

DOCKET

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Docket # 10-ALT-1: Written Comments

2011-2012

Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program

Submitted by Oberon Fuels

6.3.2011

As a supplement to our submittal dated 5.22.2011, we would like to make specific comments on the detailed 2011-2012 plan, on behalf of the following parties who are interested in 1) developing dimethyl ether (DME) as an alternative fuel; 2) developing DME fueling infrastructure; 3) vehicles to run on DME or DME blended with Propane, and 4) parties interested in participating in testing and research.

1. Oberon Fuels, Inc. - San Diego, CA
2. Alternative Fuel Technology, LLC – Redford, MI
3. Clean Fuel USA - Monterrey, CA
4. CompPro Systems - Los Angeles, CA
5. Consulting Solutions, LLC - Monument CO
6. DME Institute - Houston, TX
7. Gas Technology Institute - Chicago, IL
8. Methanex – Vancouver BC, Canada
9. GV Energy, Inc. - Calgary, AB, Canada
10. Motion Consulting LTD - Calgary, AB Canada
11. National BioEnergy LLC - Fort Myers, FL
12. North American Repower - Carlsbad, CA
13. The Pennsylvania State University, EMS Energy Institute (Prof. A.L. Boehman)
14. Sempra Energy - San Diego, CA
15. Unitel Technologies, Inc. - Mount Prospect, IL

Recap from our submittal on 5.22.2011:

Dimethyl Ether (DME) is in use in Europe and Asia as a clean burning alternative fuel for over 10 years as a blendstock for propane, or run on a 100% neat DME basis. DME production as a transportation fuel is expected to be available in California in 2012, and testing of vehicles, modest infrastructure and biomethane feedstock development for DME can successfully proceed with the financial support and visibility of the California Energy Commission and Air Resources Board in supporting the development of

DME as a ready alternative fuel. DME as a viable fuel production option falls into several categories in the plan:

1. **As an additional natural gas option** in addition to LNG and CNG, consistent with California's Low Carbon Fuel Standard.
2. **As an additional benefit to California's propane strategy** (propane blended with up to 20% DME produces environmental benefits, especially if DME is produced from renewable biogas from organic waste)
3. **As a biofuel**, given our ability to capture the methane and CO₂ from landfill, wastewater treatment and dairy operations, and convert this biogas into ready to use transportation fuel on-site where the biogas originates.
4. **As a diesel alternative for hard to serve vehicle groups:** DME production from natural gas or biogas can serve the off-road and heavy construction industry, agricultural community in non-attainment areas, and municipal fleet operations that can be served by biogas. Initial planning for DME as a diesel alternative is to target centrally fueled private and municipal fleets on a distributed production basis with minimal fueling infrastructure required.
5. **As a zero-emission fuel:** DME has the handling characteristics of propane, with no particulate matter emissions and minimal NO_x that can be mitigated at nominal cost. DME is produced from domestic feedstocks – natural gas and/or biogas readily available in California.

The International DME Association (IDA) consists 52 member organizations worldwide, including major fuel production companies, vehicle manufacturers and regulators and research organizations. The IDA's North American Advisory Committee (NAAC) consists of many companies listed above, who are extremely motivated to launch the successful rollout of DME as a transportation fuel in California as soon as possible. The support of the California Energy Commission is greatly needed to leverage further investment and other forms of participation from investors, partners, vehicle manufacturers, fleet operators, DOE and USDA and the other states.

Additional Comments to the Draft Plan

We would like to bring to the attention of the California Energy Commission and the Advisory Committee the following specific comments to the 2011-2012 Alternative Fuels Investment Plan:

Program Status, page 5:

Several of the parties listed above will respond to the July 2011 solicitations and additional solicitations for 2010-2011, including the following categories, ***which should allow for DME inclusion:***

1. Medium and heavy-duty vehicle demonstration of near-commercial advanced and alternative fuel technologies
2. Propane and natural gas vehicles
3. Outreach and Marketing

4. Diesel substitutes fuel production
5. Biomethane production and quality testing, and natural gas infrastructure

2011-2012 Investment Plan Allocations

Natural Gas (\$8 million)

We suggest the following inclusion, shown in italics, to page 7, as well as inclusion in the relevant section in Chapter 3:

“Natural gas, *including DME derived from natural gas*, is expected to play a growing role in the state’s transportation sector, in response to greenhouse emission reduction targets, volatile oil prices and air quality standards.”

