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

RECIPIENT: Oorja Protonics **STATE:** CA

PROJECT TITLE: Deployment Testing of Alternative-Fuel Fuel Cell Technologies for Fuel Cell-Powered Material Handling Equipment; NREL Tracking No. 11-005

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
		NREL-11-005	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.

B3.6 Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible).

Rational for determination:

NREL and the Department of Energy (DOE) are interested in supporting the development of early market applications for fuel cell technologies. For this proposed project, DOE funds would be used to deploy and test renewable liquid fuel (e.g., direct methanol or direct ethanol, or other direct conversion instead of reforming) fuel cell technologies that also have the potential for radical improvements in fuel cell-powered material handling equipment performance, durability, cost, fueling infrastructure, and/or manufacturing efficiencies. The Subcontractor for this proposed project would be Oorja Protonics, Inc. (Oorja) of Fremont, California. This is not a research and development (R&D) project, but rather involves the pilot-scale deployment and evaluation of current technology in real-world situations.

PROPOSED PROJECT TASKS
Task 1 – Direct-liquid fuel cell (DLFC) powerpack development, prototyping, and integration
Oorja would develop a direct-liquid fuel cell powerpack using existing powerpack solutions that they have previously developed and marketed. Liquid alcohol fuels would be obtained from sources such as wood, wood wastes, grass, agricultural crops and by-products, and municipal waste. Oorja would not produce these fuels, but documentation would be provided that the fuels used were made from renewable sources. The developed systems would be fully packaged powering solutions incorporating liquid-fueled fuel cell systems (approximately 1.5kW to 20kW in size), capable of powering material handling equipment (MHE) such as forklifts, pallet jacks, etc.

Task 2 – Deployment and testing of direct-liquid fuel-cell powered material handling equipment
Oorja Protonics would deploy and demonstrate 75 fuel cell-powered MHE using renewable liquid fuels at four different customer locations: Unified Grocers in Stockton, California and in Commerce, California; EARP Distribution in Kansas City, Kansas; and Testa Produce in Chicago, Illinois . Oorja would install and commission the necessary liquid alcohol fuel storage and dispensing infrastructure at all four deployment tests. The units would be provided to the above customers and run for 12 to 18 months under "real-world conditions" in order to gather data about their effectiveness in distribution centers where battery-powered forklifts are currently being used.

Task 3 - Data collection and reporting
Oorja would collect and report performance data on the DLFC forklifts and on the associated fueling infrastructure

deployed as part of Task 2. Test data supplied by Oorja to NREL would enable NREL to validate the performance of liquid-fueled fuel cells in material handling applications and validate the market viability of these fuel cell technologies.

Task 4 – Disposal and decommissioning
Oorja would be responsible, at the end of the project, for disposal and decommissioning of the DLFC systems and the methanol storage and refueling infrastructure. This would be conducted in compliance with all applicable Federal, state, and local regulations pertaining with the disposal and decommissioning of such systems and infrastructure. Unused methanol would be returned to the supplier, or disposed of in accordance with federal, state, and local regulations and requirements. Excess equipment would be returned to the manufacturer/supplier, or held for re-use, recycling, or appropriately disposed.

Oorja has been working with all the customers who would be deploying the proposed DLFC systems for a period ranging from 1 to 2 years, and has successfully established the product design for the fuel cells in conjunction with these customers. The product has been designed in consideration of customer needs, such as power requirements, duty cycle, electrical and mechanical interface of the fuel cell with the mobile industrial equipment, product installation options, safety features, ergonomics, counter-balance (minimum weight requirements) issues, and ease of implementation/use. Oorja has designed the fuel cell to minimize any potential electrical or fire risk during refueling and DLFC operation.

PROPOSED DEPLOYMENT LOCATIONS
Unified Grocers – 16 OorjaPac Model III Units
1990 Piccoli Road
Stockton, California 95215

Unified Grocers – 15 OorjaPac Model III Units
5300 Sheila Street
Commerce, California 90070

EARP Distribution – 24 OorjaPac Model III Units
6550 Kansas Ave
Kansas City, Kansas 66111

Testa Produce – 20 OorjaPac Model III Units
1501 South Blue Island Avenue
Chicago, Illinois. 60608

All of the proposed deployment locations are existing distribution/warehouse facilities located in light industrial areas with existing infrastructure and roads. The deployment modification/construction/implementation at each facility would consist of the following three items:

(1) Construction of an outdoor bulk storage facility (aboveground storage tank - AST) at each of the four deployment test facility.

Minor modifications to each facility would be made including the construction of a concrete pad, outdoor above-ground storage tank and associated tank equipment. Size of the area for the outdoor bulk storage facility would be approximately 30 FT x 30 FT and would be sited on previously distributed land that is currently covered with an impervious surface, such as concrete or asphalt. A limited amount of excavation would be necessary to install concrete footers, pad, and secondary containment. Excess spoils would be disposed offsite at an acceptable facility, concrete washout would be minimized, and excess concrete would be recycled as practicable. Provisions would be incorporated to preclude discharge of concrete wash water and incidental leaks/drips from construction equipment to the environment. According to the NFPA code, methanol is considered a class IB flammable liquid. To comply with various codes Oorja would purchase and install a 6,000 gallon double-wall tank compliant with UL 142 and UL 2085 specifications for outdoor bulk methanol storage at each facility. The AST would have interstitial monitoring, overfill protection, and vapor recovery systems. Methanol would be offloaded to bulk storage tanks via transfers from a delivery truck. These methanol bulk offloading events would comply with industry-standard hazardous materials offloading methods, using a truck-mounted transfer pump, transfer hose, vapor recovery systems, and fail-safe leak detection systems, and offloading would be attended by the delivery driver at all times. Approximately one truck delivery (5,000 to 6,000 gallons) would be required every two to three months (5-7 times total over a 15 month operation life) at each of the four deployment test facilities. Methanol would be transferred from the outdoor storage tank to the indoor OorjaRig dispensing station (described below) via standard 55-gallon, closed head steel drums (UN rated). The 55-gallon steel drums would be filled from the bulk tank using a transfer pump, transfer hose, vapor recovery system and fail-safe leak detection system which are all a part of the bulk storage facility.

