PMC-EF2a

(2.04.02)

U.S. DEPARTMENT OF ENERGY
EERE PROJECT MANAGEMENT CENTER
NEPA DETERMINATION

RECIPIENT: University Retirement Center at Davis (URCAD) **STATE:** CA

PROJECT TITLE : Bringing Hydrogen Fuel Cell Systems into Green Communities - University Retirement Center at Davis (URCAD) Green Energy Community; NREL Tracking No. 11-027

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
		NREL-11-027	GO10337

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:

B5.1 Actions to conserve energy, demonstrate potential energy conservation, and promote energy-efficiency that do not increase the indoor concentrations of potentially harmful substances. These actions may involve financial and technical assistance to individuals (such as builders, owners, consultants, designers), organizations (such as utilities), and state and local governments. Covered actions include, but are not limited to: programmed lowering of thermostat settings, placement of timers on hot water heaters, installation of solar hot water systems, installation of efficient lighting, improvements in generator efficiency and appliance efficiency ratings, development of energy-efficient manufacturing or industrial practices, and small-scale conservation and renewable energy research and development and pilot projects. The actions could involve building renovations or new structures in commercial, residential, agricultural, or industrial sectors. These actions do not include rulemakings, standard-settings, or proposed DOE legislation.

A9 Information gathering (including, but not limited to, literature surveys, inventories, audits), data analysis (including computer modeling), document preparation (such as conceptual design or feasibility studies, analytical energy supply and demand studies), and dissemination (including, but not limited to, document mailings, publication, and distribution; and classroom training and informational programs), but not including site characterization or environmental monitoring.

Rational for determination:

PROPOSED ACTION

NREL and DOE are supporting the use of fuel cell and hydrogen technologies as part of a community's overall energy efficiency, conservation and renewable energy portfolio. This support includes assisting communities that have existing energy efficiency plans, greenhouse gas (GHG) reduction plans, sustainable energy plans and the like in place to incorporate hydrogen and fuel cell technologies as another option to achieve energy savings and GHG reduction goals.

For this project, NREL proposes to install one 1.4 MW natural gas-fueled fuel cell system at the University Retirement Center at Davis (URCAD), located at 1515 Shasta Drive, Davis, CA 95616 in Yolo County. Coordinates of the proposed project are 38.55919, -121.775107. The fuel cell system would generate electricity and heat in a combined heat and power configuration for consumption by the URCAD facility. The proposed fuel cell system would convert pipeline-quality natural gas into a hydrogen rich stream within the fuel cell stack module, without the use of an external reformer. The hydrogen generated on demand by the internal reforming process would be consumed nearly immediately and require no hydrogen storage, as it reacts with carbonate ions in the fuel cell module to produce heat and electricity for use at the site. Exhaust gases would leave the fuel cell stack module and heat from this exhaust stream would be recovered through heat exchangers to preheat the incoming natural gas fuel and provide heat to the site. The exhaust stream would then be vented to the atmosphere once all the useful heat was extracted. Greater detail regarding the chemical processes is provided in the Fuel Cell Questionnaire (uploaded to the PMC database).

The FuelCell Energy DFC 1500 fuel cell would produce 1.4 MW of electrical power and be capable of supplying the majority of the base electrical load at the site. Supplemental electrical power would be supplied when needed by a grid connect. The fuel cell would also provide 3.7 million BTU/hour of heat to the site. The thermal demands for the site closely match the thermal output of the fuel cell (the only exception would be on the hottest summer days when limited thermal venting from the fuel cell may be required to maintain thermal balance at the site). The fuel cell would deliver heat for the centralized domestic hot water system, including hot water for the skilled nursing center, a full service restaurant and laundry, two swimming pools and multiple spas, as well as water source heat pumps. The fuel cell would reduce the use of the boilers thereby reducing the source emissions.

URCAD is currently constructing a new wing, and rebuilding the central plant by replacing all of the boilers, piping, and heat exchangers to accommodate the new expansion including the fuel cell. NREL's proposed funding for this project only applies to the fuel cell, rebuilding would occur with or without the fuel cell. Natural gas service already exists at

the proposed installation site.

