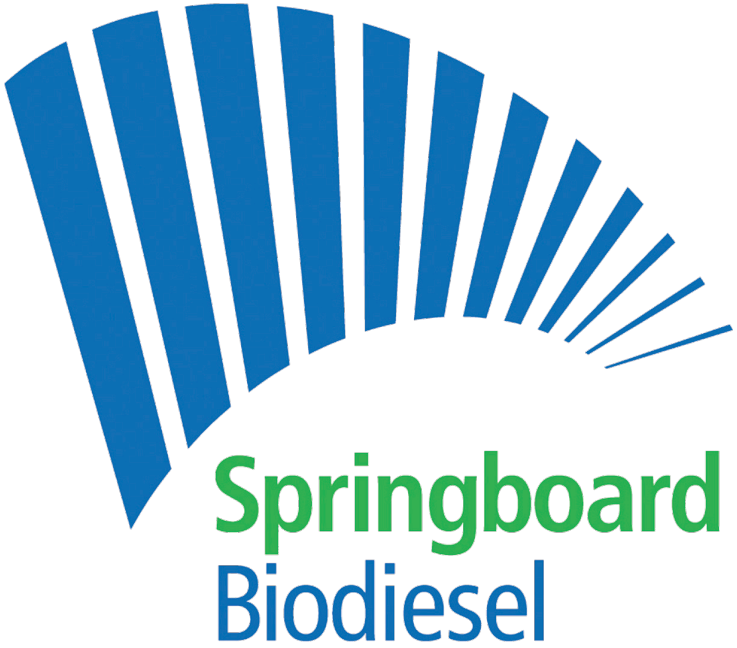

The Cure for Diesel™

Biodiesel Basics

June 2009

Springboard Biodiesel

Biodiesel Basics

- Biodiesel is a non-toxic, biodegradeable biofuel that can be used in any diesel engine, in any ratio, without any engine modification
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- Biodiesel burns significantly cleaner then diesel fuel - for every gallon of biodiesel used to replace a gallon of Diesel #2, 13lbs of CO2 are kept out of the atmosphere (Particulate Matter –"soot" - also declines nearly 50%)
- Biodiesel is recognized by every industry and government entity, including the EPA and the US Department of Transportation
    - It is the only alternate fuel approved by the Environmental Protection Agency (EPA); it has passed every Health-Effects Test of the Clean Air Act, and it meets the requirements of the California Air Resources Board (CARB)

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The Biodiesel Change Matrix *

Economic Drivers

Absolute Costs

- RVO vs. Virgin Oils
- Inputs
- Savings vs. Diesel

Govt. Incentives

- Tax credits
- Usage Mandates

Development Opps.

- Green Collar jobs
- New Wealth Wave
- Greater Tax Revs

Environmental Drivers

GHG Emissions

- Substantial Reductions in CO2, CO, PM, Sulfates, PAH, nPAH
- 1 billion gallons removes 1.7 million diesel cars
- Renewable and sustainable fuel source

Health Benefits

- Diesel fumes cost healthcare $

Impediments

Ignorance

- Public and policy makers do not understand biodiesel

Lobbyists

- Big Oil
- Detroit / Auto Mfgers
- Corn / Ethanol

"Too Small To Matter"

- $3 billion annuity
- Plus Equipment, Wages, Land and "other"

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* Matrix assumes that Green House Gas (GHG) emissions exist and are bad for all of us.

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The Diesel Engine Problem / Opportunity

- More than 40 billion gallons of diesel were consumed in the US last year
  - Economic cost = approximately $250 billion (assuming $70/bbl)
  - Environmental impact = 260 million tons of CO2
  - Substantially negative health impact of diesel emissions – 10x higher cancer risk than all other hazardous air pollutants combined*
- As the world accelerates towards 1 Billion cars by 2020, diesel adoption rates are projected to increase in every part of the globe
  - Europe: 51% of new car registrations (8+MM) in 2007
  - Asia (ex Japan) 25% penetration and projected to increase 50% over the next 10 years

This is a global problem in search of a current solution

*www.scorecard.org/env-releases/def/hap_diesel.htm

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The Cost of Importing Diesel

- Given the US's growing appetite for diesel fuel, it is worthwhile to evaluate the dollar cost of the current petroleum status quo

