



# U.S. Department of Energy Categorical Exclusion Determination Form

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Proposed Action Title: University of Maryland -- Modular Design and Additive Manufacturing of Interlocking Superinsulation Panel from Bio-based Feedstock for Autonomous Construction

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): College Park, Maryland; Buffalo, New York

Proposed Action Description:

Funding will support the project team's small-scale, research and development activities to design and additively manufacture modular interlocking superinsulation panel materials. Specifically, the project team will (1) design and develop interlocking panel materials, (2) develop full superinsulation panels, (3) test, evaluate, and verify panel performance, (4) test panel materials for recycling and repurposing. If successful, the project team will develop low-cost superinsulation panels with materials that can be recycled or repurposed, resulting in reduced CO2 emissions. The principal investigator previously worked at State University of New York (SUNY), Buffalo, where project work covered by the attached CX determination, dated August 19, 2022, was performed. The investigator has since moved to the University of Maryland where the project work will continue.

Project activities will be conducted at existing facilities at the University of Maryland (College Park, MD), SUNY, Buffalo (Buffalo, NY) and CleanFiber (Buffalo, NY) designed for the applicable activities. Project tasks fit within the class of actions identified under the DOE Categorical Exclusions identified below. This assessment was based on a review of the proposed scope of work and the potential environmental impact of the project. Project tasks will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and local regulatory requirements. No modifications will be made to the existing facilities to accommodate the proposed work.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of [10 CFR Part 1021](#).

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

The proposal 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 proposal that may affect the significance of the environmental effects of the proposal.

The proposal 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.

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer: **GEOFFREY GOODE** Digitally signed by GEOFFREY GOODE  
Date: 2023.09.22 13:42:27 -04'00'

Date Determined:



# U.S. Department of Energy

## Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Harnessing Emissions into Structures Taking Inputs from the Atmosphere (HESTIA) Program (FOA Numbers DE-FOA-0002625 and DE-FOA-0002626)

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): CO; IL; NC; NY; PA; SC; WI

Proposed Action Description:

The HESTIA Program supports the development of technologies that nullify embodied greenhouse gas (GHG) emissions, while simultaneously transforming buildings into net carbon storage structures. Specifically, projects funded under the HESTIA Program will develop and test building materials and whole-building designs that are net carbon negative on a life cycle basis by utilizing atmospheric CO<sub>2</sub> or CH<sub>4</sub> from a wide range of potential feedstocks (e.g., forestry and purpose-grown products, agricultural residues, marine derived, direct carbon utilization) in the production process. If successful, HESTIA projects will dramatically reduce CO<sub>2</sub> emissions from building material manufacture and create net carbon negative building designs.

The HESTIA Program is composed of 18 small-scale research and development projects that will be conducted by universities, for-profit entities, and federal laboratories. This Determination covers 4 of the 18 projects (listed in Attachment A). All 4 projects fit within the class of actions identified under the DOE Categorical Exclusions identified below. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of each project. All project tasks will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and Local regulatory requirements.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

B3.15 - Small-scale indoor research and development projects using nanoscale materials

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of [10 CFR Part 1021](#).

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

The proposal 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 proposal that may affect the significance of the environmental effects of the proposal.

The proposal 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.

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer: **GEOFFREY GOODE** Digitally signed by GEOFFREY GOODE  
Date: 2022.08.23 06:05:16 -04'00'

Date Determined:

**Attachment A: Projects in the HESTIA (FOA No. DE-FOA-0002625 and DE-FOA-0002626)  
Program**

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
Clemson University (2625-1632)	An Entirely Wood Floor System Designed for Carbon Negativity, Future Adaptability, and End of Life De/re/Construction	A9; B3.6
University of Colorado Boulder (2625-1532)	A Photosynthetic Route to Carbon-Negative Portland Limestone Cement Production	A9; B3.6
State University of New York (SUNY) Buffalo (2625-1537)	Modular Design and Additive Manufacturing of Interlocking Superinsulation Panel from Bio-based Feedstock for Autonomous Construction	A9; B3.6; B3.15
University of Wisconsin, Madison (2625-1618)	Carbon-Negative Ready-Mix Concrete Building Components Through Direct Air Capture	A9; B3.6