The fuel cell equipment (i.e., fuel cell modules, electrical transformer at fuel cell area, heat recovery unit, water treatment skid, gas desulfurizer tank, 1,000 liter bulk liquid nitrogen tank and vaporizer, and the switchgear) would be shipped to the site in parts, and assembled onsite on a metal skid located on a concrete pad. The gas desulfurizer tank contains an adsorbent that would remove sulfur from the incoming natural gas. This tank would be exchanged approximately every two years by the manufacturer, who would recycle or dispose of the absorbent in accordance with federal, state, and local regulations. The nitrogen would be used as a safety measure to purge the power-plant fuel and air system during start-up and shut-down cycles, and would not be used during power-plant steady-state operations. The liquid nitrogen tank would have at least two independent pressure relief devices to prevent over pressurization, and no connections to allow direct withdrawal of liquid. The water treatment skid would purify and de-ionize water from the existing city water service at the URCAD site for use in the fuel cell modules to sustain the internal reforming process.

The fuel cell system features independent and automated operation which would be monitored 24/7 by the fuel cell system manufacturer via a remote monitoring system integrated into the fuel cell system and a web portal. This remote monitoring system includes communication links to local first responders to provide contact and support during any unplanned events.

The total footprint for the fuel cell system would be approximately 42' x 58', and the area for utility connections would be approximately 30' x 42'. Utility tie-ins would require excavation of a trench approximately 135' long, 4' wide, and 6' deep. The fuel cell system pad would be enclosed by a chain-link fence to prevent authorized access.

Work is anticipated to commence by August 2011, and commissioning the fuel cell by December 2011. The proposed fuel cell for URCAD is designed for up to a 30-year life with nominal stack replacement after 10-years of operation. On or before the 30th year of operation, the fuel cell would be decommissioned due to the age of all components. This would be done in accordance with a decommissioning plan that would reflect the requirements of all applicable regulations, standards, or guidelines. A decontamination plan would be developed prior to decommissioning.

The project recipient, URCAD, would collect and report performance data on the fuel cell system to the NREL Technical Monitor for handling and analysis per the Deployment of Hydrogen and Fuel Cell Technologies into Green Communities Scope of Work uploaded to the PMC database. The purpose of this data collection is to document benefits to the community in terms of financial, performance and environmental impact metrics so successful demonstrations can be replicated and adopted by similar communities. Additionally, recipient would conduct high profile public outreach and education activities that increase the public's awareness of the hydrogen and fuel cell technologies implemented as part of the green community demonstration.

IMPACTS OF PROPOSED ACTION

Constructing the pad for the fuel cell system skid and associated infrastructure would disturb approximately 4,300 square-feet of previously disturbed landscaped and impervious surfaced areas. The disturbed areas would be backfilled with grass and shrubs to extent feasible. As the area of disturbance is less than one acre, a storm water associated with construction activity permit would not be required.

The proposed project location is located in a highly urbanized area and it is not anticipated to impact threatened or endangered species, critical habitat, prime farmlands, floodplains, or wetlands. As all earth disturbing activities would occur in previously disturbed areas, no cultural resources should be impacted.

While, operation of the proposed fuel cell would result in de minimis point-source air emissions (see spec sheets in PMC database) of priority air pollutants (NOx, SOx, PM10) and CO2, the FuelCell Energy DFC 1500 would meet or exceed the requirements of California Air Resources Board Distributed Generation Program and Section 94203; Table 2 of the California Code of Regulations. The system would be exempt from having an air quality permit, but notification of the California AQMD would be required. Furthermore, emissions from this proposed fuel cell would be far less than an equivalently-sized typical natural gas-fired generator and boiler.

Generation of hazardous waste is not anticipated during the construction and operation of this proposed fuel cell. Operation and maintenance of the water treatment and gas desulfurizing equipment may utilize or generate hazardous materials and the fuel cell system would also include bulk liquid nitrogen storage, which is considered a hazardous material. These hazardous materials would handled by appropriately trained maintenance personnel in accordance with applicable federal, state, and local regulations.

Based upon the information provided above, this proposed project would qualify for Categorical Exclusions A9 and B5.1.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

Note to Specialist :

EF2a prepared by Rob Smith on 08/16/2011.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Lori Plummer Lori Plummer Date: 8/16/2011
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.

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____
Field Office Manager