Propane (\$1.5 million)

We suggest the following inclusion, shown in italics, to page 7, as well as inclusion in the relevant section in Chapter 3:

“Propane, *and propane blended with DME*, like natural gas, offers the potential for immediately reducing greenhouse gas emissions petroleum dependence, and fuel costs for light- and medium-duty vehicles.”

Biofuels

We suggest the following inclusion, shown in italics, to page 8, as well as inclusion in the relevant section in Chapter 3:

“Within biofuels, the investment plan focuses on three fuel end uses: advanced ethanol, *diesel substitutes including DME, bioDME derived from biomass including agricultural waste, and biomethane including DME from bio-methane.*”

Diesel Substitutes (\$7.5 million)

“Diesel substitutes, such as biodiesel and renewable diesel, *and DME (including bioDME)*, similarly offer an immediate opportunity to significantly reduce California’s greenhouse gas emissions and petroleum dependence.”

Biomethane (\$8 million)

“Additionally, biomethane can reduce lifecycle greenhouse gas emissions in a broad variety of fuel pathways, from natural gas *and DME (including bioDME)*, to hydrogen to ethanol. Anaerobic digestion of waste-based feedstocks is proving to be a robust and cost-effective technology for creating very-low-carbon transportation fuels that can be readily incorporated *into DME and/or* natural gas vehicles and fueling systems.”

Medium-and Heavy-Duty Vehicles (\$21.5 million)

We suggest the following inclusion, shown in italics, to page 9, as well as inclusion in the relevant section in Chapter 3:

*“The Energy Commission is allocating \$11.5 million in deployment incentives for on-road and off-road medium and heavy duty natural gas **and DME** vehicles and \$3 million for propane vehicles.”*

Advanced Vehicle Technologies

We suggest the following inclusion, shown in italics, to page 9, as well as inclusion in the relevant section in Chapter 3:

*Advanced technologies, such as battery electric applications, hybrid hydraulics, fuel cell technology, and **DME purposed engines**, can also be incorporated into medium and heavy duty vehicles.....The Energy Commission will provide \$77 million to demonstrate advanced technologies in the medium and heavy-duty sector.*

Conclusion

This group will provide the Energy Commission with detailed research, analysis and business plans to support the development of DME as an alternative fuel, and transportation vehicles to run on DME in the near future, and fueling stations, storage tanks and other infrastructure to be rolled out in support of a distributed DME model until refinery-scale DME production is commenced.

DME production is successful in Asia and Europe, however without appropriate vehicles and certification in California as a zero-emissions fuel meeting ARB and EPA standards, producers of DME have been reluctant to set their sights on need and interest in the US. Together with Sempra Energy as an investor, Oberon Fuels, based in San Diego, California is developing modular (DME) production facilities based on existing technology¹ that will be installed on a build/own/operate model at central refueling stations for dedicated fleet, whether public or private fleet operators of light and medium duty trucks and buses. Each facility will produce 3,000 gallons/day and the first project will be installed in 2012 in Southern California. Oberon is pursuing the following pathways:

1. Natural gas conversion to DME: an alternative fuel under Low Carbon Fuel Standard in California, a clean alternative to diesel and a strategy to reduce dependence on foreign oil.

¹ We are incorporating syngas technology currently in operations overseas on a refinery scale. Oberon Fuels is focused on a small-scale application that will enable production of 3,500 gallons/day of DME.

2. Biogas conversion (methane and CO2 from landfill gas, wastewater treatment facilities, dairy operations and other sources) to DME: a renewable fuel for neat DME or bio-DME blend with propane, for renewable classification under EPA's Renewable Fuel Standard II and as a strategy to address the need in California and in the US for carbon sequestration of methane and carbon dioxide from organic waste.

As a diesel alternative, OEM's in addition to the work performed by Volvo to develop a neat DME engine and fuel injection system, many parties in California and other states have an interest to pursue diesel retrofits to run on DME, and blending of DME with propane at the time of propane conversion. This is the tipping point for DME in California.

Not only is are various parties comprising the group shown above focused on demonstrating that DME is the best environmental diesel substitute for compliance with US regulations but we are in a race to demonstrate to the truckers the superior performance and handling of DME versus CNG and LNG. Truck operators face enormous cost increases with their diesel fleet – the costly upgrades to comply with emissions controls on diesel tailpipes and engine certifications as well as rising diesel prices. CNG and LNG are heavily promoted and subsidies are in place and yet for certain truck classes and applications performance and handling problems have been identified. We have a window of opportunity to convince the end-use customer to consider DME.