(2) Placement of indoor MHE refueling station (OorjaRig) at each of the four deployment test facility.

The indoor refueling station (designed and built by Oorja Protonics – the OorjaRig) would be built from a flammable

cabinet that satisfies all the requirements for the NFPA 30, OSHA and FM codes (NEC Class 1 Division 2 approved). NFPA 30 code 9.5.1 limits methanol stored in a flammables cabinet to less than 120 gallons. The OorjaRig would hold up to two 55-gallon drums of methanol for a maximum total of 110 gallons. The cabinet housing the OorjaRig is FM-rated for Class 1 Division 2 operation, meets NFPA Code 30, and provides a secondary containment of 30 gallons. The OorjaRig would be placed on a spill containment platform pallet offering an additional 90 gallons of secondary containment (120 gallons total of secondary containment). OorjaRig would be designed and built at Oorja's facility and then installed at each respective test facility by Oorja. The production specification sheet for OorjaRig is included in the PMC database.

(3) Installation of OorjaPac Model III units onto existing MHE.

OorjaPac Model III is a liquid fuel cell that operates as an on-board battery charger for a wide variety of Class 3 vehicles in the material handling industry, and its product specification sheet is provided in the PMC database. Each OorjaPac Model III has the capacity of 12 liters of methanol and has a built in secondary containment system. Fuel would be dispensed from the OorjaRig refueling cabinet to the Oorja Pac through a stainless steel hose and a no-drip quick disconnect coupling, to eliminate the chance of spilling or occupational chemical exposure during refueling.

IMPACTS

Implementation of this proposed project would result in de minimis fugitive air emissions as a result of the excavation of the areas for each of the four bulk storage facilities and the utilization of typical mobile construction equipment. There would be no criteria pollutant air emissions from the bulk methanol storage or fuel cell MHE use. Specifically, there would no NOx, SOx, particulate, or sulfuric acid emissions. There are expected to be trace emissions of VOCs in the form of methanol vapor that occur during (1) bulk methanol offloading into the aboveground storage tank; (2) methanol transfer from the bulk storage tank to 55-gallon drum of the OorjaRig ; and (3) MHE refueling from the OorjaRig to the OorjaPac on each MHE. In each instance, there are vapor recovery systems installed on the bulk storage AST and the OorjaRig. Included in the PMC are discussions and calculations of the worst case scenarios of methanol vapor emissions from catastrophic failure during bulk methanol offloading , OorjaRig filling, and OorjaPac refueling. Standard and foreseeable operating conditions would result in de minimis methanol emissions, would not require air point source permitting, would be in compliance with applicable NESHAP and primary ambient air pollutant regulations, and would not result in occupational exposures in excess of established OSHA PELs.

Due to area of construction disturbance at each deployment test facility being less than one acre, no stormwater associated with construction activity would be required. Oorja would abide by standard construction industry practices including measures specified above. The bulk storage tank would be equipped with secondary containment to prevent methanol releases to the environment. The proposed project would not result in any wastewater discharges. Both the OorjaRig and OorjaPac are enclosed systems with secondary containment systems.

The proposed project would include the utilization of a hazardous chemical: methanol. Estimated annual methanol consumption per facility is as follows: Earp Distribution Kansas City 16,608 gal per year; Testa Produce Chicago 13,849 gal per year; Unified Grocers Stockton, CA 11,072 gal/yr; and Commerce CA 10,380 gal/yr. Oorja's field support personnel and a safety engineer would provide a detailed on-site training to the each deployment facilities' employees who are either operating the fuel cell-powered MHE or would be in some manner involved with the program. Oorja has a written safety training procedure for training personnel at customer sites (last update was on 12/14/2010; nest update expected 1/14/2011). The training includes basic operational aspects of the OorjaPac fuel cell system, OorjaPac use and re-fueling training and detailed safety training on both the OorjaPac fuel cell system and the OorjaRig methanol storage and dispensing system. Training meets CalOSHA and federal OSHA requirements for storage and handling of hazardous liquids. All applicable permits for hazardous material storage and usage shall be obtained.

As this proposed project would occur in existing distribution facilities located in light industrial areas and result in minimal excavation of previously disturbed lands with existing impervious surfaces, no impact to cultural resources, wetlands, floodplains, prime farmland, critical habitat, and threatened and endangered species is anticipated. No hazardous waste generation is expected.

Based upon the information provided above, this proposed project would qualify for Categorical Exclusions A9, B3.6, and B5.1.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

Insert the following language in the award:

You are required to:
Oorja shall be responsible, at the end of the project for disposal and decommissioning of the DLFC systems and the methanol storage and re-fueling infrastructure. This shall be carried out in compliance with all federal, state, and local regulations dealing with the disposal and decommissioning of such systems and infrastructure.

Note to Specialist :

EF2a prepared by Rob Smith on 02/10/2011

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Lori Plummer /Lori Plummer/ Date: 2/10/2011
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