The Transparent Solution: Biodiesel’s Growing Role

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Biodiesel is a simple and effective alternative to Petroleum Diesel

- Runs in Diesel Engines
- Reduces Emissions
- Reduces Oil Dependence
- Meets Federal Standards
- Stimulates Our Economy
Biodiesel Runs in Any Diesel Engine Without Modification

- Specify D6751-02
- Specify cloudpoint
- Use 20% blend, B20
- Does not Void Warranty
- Pay $0.20-$0.25 per gallon
- Pour into tank
- Schedule early filter change
- Resume business as usual
How does Biodiesel Perform? Better than Petroleum Diesel Fuel

- High Cetane
- High lubricity
- Comparable BTU content
- Readily mixes with diesel
What does World Energy know about biodiesel’s current role?

- Supplier for most American fleets
- Largest biodiesel capacity in the U.S.
- Strategically allied with Gulf Oil
- Partnered with BP (regionally)
- Nation-wide distribution network
- Longest cold-weather experience

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What Is Driving the Switch to Biodiesel?
Opportunity to Reduce Petroleum Dependence

- Displace 302 million barrels of crude oil by 2016
- Displace 2.9 billion barrels of crude from 2002-2016
- Reduce imports from 70 percent to 65 percent by 2016
Truly Renewable Power Source

- Biodiesel yields 3.2 units of fuel energy for every unit of fossil fuel consumed in its life cycle.
- Petroleum diesel yields 0.83 units of fuel energy per unit of fossil energy consumed.
Regulatory Compliance

- **EPA Act:**
  - 2250 gallons of B20 = 1 vehicle ($450 at .20)
- Limited to 50 percent of compliance
- Executive Order 13149
  - 20 percent petroleum reduction
Slow Down Global Warming

- 78 percent reduction per US Department of Energy and US Department of Agriculture
Recycles CO₂

\[ \text{g CO₂ per bHP-h of work} \]

- Biodiesel emits 78.5\% less CO₂ than petroleum diesel
- Blends exhibit proportionate benefits
  - B20 emits 15.66\% less CO₂ than petroleum diesel
Stimulate the US Farm Economy

- Soybean oil demand increase from 51 million bushels to 318 million bushel
- $7.8 billion reduction in direct payments to farmers
- $63.4 billion improvement in US trade deficit
- $100 billion increase in net farm income
Meet EPA 2006 Standards for Clean Diesel…

- Soy Envirodiesel at 0-1 ppm sulfur.
- Zero aromatics
- Specify 15 ppm standard
...Without Sacrificing Lubricity

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Emissions Reductions

B20 emissions reductions compared to petroleum diesel:

- Carbon monoxide -20%
- Unburned hydrocarbons -30%
- Particulate matter -22%
- Sulfates -20%
- NPAH -50%
- Mutagenicity -20%
HEAVY HC SPECIATION
- CUMMINS N14 ENGINE

Tier I Health Effects Data supplied by SWRI, 1997-8

RELATIVE EMISSION RATE (MG/HP-HR)
NOx Reductions

- Fuel alone is insufficient
- Compatible with All Clean Diesel Technologies
- Amenable to timing retards, EGR, retrofits
Public Health Risk Reduction

- Lovelace Research Institute 211(b) test results
- **NO** pronounced toxicity at any level (B100)
- **NO** mortality or clinical abnormality
- **NO** neurotoxic or internal pathologic response
- **NO** adverse effect on fertility and reproductive systems
- Corroboration of Tier I findings concerning decreased mutagenic activity in living organisms

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Pure Biodiesel is Safer to Drink, Burn and Spill

- B100 reduces acute toxicity to marine life by 20x
- Flashpoint exceeds 300 F
- Less Toxic than Table Salt
- B20 biodegrades twice as fast as petroleum diesel
- **B20 CONTAINS PETROLEUM AND REMAINS HAZARDOUS**
How do we Deliver?
SUPPLY BULK BIODIESEL TO YOUR AREA.

- World Energy has multiple production facilities.
- All product meets ASTM biodiesel standards and is subject to World Energy Quality Control.
- Envirodiesel™ is transported in insulated, steam-coiled jumbo railcars to Rail Distribution Nodes.
- Diesel transport vehicles bring Envirodiesel™ to local Distribution Nodes.
How do we Deliver?
Partner with Local Distributors.

- World Energy partners with local distributors to make Envirodiesel™ available from distributors in your community who can serve you best.
- Local distributors follow World Energy handling and distribution guidelines to ensure top quality product.
- You purchase and receive only fully blended product as you need it.
- Blend rates are insured through dual meter slips.
How do we Deliver? According to Your Custom Requirements.

- World Energy is licensed to sell petroleum diesel in your state and can sell to you directly.
- World Energy has been awarded the national DESC contract and is registered as a federal vendor.
- World Energy can help guide you through federal and state red tape for procurement and reporting.
- World Energy can supply your existing contractor with biodiesel to fulfill your needs.
Who is Already Using Biodiesel to Solve These Problems?

- Aspen
- Yellowstone NP
- Northstar at Tahoe
- Malmstrom AFB
- Glacier NP
- Breckenridge
- The US Post Office
- US Dept. of Agriculture
- North Carolina DOT
Who is Already Using Biodiesel to Solve These Problems?

- Commonwealth Edison
- The State of Delaware
- Alabama Power
- Georgia Power
- Reliant Energy
- Pacific Gas & Electric
- New Jersey Transit
- South West Ohio Transit
Who is Already Using Biodiesel to Solve These Problems?

- Transit of Northern Kentucky
- Austin Energy
- The State of Alabama
- Virginia DOT
- Peterson Air Force Base
- Camp Pendleton USMC
- Manhattan Post Office
- Pacific Waste
Who is Already Using Biodiesel?

- State of Connecticut
- San Diego Gas & Electric
- Florida Power & Light
- Madison Gas & Electric
- Aspen
- The US Navy
- Duke Power
- San Luis Obispo Police
References

References

- Tier 1 Environmental Effects Testing for Biodiesel, conducted by Southwest Research Institute, March 1998
- Tier 2 Testing of Biodiesel Exhaust Emissions, conducted by Lovelace Respiratory Research Institute, May 2000
World Energy Alternatives, LLC

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