

DOCKET

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2011-2012

Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program
Innovative Technologies and Advanced Fuels (\$3M)

2010-2011

Innovative Technologies and Advanced Fuels (\$8M)

CleanFUEL USA LLC
Georgetown, Texas / Monterey, CA

DME Refueling Infrastructure and Vehicle Fuel System Development

Phase I

Underwriters Laboratory and
Weights and Measures
Certification Research Project for DME
Refueling Dispenser and related Infrastructure Equipment

Phase II

DME Engine Fuel System Development and Demonstration Testing for GM 6.0L &
8.0L / V-8 Vortec LSI Engines

Phase-III

DME Engine Fuel System Development and Demonstration Testing for Diesel
Engines (OEM TBD)

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BACKGROUND

There is an immediate demand for commercially viable/certified Dimethyl Ether (DME) refueling infrastructure equipment and EPA/CARB certified engine fuel system platforms for on-road and off-road vehicles and equipment. DME projects in Europe, Asia, South America and North America are pressing forward with demonstration and commercialization strategies to prove engine fuel system technologies for both Large Spark Ignited (LSI) engines for DME-Propane blends and Compression Ignited (CI) engines for 100% DME fuel. Fuel market development of DME as a transportation fuel is a favorable path to market which will achieve: 1) lower emission standards without expensive emission controls and vehicle exhaust after treatment systems, 2) development of DME as an alternative fuel to displace petroleum based gasoline and diesel fuels, and 3) reduced GHG and toxic emissions through viable carbon neutral technologies.

CleanFUEL USA (CFUSA) of Georgetown, TX is a global leader of Under Writers Laboratory - Listed alternative fuel dispensing technologies and GM engine fuel system development for liquid propane injection (LPI) systems. CFUSA has a proven track record of EPA/CARB certified engine platforms and UL Listed propane and E85 dispensing technologies. Since its founding nearly two decades ago, CFUSA has developed long-term relationships with both Gilbarco and Dresser Wayne (the two leading dispenser manufacturers in the United States) as well as storage tank manufacturers and component suppliers for refueling infrastructure equipment. Because DME shares many of the basic fuel characteristics of propane, propane storage tanks and refueling dispensers are universally believed to be as close to “off the shelf” technology for transportation refueling equipment in the market today. Nevertheless, there is no commercially available UL-listed or Weights and Measures-approved DME transportation infrastructure equipment for commercial refueling in the United States. CFUSA is uniquely qualified to undertake the level of research and testing for pre-certification development for Phase I (UL - Listed Equipment), Phase II and Phase III (EPA/CARB Engine Certification) objectives.

PROPOSED PROJECT SUMMARY FOR CONSIDERATION

First, the project will involve a comprehensive feasibility study to identify all regulatory compliance and certification standards for Phases I, II and III including, but not limited to:

- DME vehicle fuel system evaluation, durability and emission testing for EPA/CARB precertification assessment,
- Refueling dispenser and infrastructure fuel storage and handling safety,
- UL and NCWM test evaluations for commercial dispensing for both fleet-attendant fueling applications, and fully automated self-serve "pay at the pump" retail dispenser functionality.

In addition, a full review of all material and component for compatibility of seals, gaskets, valves, hoses, and related fittings and fixtures with fuel contact exposure. Also, the project will complete cell and bench testing simulations for Phase I (UL - NCWM) product evaluation testing, and Phases II and III for (EPA/CARB certification evaluation and testing projects.

Phase I

OPW Fueling Components (Requested Assistance)

Product development and in-house testing for dispenser hanging-hardware evaluation testing prior to submittal to UL. Once this is complete, OPW will submit the new hardware for testing. Estimated time for product work and testing/approval is twelve (12) months from date of project approval.

DME Compatible Dispenser Nozzle:

- Rework Required Components
- Simulated UL Testing

Veyance (Requested Assistance)

Product development in-house testing for dispenser hanging hardware evaluation testing prior to submittal to UL. Once this is complete Veyance will submit the new hardware for testing. Estimated time for product work and testing/approval is twelve (12) months from date of project approval.

Completed, final designs of the new DME dispenser hose will be submitted to UL. The final designs will then be field-tested in biofuel applications before production begins. The time estimate to complete this project (given no further/future delays from UL) is about approximately twelve (12) months from project approval.

DME Compatible Dispenser Hose:

- Rework Required Components
- Simulated UL Testing
- Field testing/Implementation

Clean Fueling Technologies (CFT) – a Division of CleanFUEL USA LLC

Rework required components of existing UL Listed and NCWM Approved propane dispensers

Product development and in-house testing for dispenser hanging hardware evaluation testing prior to submittal to UL. Once this is complete CFT will submit the new hardware for testing. Estimated time for product work and testing/approval is twelve (12) months from date of project approval.

- CFT Dispenser Cabinets, Electrical Wiring and Liquid Controls / OPW and Veyance Components
 - Pro-2000, Pro-6000 and Pro-7000 Series
 - Assemble UL Test Units

PHASE II and III

II. General Motors and Power Train Integration Test Engines (Requested Assistance)

III. OEM Diesel Engine Manufacture (TBA - Assistance Required)

Procure (2) GM 6.0L and (2) GM 8.0L engines for component evaluation, durability and emission testing

Procure (2) OEM Diesel Engines

DME Compatible Engines Components, Durability and Emission Testing:

- Rework Required Components
- Durability and Emission Testing
- Simulate EPA/CARB Simulation Testing
 - Assemble EPA/CARB Test Engines for Testing