

**U.S. DEPARTMENT OF ENERGY  
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY  
NEPA DETERMINATION**



**RECIPIENT:** Echogen Power Systems (DE), Inc.

**STATE:** OH

**PROJECT TITLE :** CO2 High Temperature Heat Pump (HTHP)

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002997	DE-EE0011192	GFO-0011192-001	GO11192

**Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:**

**CX, EA, EIS APPENDIX AND NUMBER:**

Description:

**A9 Information gathering, analysis, and dissemination**

Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)

**B1.31 Installation or relocation of machinery and equipment**

Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.

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

Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Echogen Power Systems, Inc. (Echogen) for the design, fabrication and demonstration of a novel CO<sub>2</sub>-based high-temperature heat pump. The project would be executed over a three-year period with the design occurring in the first year, fabrication and installation during the second year, and demonstration/operation occurring in the third and final year.

Design, installation and demonstration, as well as performance and operational testing of the proposed heat pump would occur at Echogen's headquarters in Akron, Ohio. Design and analysis of the primary CO<sub>2</sub>-air heat exchanger would occur at Reaction Engines, Inc. in Watkins, Colorado and at Reaction Engines, Ltd. in Abington, England, while heat exchanger manufacturing would occur Reaction Engines Abington facility. The CO<sub>2</sub> compressor design, and analysis and fabrication would occur at Barber Nicols, Inc. in Arvada, Colorado.

No hazardous materials are anticipated to be used during the execution of this project at any of the four project work locations. If new health or safety risks are identified, additional policies and procedures would be implemented in addition to the existing health and safety policies and procedures.

Emissions from the production of the electricity in the form of CO<sub>2</sub> would be released during the operation of the heat pump at the Echogen site in Akron, Ohio. Direct emissions (greenhouse gases) from the combustion of natural gas and indirect emissions from electricity usage would occur during the manufacture of the primary heat exchanger at the Reaction Engine facility in England. Emissions at these two sites are expected to be negligible. No emissions (greenhouse gases, particulate matter, or airborne pollutants) would be directly released as a result of project operations at the Reaction Engines site in Watkins, Colorado or the Barber Nicols site in Arvada, Colorado.

The proposed heat pump system (compressor/turbine/heat exchangers/air system) would be located at Echogen's Akron, Ohio facility. The installation would occur in the parking lot at the rear of the building and be integrated around existing test equipment within a previously disturbed footprint. Excavation would occur as part of the installation and approximately 12-18 inches of pre-disturbed soil would be removed for the concrete pad, which would support the skidded heat pump equipment and air exhaust system. The foundation would be approximately 784 square feet and 12 inches thick and 20 feet above grade. New visual impacts related to this installation on the nearby Ohio and Erie Canalway, a National Heritage Area, would not occur as there are other industrial features immediately adjacent to the proposed structure that are approximately 35 feet high. This installation, therefore, would occur within the context of an already industrialized footprint. No physical modifications, ground disturbing activities, change in use, or installation of outdoor equipment would occur at any of the other three locations.

Local building permits would be required at the Echogen site to install the heat pump and air system. Any and all permits required for the execution of the project at the above-referenced locations would be the responsibility of the recipient.

DOE has considered the scale, duration, and nature of proposed activities to determine potential impacts on resources, including those of an ecological, historical, cultural, and socioeconomic nature. DOE does not anticipate impacts on these resources which would be considered significant.

## NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Industrial Efficiency & Decarbonization Office  
NEPA review completed by Chris Akios, 06/18/2024

## FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) 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 proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action 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.

DOE has determined that work to be carried out outside of the United States, its territories and possessions is exempt from further review pursuant to Section 5.1.1 of the DOE Final Guidelines for Implementation of Executive Order 12114; "Environmental Effects Abroad of Major Federal Actions."

The proposed action is categorically excluded from further NEPA review.

## SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: \_\_\_\_\_



Andrew Montano

NEPA Compliance Officer

Date: 6/18/2024

**FIELD OFFICE MANAGER DETERMINATION**

- Field Office Manager review not required
- Field Office Manager review required

**BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :**

Field Office Manager's Signature: \_\_\_\_\_  
Field Office Manager

Date: \_\_\_\_\_