Assuming 40 billion gallons of diesel used:

Assume:	
Number of gallons of crude/barrel	42.0
Number of gallons of diesel/barrel	10.5
Number of barrels (in billions) needed for 40B gals	3.8

Oil Prices Per Barrel	Gross Cost ***($ in billions)***	Net $ Outflows * ***($ in billions)***
$30.00	$114.29	$110.86
$40.00	$152.38	$147.81
$50.00	$190.48	$184.76
$60.00	$228.57	$221.71
$70.00	$266.67	$258.67
$80.00	$304.76	$295.62
$90.00	$342.86	$332.57
$100.00	$380.95	$369.52
$120.00	$457.14	$443.43
$140.00	$533.33	$517.33

* Assumes that the US imports 91% of its oil - *Research Paper No. 1997 U.S. Dependence on Oil in 2008: Facts, Figures and Context; by Andrew S. Grove, Robert A. Burgelman, Debra Schifrin. August 2008*

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How Beneficial is Biodiesel?

Average Biodiesel Emissions Compared to Conventional Diesel*

Emission Type	B-100	B-20
Regulated		
Total Unburned Hydrocarbons	-67%	-20%
Carbon Monoxide	-48%	-12%
Particulate Matter	-47%	-12%
NOX	10%	-2% to +2%
Non-Regulated		
Sulfates	-100%	-20%
Polycyclic Aromatic Hydrocarbons (PAH)	-80%	-13%
Nitrated PAHs (nPAH)	-90%	-50%
Ozone Potential of Speciated HC	-50%	-10%
Carbon Dioxide Emissions **	-75%	-15%

* *source: EPA, 2002*

** *not part of the EPA data*

Biodiesel CO2 Equivalent Metrics:

- 784MM available gallons of Yellow Grease
- Assume 1/3rd is processed into biodiesel
- 259MM gallons of biodiesel saves 3.37 billion pounds of C02
- Removes 443K diesel vehicles from the road

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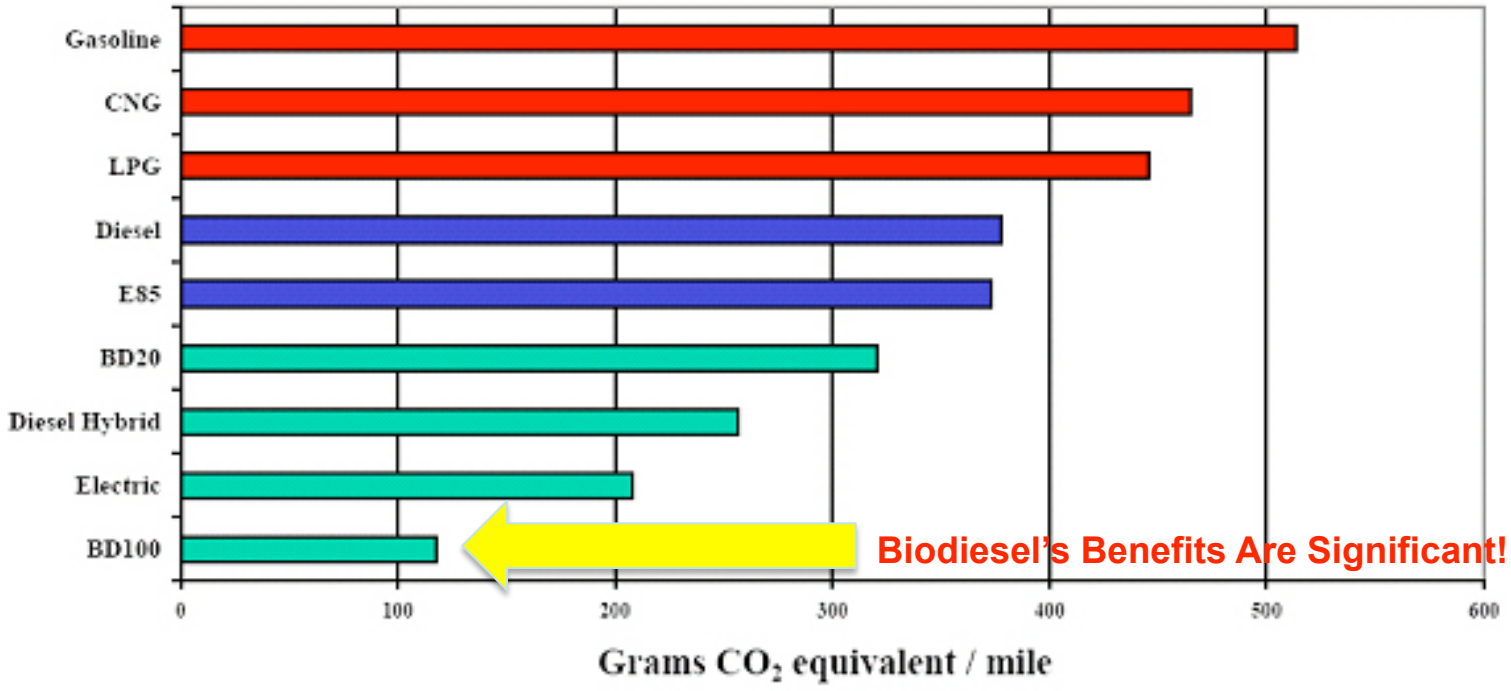
How Beneficial is Biodiesel?



