

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



RECIPIENT: The Washington University

STATE: MO

PROJECT TITLE : Enhancing Carbon Utilization by Algal Systems via Integrated Biogas Purification, Nitrogen Reuse, and Innovative Carbon Delivery

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002654	DE-EE0010291	GFO-0010291-001	GO10291

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 Washington University (WashU) to design, fabricate, and test an algae-growing system which would incorporate anaerobic digestion (AD) and electrochemical reactor technologies.

Simulated and actual liquid wastes (e.g., sewage sludge) would be used as feedstock for AD activities. The liquid wastes resulting from AD activities would be electrochemically treated, combined with resulting biogas from AD activities, and then used for algae cultivation activities. Algae cultivation activities would use select algae strains (from genera *Scenedesmus* and *Chlorella*) produced from adaptive evolution laboratory techniques conducted as part of this award. Such techniques would involve the cultivation of algae in different growth environments to produce strains which could be productive in saline (salty), alkaline (high-pH) environments. Genetic sequencing technologies would be used on the select strains, but strains would not be genetically engineered. Additional award activities would include the completion of a life cycle analysis, techno-economic analysis, and numerical modeling.

Design, fabrication, and testing of the system would occur at two different scales. The smaller scale would use up to four electrochemical reactors and photobioreactors (PBRs) up to 2-Liter (L) and 5 L capacities, respectively, and would be tested in a laboratory environment. The larger scale would use two electrochemical reactors and one PBR up to 10 L and 50 L capacities, respectively, and would be tested in an outdoor environment. Outdoor testing would be conducted in a controlled, previously developed area at WashU (St. Louis, MO) or at an existing wastewater treatment plant. Testing activities would use approximately 1500 L (total) of feedstock. Except for the larger PBR, systems would be fabricated by WashU. The larger PBR would be fabricated by CLEARAS Water Recovery, Inc. (Missoula, MT).

Award activities would be conducted at WashU, Lincoln University (Jefferson City, MO), Virginia Tech (Blacksburg, VA), and Argonne National Laboratory (Lemont, IL). Activities would be conducted at preexisting purpose-built facilities for the type of work to be conducted at each location. Facility modifications would not be required. Award activities would involve typical hazards associated with fabrication and laboratory activities, including handling and use of hazardous materials and operation of potentially hazardous equipment. Existing health, safety, and environmental policies and procedures would be followed to mitigate hazards to acceptable levels. Mitigated hazards would pose negligible risks to the public and environment. All activities would comply with existing federal, state, and local laws and regulations.

DOE has considered the scale, duration, and nature of proposed activities to determine potential impacts on resources, including those of an ecological, historical, cultural, and socioeconomic nature. DOE does not anticipate impacts on these resources which would be considered significant or require DOE to consult with other agencies or stakeholders.

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Bioenergy Technologies Office (BETO)
NEPA review completed by Dan Cahill, 05/15/2023.

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.

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: **Andrew Montano**
NEPA Compliance Officer

Date: 5/16/2023

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: _____