

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



RECIPIENT: Washington State University

STATE: WA

PROJECT TITLE: Towards Durable Carbon-Negative Concrete: Using Biochar to Replace Part of the Clinker and Fine Aggregate

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002804	DE-EE0010855	GFO-0010855-001	

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.
B5.15 Small-scale renewable energy research and development and pilot projects	Small-scale renewable energy research and development projects and small-scale pilot projects, provided that the projects are located within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.
B3.15 Small-scale indoor research and development projects using nanoscale materials	Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification activities would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible).

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Washington State University (WSU) to use different biomass feedstocks to develop a biochar substitution for concrete that would decrease its carbon intensity without decreasing its strength and durability.

Award activities would focus primarily on modeling, development, production, laboratory research, and intramural and extramural field testing of cement and concrete containing different types of biochar substitutions. Characterization, preparation, and testing of biomass feedstocks and biochar-concrete blends both in lab and in test plots would take place at WSU (Pullman, WA). Qualterra (Cheney, WA) and their selected subcontractors would carry out fabrication and testing of biochar production equipment and shipping-container sized biomass processing units. Cemex USA (Riverview, FL; Victorville, CA) would test biochar-concrete and biochar-cement blends at test plots blended with their existing cement production stream.

Cemex USA in Victorville is a pre-existing facility that was purpose-built for cement production activities. However, some facility modifications and ground disturbing activities would occur in order to deploy two biomass processing units at the site. The biomass processing units to be installed would be composed of prefabricated 20-foot (ft) shipping containers and bio-char sorting machines and storage silos capable of storing up to 2000 cubic meters of bio-char. The storage silos would require 3-ft deep foundations, 12 yards in diameter. Trench excavation would be needed to connect the biomass processing units to the existing electrical supply at the facility. This would require trenches 3-ft deep, 2-ft wide, and 80 linear feet for a total excavation volume of 480 cubic ft of top soil. The excavated material

would be reused on the industrial site.

Award activities would involve the production and modification of biochar and cement which could involve high temperatures, skin irritation, and the risk of nano-scale biochar particle inhalation. Materials would be managed in accordance with federal, state, and local environmental regulations. Existing university health and safety policies and procedures will be followed, including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. This would include exhaust ventilation, air locks, and sealed containers to mitigate the risk of nanoparticle inhalation.

All tasks within Budget Period 1 and Budget Period 2 would occur within known facilities, including Task 1, subtasks 1.1 through 1.5; Task 2, subtasks 2.1 through 2.4; Task 3, subtasks 3.1 through 3.4; Task 4, subtasks 4.1 through 4.3; Task 5, subtasks 5.1 through 5.3; Task 6, subtasks 6.1 through 6.4. Tasks under Budget Period 3 that would occur within known facilities include Task 7, subtasks 7.1 and 7.2; Task 8, subtasks 8.1 through 8.3; Task 9, subtasks 9.1 and 9.4.

Activities under Budget Period 3 that would occur within currently unknown facilities include Task 9, subtasks 9.2 and 9.3. These activities would require further NEPA review once the locations become identified, and thus, are not included in this NEPA Determination.

NEPA PROVISION

DOE has made a conditional NEPA determination.

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

- Task 1, subtasks 1.1 through 1.5; Task 2, subtasks 2.1 through 2.4; Task 3, subtasks 3.1 through 3.4 of Budget Period 1
- Task 4, subtasks 4.1 through 4.3; Task 5, subtasks 5.1 through 5.3; Task 6, subtasks 6.1 through 6.4 of Budget Period 2
- Task 7, subtasks 7.1 and 7.2; Task 8, subtasks 8.1 through 8.3; Task 9, subtasks 9.1 and 9.4. of Budget Period 3

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

- Task 9, subtasks 9.2 and 9.3 of Budget Period 3

Notes:

Industrial Efficiency and Decarbonization Office (IEDO)
Original NEPA review completed by Alex Colling on 01/22/24
Updated NEPA review completed by Chris Akios on 7/26/24

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** _____ Date: 7/31/2024
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