Life-cycle Analysis: CO2 emissions per mile for passenger car (Source: Alternative Fuel Vehicle Program, "Report on Biodiesel," August, 13, 2001. Used Argonne National Laboratory's GREET Model version 1.5a.)

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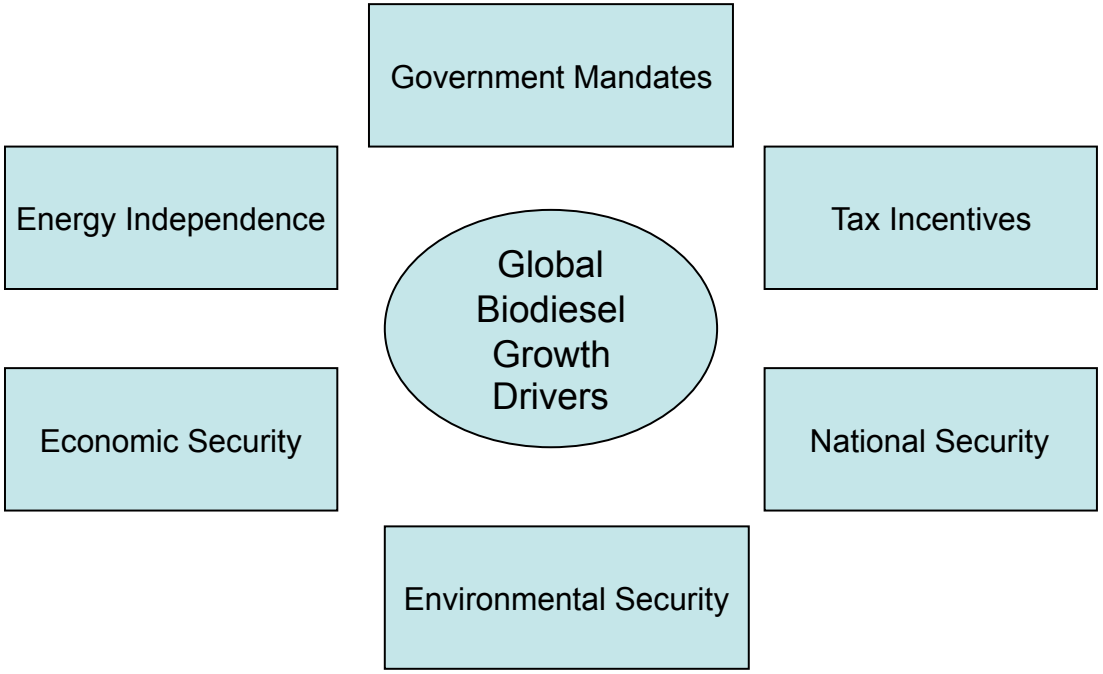
Current Biodiesel Drivers:



