Stony Brook Development Center

Biodiesel

Steven J. Levy
Sprague Energy
(914)328-6770
Sprague has been focused on the needs of energy consumers and wholesalers for 140 years. Our vast network of facilities and global expertise have made us a leader in the procurement, handling and delivery of fuel, unique products and management programs and services.

- Corporate headquarters in Portsmouth, New Hampshire
- Locally on Long Island
- Employs 400 people
- Annually distributes/handles more than:
  - 2.5 billion gallons of petroleum products
  - 170 billion cubic feet of natural gas
  - 3 million tons of bulk materials
- Owns and operates 20 major oil terminals
- Throughputs and exchanges at over 50+ additional facilities
Sprague’s terminals hold over 300 million gallons of liquid storage.
Sprague’s Commitment to Our Customers

• Fuel management to afford customers fuel management controls to manage fuel transactions; up-to-the-minute tank monitoring, and expeditious operational maintenance repairs

• Fuel source derived from vegetable oils and/or animal fats. Domestic, environmentally sound and sustainable

• Sprague Energy was the first petroleum distributor to earn biodiesel certification.

• Daily natural gas and oil commentaries help customers make informed energy decisions with the two MarketWatch reports.

• Sprague Real-Time is a web-based tool to allow certified customers access to their information on a real time basis.

• The BTU Options program is designed to leverage the cost gaps between natural gas and oil to lower total cost of energy.

• Premium product designed to help maintain and preserve diesel engine systems year round

• Premium product designed to help maintain and boost heating systems

• Specialty price protection program designed to allow customers to match real demand to financial instruments.
The National Biodiesel Board

- Represents the biodiesel industry as the coordinating body for research and development in the United States.

- Founded in 1992 by state soybean commodity groups.

- Today NBB’s membership is state, national, and international feedstock and feedstock processor organizations, biodiesel suppliers, fuel marketers and distributors, and technology providers.

www.biodiesel.org
Biodiesel, n. -- a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils, animal fats, or recycled cooking oil, designated B100, and meeting the requirements of ASTM D 6751.

Official IRS and EPA definition – goes to fuel quality.
Biodiesel can be used in any concentration with petroleum-based diesel fuel in existing diesel engines or heating systems with little or no modification. Biodiesel is NOT ethanol!

- Biodiesel is **not** raw vegetable oil!
  - Biodiesel **must** be produced by a chemical process that removes glycerin from the oil.
Biodiesel Attributes

- Blends with petrodiesel in any percentage
  - Once it is blended it does not separate back out

- Higher Cetane
  - Over 50 vs. average petrodiesel around 44
  - Smoother, more complete burn

- High Flash Point
  Makes it Safer

- Virtually Zero Sulfur
  - Meets ULSD limits of 15 ppm or less

- Zero Aromatics
  Reduces Toxicity

- Superior Lubricity with ULSD and Reduces Black Smoke (Particulates)
### Emissions & Health

<table>
<thead>
<tr>
<th>Emission Type</th>
<th>B20</th>
<th>B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Unburned Hydrocarbons</td>
<td>-20%</td>
<td>-2.2%</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>-12%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>-12%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Oxides of Nitrogen (NO(_x))</td>
<td>+/-2%</td>
<td>+/-0.2%</td>
</tr>
</tbody>
</table>

**MSHA (US Department of Labor – Mining Safety and Health Administration)** recognizes biodiesel as the least expensive means for reducing underground worker exposure to DPM – **this is a direct worker health issue**
Statewide Mandates: 2011

Currently 107 million gallons
Production Incentives

Incentives

No Incentives
LCFS Policies

Actively Considering

 Already Passed

Actively Considering

 Already Passed
The World Bank recently reversed claims that biofuels triggered food prices increases.

Producing food and energy side-by-side boosts countries' food and energy security while reducing poverty, according to a new FAO report.

Increasing value of farm products makes the business of growing food more stable.
Co-products of Food Production

- Protein meal for livestock feed is the primary driver for soybean production.
- Better utilization of the oil co-product can reduce the price of the protein meal.
In 2008, 360 million gallons of biodiesel from soybeans co-produced enough soybean meal for the equivalent of 110 billion rations of protein for the hungry.
Traditional Feedstock Diversity

- Soybean
- Rapeseed
- Canola
- Sunflower
- Safflower
- Flax
- Cottonseed
- Palm
- Hemp
- Mustard
- Peanut

- Jatropha
- Coconut
- Radish
- Pennycress
- Tung Oil
- Used cooking oil
- Trap grease
- Tallow
- Corn oil from ethanol production
Potential Feedstocks of Tomorrow

- Algae
- Fungi
- Bugs
- Sugar
- Paper
- Wood
- Dog Poo
- Potato Peels
- Used Coffee Grounds
- Yeast
- Cornstalks
- Street Refuse
- Grasses
- Sewage
Potential New Sources

