University of Wisconsin-Madison (1797-1552)** | Wisconsin Engine Research Consortium, UTRC, Caterpillar | An Integrated High Pressure SOFC and Premixed Compression Ignition (PCI) Engine System | A9; B3.6 |
| **Washington State University (1797-1536)** | Saint-Gobain Ceramics & Plastics, Capstone Turbines | De-Coupled Solid Oxide Fuel Cell Gas Turbine Hybrid (dFC-GT) | B3.6 |