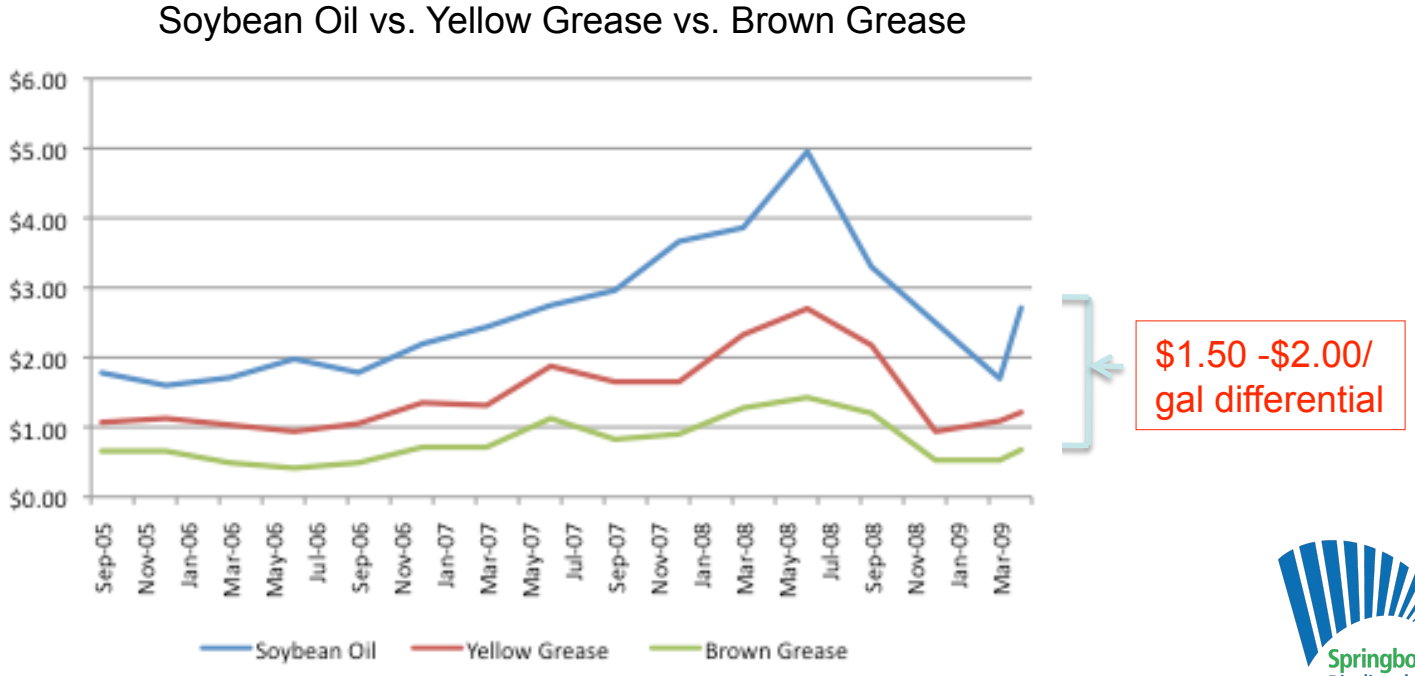
What about Profitability?

Source: Biodiesel 2020: A Global Market Survey

Springboard Biodiesel

RVO Feedstocks Create Economic Value

- Grease as a feedstock provides a meaningful cost advantage…and it's renewable!



Source: The Jacobsen, April 2009

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The Profitable RVO ("Grease") Alternative: Input Costs

- While commodity inflation/pricing impacts broad biodiesel production and adoption, the yellow grease (or RVO) market is far from systemized
  - The majority of Springboard's customers use "free" grease
  - Those who pay seldom pay "retail"
  - Current Yellow Grease pricing is approximately $0.15/lb or $1.12/gallon

- BioPro 190 Economics:

• Methanol:	10 gallons at $2.75/gallon	= 55¢/gallon
• Lye:	NaOH: 3.41 lbs @ $1.40/lb	= 10¢/gallon
	or	
	KOH: 5.17 lbs at $2.50/lb	= 26¢/gallon
• Acid:	190ml at $4/"dose"	= 8¢/gallon
• Electricity:		= 4¢gallon
• **Total pre-grease cost**		**= $0.77 - $0.93/gallon**

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The Chemistry of Biodiesel

The manufacture of biodiesel is quite simple, especially in a Springboard Biodiesel BioPro processor

The Recipe:

1. Veg. or Animal Oil
2. Methanol (or Ethanol)
3. Lye (Potassium or Sodium Hydroxide)
4. Acid Catalyst
5. Time

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