- Algae
- Jatropha
- Brassica Juncea
- Low Ricin Castor
• 3.2:1 in 1998

• Grew to 4.56 due to improved farming

• Will reach 5.44 by 2015
An “Advanced Biofuel” Available Today

Over 150 plants nationwide
Biodiesel Use - Nationally

- Airports
- Construction
- Schools
- Businesses
- Underground Mining
- State, City, County, and Federal Government
- Pro Sports
- Colleges/Universities
- Utilities

http://www.biodiesel.org/resources/users/
#1 Priority of Fleet Managers, Operators, Users = *Fuel Quality*

2) Biodiesel and Engine Warranties

3) Performance in Cold Weather

4) Filter Plugging (e.g., High Blends, Bad Biodiesel)

5) Lubricity with ULSD
OEMs Supporting At Least B20

- Ford
- GM
- Dodge
- New Holland Agriculture
- Case IH Agriculture
- International Harvester
- Caterpillar
- John Deere
- HDT
- Ferris
- Toro
- Arctic Cat
- Fairbanks Morse Engine
- Yanmar
- Tomcar
- Cummins
- Navistar
- Perkins Engines
Fuel Quality & Standards

ASTM Specifications exist for:

- B5 and lower
- B6 to B20
- B100 (ASTM D 6751-09)

Industry-wide Fuel Quality Program BQ-9000 (www.bq-9000.org)

- Insures for “supply-chain management” (from feedstock through fuel use)
Supply Chain Management
A voluntary quality system certification program for the North American biodiesel industry

Applies internationally accepted quality management principles

Incorporates fuel specifications

Uses a series of audits to verify adherence to the company’s own quality management system

www.bq-9000.org
BQ-9000 Quality Management Program

HOME...

The National Biodiesel Accreditation Program is a cooperative and voluntary program for the accreditation of producers and marketers of biodiesel fuel called BQ-9000. The program is a unique combination of the ASTM standard for biodiesel, ASTM D 6751, and a quality systems program that includes storage, sampling, testing, blending, shipping, distribution, and fuel management practices.

BQ-9000 is open to any biodiesel manufacturer, marketer or distributor of biodiesel and biodiesel blends in the United States and Canada.

About the National Biodiesel Accreditation Commission:

- Commissioners represent wide scale of interested parties
- Nominated by the NBB President, and approved by the NBB Board of Directors
- Although committee of NBB, NBAC has full authority for design and implementation of BQ-9000
- Developed BQ-9000 as it stands today
- Responsible for on-going improvements to BQ-9000

TWO CATEGORIES OF CONFIDENCE...

BQ-9000 helps companies improve their fuel testing and greatly reduce any chance of producing or distributing inadequate fuel. To receive accreditation, companies must pass a rigorous review and inspection of their quality control processes by an independent auditor. This ensures that quality control is fully implemented.

ACCREDITED PRODUCER

This category is for companies that produce biodiesel fuel to the ASTM D 6751 standard. To maintain accreditation in this category, companies must pass a rigorous self-inspection quarterly.
Quality, Quality, Quality
Oceanside Rack Injection System
Case Study: NYC Dept. of Sanitation

- Uses biodiesel blends (B5 to B20) in 4,000 vehicles
- Garbage trucks pull double duty for snow removal

**DSNY requires BQ-9000.**  
Sprague First designated NBB BQ-9000 Certified Marketer
Does This Processing Meet Your Needs?
Biodiesel and biodiesel blends will form high sediment levels when in contact with brass, bronze, copper, lead, tin and zinc.

Biodiesel is compatible with stainless steel, aluminum, fluorinated polyethylene, fluorinated polypropylene, Teflon and most fiberglass.

Teflon, Viton, fluorinated plastics, and Nylon are compatible with B100.
Sustainable Industry Growth

- Blend economics (i.e. petroleum prices)
- Feedstock availability
- Maintaining federal legislation
- Sound scientific approach to national and global issues
- Consumer confidence
Biodiesel Opportunity

- Renewable-Sustainable-Low Carbon Fuel
- Right product at right time
- Demand today and future
- Demonstrated and proven
- Wide acceptance by OEM
- Technology
- Transparent product for multiple uses
- Grants, loans, tax incentive/credits > Federal, State, Local
- Financial investment interest through traditional financial/institutional firms, VC, and private funding
Producer Opportunity/Pitfalls

- Federal, State, LOCAL Regulations
- Financial security
- Overall Business Plan
- Engineering experience
- Technology choice
- Production capacity > off-take agreements
- Feedstock options
- Raw material options/availability
- Evolving product specifications
- Supply and demand forecast
- Sprague decision
Marketer Opportunity/Pitfalls

- Federal and State: motor fuel distributor license
- Consistent Product Supply
- Consistent Product QUALITY
- Financial Stability
- Create sales in competitive market
- Forge critical supplier relationships
- Ability to absorb and hedge fluctuating volatile commodity pricing
- Sales potential/ability
- Accounts Receivable management
- Customer retention in competitive industry
Related Opportunities/Pitfalls

- Feedstock collector: recycled cooking oil/trap grease/other waste streams
- Feedstock broker aggregator
- Broker: feedstock/processed product

Local-Regional-National-Worldwide
Contact Information

Steven J. Levy
Sprague Energy
4 New King Street
White Plains, NY 10604
914 328 6770
914 328 6701 fax
slevy@spragueenergy.com

www.spragueenergy.com