

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



RECIPIENT: Heliogen Holdings Inc

STATE: CA

PROJECT TITLE: Development of an In-directly Irradiated Solar Thermal Calcination System, nominally at 400kWth, for On-Sun Testing

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002630	DE-EE0010312	GFO-0010312-001	

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 federal funding to Heliogen Holdings Inc. to design, develop, and demonstrate a solar-driven version of a device called a calciner, which performs a heated chemical reaction to remove carbon dioxide from limestone for cement production. The proposed project would also support the development of the commercial solar calciner by creating modeling tools, designing a scalable prototype, and performing on-sun testing of this prototype. The prototype calciner would be able to operate at high temperatures by using innovative particle receiver technology that would accelerate the chemical reactions, fabricated from readily available materials like limestone.

The proposed project is comprised of three Budget Periods (BP). BP1 and BP2 would involve indoor research and development (R&D), preliminary design, and laboratory-scale testing of receiver components. BP3 would include on-sun testing and associated modifications to existing infrastructure. This NEPA Determination reviews activities associated with BP1 and BP2 only; further NEPA review would be required for BP3 once the details of the project design are fully defined.

Project administration, industrial partner meetings, literature review, and data analysis would be undertaken at Heliogen Headquarters (Pasadena, CA). Engineering R&D, including cold and hot flow testing of a ground level test rig, would occur at Heliogen's main manufacturing facility (Long Beach, CA). Project work would be conducted in collaboration with The Colorado School of Mines (CSM; Golden, CO), the University of Michigan (UM; Ann Arbor, MI), and CTP Advanced Composites (CTP; Lynchburg, VA). UM would conduct thermochemical model development for reactors. CSM would conduct lab-scale reactor design and testing and sub-scale model development. CTP would fabricate the ceramic calciner tubes.

Proposed activities would involve standard workplace hazards associated with engineering R&D in an industrial environment, such as exposure to rotating machinery, compressed gases, and electrical and thermal hazards as well as lifting/hoisting large equipment. Existing health and safety policies and procedures would be followed including a review of R&D space and general R&D procedures, employee training, personal protective equipment, engineering and administrative controls, and appropriate signage. High temperature processing would be performed in specialized equipment specifically acquired for this project.

The proposed project would not involve the use or handling of any hazardous materials or those requiring special

management. The proposed project would use bench-scale quantities of MgCO₃ and CaCO₃ (limestone) particles, SiC and quartz materials, and preceramic resin in addition to various gases to support reactor flow (N₂, CO₂, and/or Ar). Such nonhazardous waste materials would be disposed of via normal routes at each facility.

The proposed activities would not involve outdoor deployment of equipment, the construction of new facilities, or the modification of existing facilities. Additional permits, licenses, or authorizations are not required for work to be performed during BP1 and BP2; proposed work is within the permitted scope of each facility. No change in the use, mission, or operation of existing facilities would arise out of this effort. The locations at which project work would occur are purpose-built for the type of activities being proposed; therefore, no adverse impacts to sensitive resources are expected as a result of BP1 and BP2 activities.

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 and Budget Period 2

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

Budget Period 3

Notes:

Solar Energy Technologies Office (SETO)
Review completed by Whitney Donoghue on 02/17/2023

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.

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:

Electronically
Signed By: Andrew Montano

NEPA Compliance Officer

Date: 2/27/2023

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: _____