

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



**RECIPIENT:** Noble Thermodynamic Systems

**STATE:** CA

**PROJECT TITLE :** Ultra Efficient CHP with High Power/Heat Ratio using a Novel Argon Power Cycle

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0001980	DE-EE0009136	GFO-0009136-002	G09136

**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.)

**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 Noble Thermodynamic Systems, Inc. (NTS) for the research and development of increased thermodynamic efficiency of internal combustion engines through the integration of the Argon Power Cycle (APC). The project would include the design, evaluation, fabrication, and testing of the APC and analytical studies.

Project work would be completed over two Budget Periods (BP). Previously, DOE reviewed this project and issued a conditional NEPA determination for BP1 (GFO-0009136-001, 5/7/2020). Information developed during BP1 was used to inform and define the full system integration and initial operation of the membrane unit with the engine and heat recovery system as well as the location for these activities in BP2. BP2 was restricted until further information was available. BP2 activities have now been defined and work sites have been identified. This NEPA determination is to review BP2 activities. These include techno-economic analysis, fully integrating the system (engine, membrane, and heat recovery unit), and operation of the closed loop system. All necessary components would be integrated and the Argon Power Cycle experimental setup would be tested to verify its ability to withstand relevant operating conditions.

Proposed activities at each location would include:

Noble Thermodynamic Systems, Inc.

Alameda, CA

- Office space used for engineering design and techno-economic analysis.

Richmond, CA

- Industrial space outfitted with the necessary utilities to host the stationary engine testing. Installation of .5 MW dynamometer and cooling tower and installation and operation of the engine and membrane system.

Membrane Technology and Research, Inc. - Newark, CA

- Process design calculations, project management and reporting, and membrane and module manufacturing.

Trimeric Corporation - Buda, TX

- Techno-economic analysis.

The project would require the use and handling of power and manufacturing equipment, industrial lubricants and coolants, fuel, industrial gases, solvents, and adhesives. All such handling would occur in-lab, and the organization is dedicated to proper hazardous material handling and disposal practices. All hazardous materials would be managed in accordance with federal, state, and local environmental regulations. Existing corporate health and safety policies and procedures would be followed, including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. Additional policies and procedures would be implemented as new health and safety risks are identified.

The final setup would be installed and operated at the NTS site. This location is fitted for large research projects and contains several well-equipped warehousing spaces to host the testing setup. No modifications, new permits, or changes in the use, mission, or operation of facilities would be required.

## NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Manufacturing Office  
NEPA review completed by Shaina Aguilar on 1/9/2023.

## 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.

The proposed action is categorically excluded from further NEPA review.

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

NEPA Compliance Officer Signature:  \_\_\_\_\_ Date: 1/10/2023  
NEPA Compliance Officer

## 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: \_\_\_\_\_ Date: \_\_\_\_\_  
Field Office Manager