PMC-ND
(1.08.09.13)

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

RECIPIENT: NREL **STATE:** CO

PROJECT TITLE : Power to Gas Pilot Skid Project; NREL Tracking No. 15-017

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
	DE-AC36-08GO28308	GFO-15-017	GO28308

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:
Description:

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.
DOE/EA-1968 (NREL STM)	SITEWIDE ENVIRONMENTAL ASSESSMENT, U.S. DOE NATIONAL RENEWABLE ENERGY LABORATORY, SOUTH TABLE MOUNTAIN CAMPUS, GOLDEN, COLORADO

Rationale for determination:

The U.S. Department of Energy (DOE) proposes to design, install and test a pilot-scale power to gas energy conversion system at the National Renewable Energy Laboratory's (NREL) Energy Systems Integration Facility's (ESIF) Outdoor Test Area (OTA). The skid-mounted bioreactor and associated systems would demonstrate the technology that can convert power into a fuel that can be stored and converted back to power based on grid demand.

The proposed project is being completed under a Cooperative Research and Development Agreement between NREL, Southern California Gas Company (SoCal Gas) and other industry partners. The system would be fabricated off-site and delivered to NREL as four separate components for final assembly at the OTA. The system would be connected to existing ESIF electrical power and hydrogen (H2) and carbon dioxide (CO2) gas connections. Each of the four components would contain one of the four steps in the power to gas conversion process which includes an electrolytic hydrogen (H2) generation system, biomethanation or methane production system, a steam-methane reformer, and a fuel cell power generation system. Once assembled and tested, the power-to-gas system would run for 6 to 9 months. The system would run 8 to 10 hours per day, 7 days per week. There would be no ground disturbance, no new construction and no physical modifications of existing facilities required for this proposed project.

Simulated photovoltaic (PV) energy would be supplied to produce hydrogen with an existing 120 kilowatt water electrolyzer which would combine with CO2 in the bioreactor to produce 4.1 scfm or 0.25 MMBtu per hour of methane (CH4). The produced CH4 would be cleaned and filtered before being reformed back into H2 on a separate skid where it can be used to generate power through a fuel cell. Detailed information on each step of the power to gas energy conversion steps are provided in the project documentation uploaded in the PMC.

The four component system would cover a 420 square foot area within the OTA. The bioreactor component would be approximately 25 feet tall and all other equipment would have a lower height.

The proposed project would involve the use and handling of various hazardous materials, including bases, salts, and ethylene glycol. There would be secondary containment for chemical storage at the site. It would also include the handling of bacteria called methanogens which oxidize hydrogen to produce methane. These organisms are a Biosafety Level 1 hazard which is the lowest hazard level and is used to classify organisms that are a minimal potential hazard to laboratory personnel and the environment.

There are two historic structures listed on the National Register of Historic Places on the NREL campus. Due to the location of the OTA and this proposed project, the proposed project would not be visible from these two features;

therefore there would not be visual impacts to these structures.

Noise created by feed/recirculation pumps and the main reactor agitator would be less than 50 decibels at the edge of the system. Adverse impacts as a result of noise are not expected. NREL and all project participants and sub-contractors would follow all applicable federal, state, local regulations and NREL Environmental Health and Safety (EHS) policies and procedures.

The proposed project would generate effluent waste which would be captured in a waste collection tank and eventually discharged into the sanitary sewer system. A maximum amount of 6,825 gallons of liquid waste would be produced during the project. NREL environmental staff would test any produced effluent prior to release into the sanitary system to ensure that the pH would be at a non-hazardous level, and would coordinate with Denver Metro Wastewater Treatment Plant during the project operation. No permitting would be required. Bio-solids would be generated periodically as a result of methanogen die-off and replenishment over the life of the project. These solids would be autoclaved to destroy any live bacteria and would be properly disposed of according to applicable federal and state regulations.

The project would generate small amounts of air emissions of ammonia (NH3) and hydrogen sulfide (H2S). NREL environmental staff has reviewed the calculations for expected emissions and no air permits would be required as a result of the proposed project. H2S would be run through a sulfur scrubber to remove nearly all sulfur. A flare would be added to the system to vent excess H2S if needed. This would not result in an odor at the expected emission levels. Ammonium hydroxide is largely contained in aqueous form and less prone to release from solution as NH3; therefore, the amount of NH3 released to the atmosphere would be minimal. NREL EHS would continue to work with the project manager to insure calculation accuracy and the estimates of emissions as the project is finalized.

Per agency consultations conducted during the Site-Wide Environmental Assessment for the NREL South Table Mountain campus (DOE/EA-1968), no cultural resources, threatened or endangered species, wetlands, floodplains, or prime farmlands would be impacted by this proposed project.

Based on review of the project information and the above analysis, DOE has determined that the activities associated with the proposed project would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined that the proposed activities are bounded by the analysis of the December 2014 NREL STM Site-Wide Environmental Assessment (DOE/EA-1968) and its Finding of No Significant Impact and DOE categorical exclusion B3.6 "Small-scale research and development, laboratory operations, and pilot projects," and no further NEPA review is required.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If you intend to make changes to the scope or objective of your project you are required to contact the Project Officer identified in Block 11 of the Notice of Financial Assistance Award before proceeding. You must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved.

Note to Specialist :

This NEPA determination does not require a tailored NEPA provision.

Review completed by Logan Sholar, 10/13/15.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Lori Gray / Lori Gray / Date: 10/13/2015

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☐ Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

☐ Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.

☐ Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.