

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** T2C-Energy, LLC**STATE:** FL

PROJECT TITLE: TRIFTS Catalytic Conversion of Biogas to Drop-in Renewable Diesel Fuel

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002029	DE-EE0008916	GFO-0008916-001	GO8916

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.)
- B1.31 Installation or relocation of machinery and equipment** Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.
- 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 T2C-Energy to further develop and test a mobile “bolt-on” biogas conversion technology (TRIFTS® technology). The technology was initially designed as part of the Small Business Innovation Research (SBIR) Program (2016-17). The upgraded unit would use novel catalyst technologies to convert various biogas feedstocks (e.g. wastewater, food waste, animal waste, etc.) to liquid transportation fuels. This project would seek to de-risk and optimize the existing technology, enable detailed performance analysis/cost projections, and prepare the technology for future full-scale demonstration.

The pilot technology would be composed of a number of different biogas, air and water feed devices (e.g. compressors, heaters, and supply tanks), reactor devices, and processing equipment (e.g. de-pressurizer, output storage tanks). The equipment would be joined together to form a self-contained, modular unit. This unit would fit onto and be transported via a 53' x 8' x 11.5" skid mounted on a single drop deck flatbed trailer. Additional equipment would be transported using a 15' x 7' x 7' utility trailer. The pilot unit would be connected to existing biogas collection systems at existing wastewater treatment and landfill waste facilities where testing would be performed (discussed further ahead). This would be achieved via a single 1.5" polyethylene pipe. Electrical power would be provided either by establishing a grid connection at the sites that receive grid power, or by a diesel generator in cases where grid power is not available. The pilot unit would also require a water supply. All water would be supplied by T2C-Energy and transported to each site for pilot testing. Processed water would be circulated

through the pilot unit in a closed-loop system. Processed water produced as part of this project would either be reused in existing leachate systems at the pilot sites, or would be transported to a water treatment facility for treatment.

The pilot unit, once connected, would process biogas collected from the existing collection system at each pilot site. Liquid fuel (e.g. TRIFTS® derived jet/diesel and off-road diesel) would be produced as the end-product of the demonstration process. The addition of the pilot unit would not affect existing operations at the pilot sites, as the biogas that would be collected for processing would otherwise be flared as part of standard operating procedures.

Proposed project activities would involve setting up the pilot unit at selected test sites, running the device, gathering performance data, and optimizing the device and associated processes based on the data collected. Specific project activities are as follows:

Task 1: Process and Data Pre-Verification – Baseline data and project targets would be verified with DOE.

Task 2: Pilot Scale TRIFTS® Testing – The mobile TRIFTS® pilot unit would be installed and used for short-term performance testing at a waste water treatment facility and at least one other landfill waste facility. Performance demonstrations would be carried out for approximately one month at each test site and would be used to collect performance data.

Task 3: Data Analysis and Lab Testing – Data from the pilot demonstrations performed as part of Task 2 would be analyzed and used to inform laboratory testing. Laboratory testing would focus on catalyst optimization. Catalysts would be synthesized and tested (i.e. diesel fuel would be produced in approximately 1 gallon quantities). Diesel fuel produced in-lab would then be submitted for American Society for Testing and Materials (ASTM) certification. An initial life cycle assessment model would also be produced as part of this task.

Task 4: TRIFTS® Long Term Studies – Long-term pilot testing (i.e. more than 1000 hours) would be performed. Over 100 gallons of drop-in diesel would be produced as part of this testing. Long-term testing would be carried out at the Citrus County Landfill, in Lecanto, FL. This testing would be completed over an approximately 6 month period. Performance data would be analyzed and used to further optimize the TRIFTS® unit. A third-party engineering company would perform an independent assessment of the pilot demonstration. Afterwards, T2C-Energy would apply for Renewable Identification Numbers (RIN) credits

All project work would be overseen by T2C-Energy. The pilot unit and associated hardware would be optimized at T2C-Energy's warehouse facility in Pinellas Park, FL. Laboratory testing would be performed at laboratory facilities operated by University of South Florida (USF) at its campus in Tampa, FL. Several sites are being considered for short-term (~1 month) performance testing. One, or several of the following sites may be selected for short-term testing: South Cross Bayou Wastewater Reclamation Facility (Petersburg, FL), St. Lucie County Landfill (Fort Pierce, FL), Alliance Dairies (Trenton, FL), or the Northwest Solid Waste Management Facility (Brooksville, FL). Long-term (~6 months) performance testing would be performed at the Citrus Country Central Landfill (Lecanto, FL). Additionally, a life-cycle analysis would be performed at Argonne National Laboratory (ANL) in Lemont, IL. This would consist solely of office-based analysis activities.

All sites where testing would be performed are existing, purpose-built facilities. No physical modifications of existing facilities or ground disturbing activities would be required for completion of the project. The work activities to be performed would not require any change in the use, mission, or operation of existing facilities.

The project would involve the use and handling of various hazardous materials, including flammable gases, contaminant removal media, and liquid fuel. Risks associated with the handling of these materials would be mitigated through adherence to established corporate health and safety policies and procedures. Protocols would include employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. Process Hazard Analysis and Site Hazard Assessments would also be performed regularly throughout the project. Secondary containment would be used for all processes involving liquid storage/handling. Fuel volume storage capacity limits would be observed at all times. T2C-Energy and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations. Any necessary permits or authorizations would be obtained prior to initiating work activities.

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](#)

[This NEPA determination does not require a tailored NEPA provision.](#)

[Review completed by Jonathan Hartman, 01/08/2020](#)

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: 
NEPA Compliance Officer

Date: 1/9/2020

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: _____