PMC-ND

(1.08.09.13)

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

RECIPIENT: Brayton Energy, LLC **STATE:** NH

PROJECT TITLE : Performance Optimization of Solid Particle Thermal Energy Storage (TES) Heat Exchanger by Combining Benefits of Extended Surfaces and Particle Fluidization

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002378	DE-EE0009812	GFO-0009812-001	

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 Brayton Energy, LLC to design, develop, fabricate, and test a particle-to-fluid heat exchanger. The project would be completed over two Budget Periods (BPs) with a Go/No-Go decision point between each BP. This NEPA determination is applicable to both BPs.

Parameters for testing and modeling of a heat exchanger would be defined. After design, development, and lab-scale testing of a single-channel heat exchanger, the system would be scaled-up. A 10-channel (>60 kW) heat exchanger prototype test system would be designed, fabricated, installed, and operated to demonstrate functionality, evaluate system performance, validate critical elements, and retire risks associated with scaling from single channel tests. The system would first be tested with no working fluid to evaluate inter-channel flow uniformity then as a fluidized system to evaluate performance compared to predictive models and de-risk larger scale system concerns. Results would be used to refine performance models.

Proposed project activities would include design, computer modeling, and heat exchanger fabrication and testing. Brayton Energy would oversee the project. Colorado School of Mines, a subrecipient on the project, would perform lab-scale testing of the single-channel heat transfer flow experiments at high temperatures. Minor upgrades would be made to their single-channel test facility. Brayton Energy, in their heat exchanger manufacturing facility, would design, develop, manufacture, and fabricate the heat exchanger test article; fabricate the test rig modifications and additions; and perform lab testing of the particle-to-fluid heat exchanger. The subscale particle-to-fluid heat exchanger would be tested on existing equipment outdoors on an adjacent lot leased by Brayton Energy. This lot houses a non-permanent 150 kW solar field, roofing structure with particle flow loop, and CO2 circulator skid all regularly used for testing technologies related to concentrating solar power. This work would require adding a new capability to the pre-existing particle flow loop tower. The fluidization system would be incorporated into the existing structure or into an experimental skid. Aside from the abovementioned modifications, there would be no other changes in the use, mission, or operation of existing facilities required as part of this project. An existing permit for the use of the lot may need to be renewed during the course of the project.

Brayton facilities, including the leased lot, are adjacent to wetlands and are on the 100-year floodplain. DOE has determined that the proposed activities would not have short-term or long-term adverse impacts to the floodplain or wetlands. Additionally, DOE has determined that the project activities would not be considered an action subject to 10 CFR 1022 “Compliance with Floodplain and Wetland Environmental Review Requirements”.

Project activities would involve the use and handling of metals, industrial solvents, materials at high temperatures, and heavy machinery. Any risks associated with the handling of these materials would be mitigated through adherence to established health and safety policies and procedures. Protocols would include personnel training; the use of personal protective equipment such as latex gloves, face masks, eye protection, and ear protection; monitoring; and engineering controls. In addition, some operations would require the use of fall protection. All waste products would be disposed of by licensed waste management service providers. Brayton Energy and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Shaina Aguilar on 12/22/21.

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: Electronically Signed By: Kristin Kerwin Date: 12/27/2021

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