BIODIESEL & RENEWABLE DIESEL: LOW-HANGING FRUIT ON THE CLIMATE SOLUTIONS TREE

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The National Biodiesel Board (NBB) is the U.S. trade association representing the entire biodiesel and renewable diesel value chain, including producers, feedstock suppliers, and fuel distributors.

Made from an increasingly diverse mix of resources such as recycled cooking oil, soybean oil and animal fats, biodiesel and renewable diesel are better, cleaner fuels that are available now for use in existing diesel engines without modification.
BIO DIESEL & RENEWABLE DIESEL COMPARISON

Biomass-based diesel review

Renewable Hydrocarbon Diesel and Biodiesel

**Feedstock**
- Both processes can utilize any fat or oil.
- Animal fat
- Vegetable Oil

**Process**
- **Renewable Hydrocarbon Diesel**
  - React with hydrogen (hydrotreat & isomerize)
  - Convert 3-carbon backbone to renewable propane
  - Convert oxygen to H₂O

- **Biodiesel**
  - React with methanol (transesterification)
  - Convert 3-carbon backbone to glycerol
  - Oxygen remains in fuel molecule

**Product**
- Paraffin
- FAME

**Specification**
- Meets the diesel spec, ASTM D975
- Molecules are familiar constituents of ULSD (petroleum diesel)
- Paraffinic fuel
- Meets the biodiesel spec, ASTM D6751
- Different molecules than those in petroleum diesel
- Oxygenated fuel
Today’s market has reached 3.0 billion gallons with more than 3.2 billion gallons of domestic production capacity online today.

Capacity of planned US expansions will grow to nearly 5 Billion gallons by 2023.

Soybean oil makes up the largest supply of biodiesel/renewable diesel today at 54%. The rest make up the balance almost equally.

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

Renewable jet fuel, marine fuel and railroad applications are also emerging markets.

Combination of legislation that drives biodiesel success:
- Renewable Fuel Standard
- Federal Tax Incentive
- Carbon Policies
- State Mandates and Incentives
STATES WITH NOTABLE BIODIESEL POLICIES

Current as of 01/08/2016
Data from DOE Alternative Fuels Data Center and Individual State Statutes
U.S. BIODIESEL & RENEWABLE DIESEL MARKET
(MILLIONS OF GALLONS)
SOURCE: EPA EMTS*

*Biodiesel and Renewable Diesel

*Volumes reported under the RFS in the D4, D5, and D6 categories.
Biodiesel, renewable diesel, and renewable jet fuel will be recognized as mainstream low-carbon fuel options with superior performance and emission characteristics. In on road, off road, air transportation, electricity generation, and home heating applications, use will **exceed six billion gallons by 2030**, eliminating over 35 million metric tons of CO$_2$ equivalent greenhouse gas emissions annually. With advancements in feedstock, use will reach 15 billion gallons by 2050.
The Time Value of Carbon is key, and the next decade is critical.
Biodiesel offers an easy & immediate solution

Biodiesel blends can be used in any diesel vehicle, legacy and new, without modification:

- No need to make costly new vehicle or infrastructure investments
- **Vast majority of diesel equipment OEMs support use of B20+ biodiesel blends**; OEMs are actively evaluating higher blends of biodiesel and BD/RD blends with fleet customers’ growing interest in low-carbon fuels
- Readily available existing biodiesel fueling infrastructure, available from over 2,360 major truck stops, retailers & distributors nationwide
- Cost comparable to or less than diesel fuel
WHAT ABOUT ELECTRIC TRUCKS?

Even with aggressive sales targets, only ~6% Class 7-8 ZEV tractors in CA by 2040

Electricity is only clean as the grid, the vehicles, and the use of the EVs ➔ Not zero emissions in most areas

States will likely take many years, if not decades, to fully electrify and decarbonize grid

Even California still projects a multibillion-gallon diesel market post 2040
  - Significant on-road and off-road
  - Interstate/non-CA long haul

Source: CARB ACT 1st 15-Day Notice, Attachment D, May 28, 2020
• U.S. biodiesel on average provides an 80% Reduction in Carbon Emissions compared to petroleum diesel

• Offers the lowest carbon intensity of any liquid fuel, and substantial carbon reductions compared to electricity produced from coal and natural gas.

https://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/040115_pathway_ci_comparison.pdf
NEW STUDY ON PUBLIC HEALTH BENEFITS OF BIODIESEL
QUANTIFYING THE BENEFITS OF BIOBASED DIESEL

It is also important to consider how Biodiesel’s reductions in carbon emissions and particulate matter contribute to improved health outcomes and avoided costs.
Both EJ and non-EJ communities have seen dramatic decrease in diesel PM

But large gap remains between EJ and non-EJ communities

Concerns resulting in dramatic increase:
- EJ funding, projects
- Focused legislation, regulations
- Presence at EPA, state boards/councils
CONCLUSIONS

- Substantial public health benefits from using biodiesel in place of petroleum distillate in transportation and space heating
- Benefits are largely driven by the significant reductions in particulate matter (PM)
- The use of biodiesel provides an immediate and direct reduction in harmful criteria pollution
- Benefits accrue disproportionately in EJ communities, which tend to be surrounded by high-diesel use activities (ports, logistics, ag operations, high traffic roadways)
- Results scalable to similar facilities/regions in states evaluated and other states
- Publication of full study expected by end of April 2021
THANK YOU! QUESTIONS?

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