The Future of Liquid Fuel Heating Workshop

Clean Fuels Alliance America Team

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The Bioheat® Fuel Journey

Advanced Fuel Solutions, Inc.
Project **"Soy Soldier"**

Date: June 23, 2003

To: John Batey, Roger McDonald, David Daniels & C.R. Krishna

From: Paul Nazzaro, AFS

Re: Project Outline (Responsibilities Assessment)
Project Proposed Name (internally) Soy Soldiers
Confidential

Gentlemen,

Thank you for your participation on Friday's teleconference. It is clear that each of you like myself believe today's distillate fuels could benefit from the integration of some (to be determined) blend of bio-blended feed stocks. Much work has been done by each of us to date but much more will be required to resolve any and all concerns industry skeptics may have relating to the fuel and a possible strategy which would include consistent demand of the ultimate blend downstream.

Since 1999 much has been done to ascertain the likelihood of Biodiesel being mainstreamed into the heating oil marketplace. Emission testing executed by Brookhaven National Laboratory, field testing on multiple blends of Biodiesel conducted by NREL in Warwick, Rhode Island as well a recently concluded marketing assessment sponsored by Nebraska though the National Biodiesel Board all lead to and warrant taking these positive results to a next level of investigations.

From a Biodiesel demand perspective, the home heating oil marketplace is an instant oil displacement panacea for Biodiesel industry stakeholders. Potential market volume for residential heating oil in New England alone is at 2.3 billion gallons and New York and Pennsylvania at 2.5 billion gallons are the bulk of 6.7 billion gallons, national heating oil market. A 1% market share of the New England market converts to 23 million gallons annually for the Biodiesel industry.

Another large volume market opportunity exists with electric generation The State of Massachusetts alone requires that from 2002 through 2009 incremental increases of renewables at .5% per year reaching a target of 4% in 2009. In 2003 the requirement is 1% which would convert to 34 million gallons of

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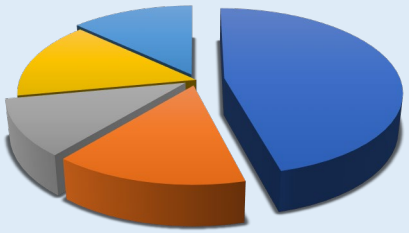
Biodiesel and renewable diesel today

Production

Today's market has reached 3.2 billion gallons annually with more than **4** billion gallons of domestic production capacity to support immediate growth.

Capacity of planned US expansions will grow to **6.0** billion gallons by **2023.**

Feedstocks



Soybean oil makes up the largest supply of biodiesel/renewable diesel today at **46%.** The rest make up the balance almost equally.

Markets

Today's markets are made of fleets, on-road and off-road diesel, as well as the expanding heating oil market.

Renewable jet fuel is also an emerging market.

Legislation

Combination of legislation that drives biodiesel success:

- Renewable Fuel Standard
- Federal Tax Incentive, BTC $1.00
- Carbon Policies
- State Mandates and Incentives

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Trends behind the growth

Population/Protein Growth

As the world population grows, so will the demand for more protein, especially animal protein.

By 2030, protein meal demand is forecast to reach almost **400 million metric tons**

- **Three-quarters** of that meal will come from soy
- 300 million metric tons in 2019

Carbon Reduction

As the general population continues to push for **more carbon policies**, energy policy will be impacted.

Government, industry and others will continue to look at solutions to limit or eliminate CO2 in varying environments.

Electrification

Electrification will mostly impact the light-duty diesel market, with little impact to the heavy-duty market as fleet turnover is very slow.

Many New England states are supporting electric heat pumps for home conversions

Petroleum Shifts

The global petroleum industry faces some major challenges:

- Increased supply of sweet crude
- Rapid expansion of refineries engineered to maximize gasoline
- Regulations on ship emissions
- Lack of public confidence

The Future of Liquid Fuel Handling

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