PMC-ND

(1.08.09.13)

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

RECIPIENT: Gas Technology Institute **STATE:** IL

PROJECT TITLE : Novel Electric Reformer for Drop in Fuels from Biogas or Waste CO2

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002396	DE-EE0009754	GFO-0009754-001	GO9754

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 the Gas Technology Institute (GTI) to model, design, and construct a commercially relevant pre-pilot Electric Reformer (E-Reformer), applying GTI's previously developed technology that converts biogas or waste carbon dioxide (CO2) and hydrogen to drop-in jet diesel and gasoline.

The project would begin with an initial verification process to review the proposed technical and programmatic approach and determine a path to achieving design, testing, and commercial metrics at the GTI facility where the pre-pilot system would be installed. The mechanical design of the main reactor or E-Reformer would be developed with the goal of producing liquid transportation fuels from two types of input: biogas and waste CO2. The pre-pilot system would be designed, and a vendor would construct it as skid-mounted system to transport to GTI's advanced fuels laboratory for installation. A preliminary lifecycle assessment would be conducted to optimize the system. The E-Reformer system (approximately 8 inches in diameter and 6 feet in length) would be erected and installed at GTI along with system connections such as power, supply gas, pneumatics, controls, and safety systems. A test run would be performed to verify systems are operable. The full E-Reformer test would be executed in 2 parts. The first would be done with a biogas feed. The location from which this feed would be sourced is yet to be determined however, it would be collected from an operating digestion unit, stored, and transported to GTI in tanker trucks. This test would run with a target of producing approximately 100 barrels/day of liquid fuel. The second test would be run using an industrial CO2 source with a target of producing approximately 600 barrels/day. The commercial viability of generating liquid transportation fuels using both feed sources would be assessed using a techno-economic analysis and lifecycle assessment. The project would also include an outreach program dedicated to educating a group of high school students about novel energy technologies, using the results from this project as an example.

Proposed project activities would include design, construction, installation, and testing of the pre-pilot unit and outreach. Gas Technology Institute in Des Plaines, IL would oversee the project and design, install, commission, and operate the new pre-pilot plant. They would also conduct data analysis, handling of products, and engineering and technoeconomic studies. Michigan Technological University in Houghton, MI would conduct modeling work such as life cycle analysis and carbon footprint analysis for the technology based on experimental inputs from GTI.

No ground disturbance would be required for this project and activities would be conducted at existing, purpose-built facilities. Minor facility modifications would be necessary for the installation of the E-Reformer skid at GTI which would

include additional infrastructure such as power hook up and piping for process gas, product gas, cooling, pneumatics, and instrumentation. No changes in the use, mission, or operation of existing facilities would be required as part of this project and no additional permits would be required in order to conduct any of the work activities.

Project activities would involve the use and handling of gas mixtures, solid materials, and liquid products that could contain hazardous materials and flammable gases. 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 employee training, the use of personal protective equipment, monitoring, engineering controls, and internal assessments. Transportation of gasses would be done in accordance with appropriate Department of Transportation regulations. Approximately 17,000 pounds of process water would be used and would be discarded into sewage system if free of hazardous chemicals. If analysis shows presence of hazardous components, process water would be handed over to a licensed hauler. All waste products would be disposed of by licensed waste management service providers. Gas Technology Institute 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:

Bioenergy Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Shaina Aguilar on 12/10/21.

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: Roak Parker Date: 12/14/2021

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