

PMC-ND
(1.08.09.13)

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

**RECIPIENT:** Brayton Energy**STATE:** NH

PROJECT TITLE: Development of Integrated Thermal Energy Storage Heat Exchangers for Concentrating Solar Power Applications

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001697	DE-EE0008368	GFO-0008368-003	GO8368

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 federal funding to Brayton Energy, LLC to design a commercial-scale gas-phase Concentrating Solar Power (CSP) solution that would be developed and demonstrated via a subscale test facility. The megawatt-scale demonstration system would absorb concentrated solar energy from a heliostat field and deliver it into thermal energy storage integrated with a high-efficiency supercritical carbon dioxide (CO₂) power cycle.

The proposed project is organized into three Phases and five Budget Periods (BP). Phase 1/BP1, involving the development of a preliminary system design, was categorically excluded from further NEPA review in August 2018 (GFO-0008368-001). Phase 2/BP2, involving prototype component fabrication, validation testing, and facility design, was categorically excluded from further NEPA review in May 2020 (GFO-0008368-002). Since that time, a new site location for the performance of field testing activities in Phase 2/BP2 has been added. The testing activities were previously reviewed, but for a different location. This review will be applicable to work performed at this new location. Phase 3/BPs 3 – 5 remains conditioned upon further NEPA review, as sufficient information is not yet available to review proposed construction and demonstration tasks for this Phase.

Testing activities would occur at an existing property adjacent to Brayton Energy's facility. The property consists of a paved parking lot and cement foundation. Sub-scale prototype components would be set up outdoors at this location

for on-sun testing. Components would include solar receivers, a thermal energy storage system, heat exchangers, and heliostats. The solar receivers would be mounted on a mobile tower, extending upwards for approximately 30 feet. Approximately 24 – 30 heliostats would be positioned around the property and secured with ballast foundations (i.e. temporary foundations usually consisting of either concrete weights or sand bags). The thermal energy storage test rig would be contained within shipping containers outfitted with a custom roof module. Temporary fencing may be erected around the structure. No other modifications would be made to the property, including drilling, digging, or the pouring of concrete.

The site where testing would occur would require an electrical permit in order to connect equipment to the grid. Additionally, a permit may be needed in order to bolt a transformer enclosure to an existing cement slab. No ground penetrations would be required for this task. All permits would be obtained from relevant institutions in Hampton, NH.

Sub-scale component testing would be performed outdoors, in the designated testing area operated by Brayton Energy and described above. Equipment assembly and set up would involve the use of heavy machinery and personnel operating in areas where fall hazards are present. Operational testing of each system would involve high temperatures/pressures. In order to mitigate potential hazards, all Brayton Energy personnel would undergo operational/safety training and would utilize adequate personal protective equipment, including fall protection when applicable. Equipment would be designed to meet American Society of Mechanical Engineers standards and would be outfitted with relevant safety devices to prevent device failures (e.g. pressure relief controls, interlocks, etc.). No work would be performed on the equipment while pressurized. Brayton Energy would observe all applicable Federal, state, and local health, safety, and environmental regulations when performing work at the new location.

NEPA PROVISION

DOE has made a conditional NEPA determination.

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

[All Tasks and Subtasks of Phase 2/Budget Period 2.](#)

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

[All Tasks and Subtasks of Phase 3/Budget Periods 3-5.](#)

Notes:

[Solar Energy Technologies Office](#)
[This NEPA determination requires a tailored NEPA Provision.](#)
[NEPA review completed by Jonathan Hartman, 09/03/2020](#)

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.

A portion of the proposed action is categorically excluded from further NEPA review. The NEPA Provision identifies Topic Areas, Budget Periods, tasks, and/or subtasks that are subject to additional NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____


NEPA Compliance Officer

Date: 9/3/2020

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: _____