

PMC-ND  
(1.08.09.13)

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



RECIPIENT: Noble Thermodynamic Systems, Inc.

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-0009136-001            |                   |

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. 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 eventual testing of the APC, with analytical studies.

Project work would be completed over two Budget Periods (BP). Only BP1 is being reviewed at this time. BP1 activities would include engine/powertrain and heat recovery development, numerical model tool development, and membrane unit development. Information being developed during BP1 would inform and define the full system integration and initial operation of the membrane unit with the engine and heat recovery system including the location for this activity in BP2. At this time, there is not enough information to complete a review of BP2 activities. Once additional details including the site for activities are defined, another NEPA review will be required to assess potential impacts associated with activities in BP2.

Proposed activities at each location would include:

University of California at Berkeley, Berkeley, CA;

- Engine characterization, process design and modeling; and computer modeling

Lawrence Berkeley National Laboratory, Berkeley, CA

- Process design engineering and modeling, project management and reporting.

Membrane Technology and Research, Inc. Newark, CA

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

Susteon, Inc. Cary, North Carolina

- Waste heat process design calculations, project management and reporting

The project would require the use and handling of power and manufacturing equipment, industrial lubricants and coolants, fuel, and industrial gases. 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. No modifications, new permits or change in the use, mission, or operation of any facility would be required.

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

## NEPA PROVISION

DOE has made a conditional NEPA determination.

The NEPA Determination applies to the following Topic Areas, Budget Periods, and/or tasks:

[Budget Period 1](#)

The NEPA Determination does not apply to the following Topic Area, Budget Periods, and/or tasks:

[Budget Period 2](#)

Include the following condition in the financial assistance agreement:

Notes:

[Advanced Manufacturing Office](#)  
This NEPA determination does require a tailored NEPA Provision  
NEPA review completed by Diana Heyder, 5/7/2020

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

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



[Casey Strickland](#)

NEPA Compliance Officer

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

[5/7/2020](#)

## 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: \_\_\_\_\_