



# New Generation **BIOFUELS**

Advanced Renewable Technology

***Providing Fast Renewable Solutions  
for Power Generation Challenges***



Advanced Renewable  
Technology

# New Generation Biofuels (NGBF)

- **New Generation Biofuels is a publicly traded (NGBF) technology company focused on solving energy, economic and environmental challenges using its unique proprietary biofuel technology.**
- Our biofuels displace fossil fuels in energy applications with environmentally superior attributes and provide excellent fuel/combustion performance.
- Our biofuels address many needs of the Power Generation marketplace:
  - We qualify as biomass under the American Clean Energy Security Act of 2009.
  - We meet most state definitions of biomass.
- NGBF technology = **liquid biomass**: a strong value proposition for Power Generation
  - **Fastest low cost** way to meet state RPS and pending federal RES
  - Limited capital outlay for users to make existing infrastructure renewable
  - Significant NOx and SOx emissions reductions



# NGBF's Biofuel Advantages

- Renewable with reduced lifecycle greenhouse gas emissions
- Great feedstock flexibility
  - Allows us to address performance needs
  - Provides increased supply availability
- Low NO<sub>x</sub> emissions
- Essentially zero SO<sub>x</sub> emissions
- Excellent cold flow properties
- Competitively priced with Ultra-Low Sulfur Diesel
- Formulated to be used neat (at 100%) or blended
  - Co-fired with coal and/or solid biomass
  - Blended with #2 fuel oil and/or #6 fuel oil

# NGBF Biofuels: Classic and Ultra HF

**Classic** – Extraordinary pour point, field tested atomization and ignition, biodegradability

**Ultra HF** – High flash point, increased energy content, enhanced viscosity

*All of our products are formulated for low metals content.*

	<b>Classic</b>	<b>Ultra HF</b>
Flash Point (°F, minimum)	77	210
Heat of Combustion (BTU/gal, typical)	92,000	100,000
Kinematic Viscosity @ 40C (cSt, typical)	53	28
Bottom Sediment & Water (% , maximum)	0.05	0.5
Pour Point (°F, typical)	-49	5



# Comparison to Fuel Oils

- In comparison to fuel oils, NGBF fuels have
  - Lower ash
  - Much lower sulfur
  - Higher lubricity
  - Better low-temperature flow properties
  - Reduced NOX emissions
  - Different flash points
  - Lower energy content/gallon
  - Higher viscosity

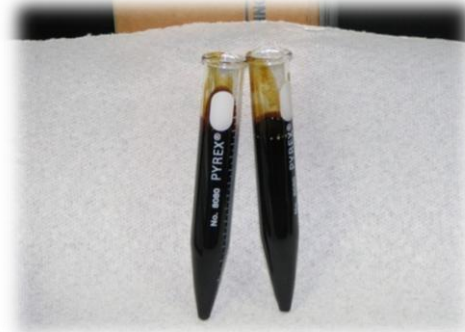
# Production Process Advantages

- Production process is a precision blending or emulsification process with high energy yield:
  - Low production costs
  - Energy costs are only 11 watt hours/gallon
  - No significant by-products, wastes, emissions or discharges, so “BTU yield” of process is greater
- Small plant footprint, production can be located to leverage existing storage and transportation infrastructure
  - 25M GPY sits on <15,000 sq. ft., excluding storage and logistics
  - Significantly lower capital costs vs. alternatives
    - NGBF Plant capital costs are \$.20 - \$.30 per gallon of annual capacity (excluding storage and logistics) i.e. 25M GPY Plant Capex ranges from \$5M - \$7.5M



# Blending with #2 and #6 Fuel Oils

- NGBF biofuels can be easily blended at different ratios with #2 and #6 fuel oils up to 35% by volume
- Final blended fuel has improved rheological properties (pour point and viscosity) and **highly improved performance in terms of emissions during combustion**



# Boiler Applications

NGBF's biofuel is being used in a series of boiler applications including:

- Cleaver-Brooks fire-tube boilers
  - 150, 250, & 500 HP
- Babcock & Wilcox utility steam boiler
  - Light off and flame stabilization
  - Steam plant for electricity generation
- Smith Cast Iron boilers
- Infern-O-Therm hot water boilers

Conversions required only simple tuning

- 45 minutes for first conversion

Main results were:

- SO<sub>2</sub> essentially eliminated
- 45% reduction in NOx emissions
- Very good ignition and combustion stability





# NOx and SO2 Credits

- Emissions tests conducted with NGBF's fuel show 30% or greater reduction in NOx
- Nearly 100% reduction in SO2
- NOx and SO2 Credits (as reported by Evolution Markets, March, 2010)
  - \$475 to \$510/ton Annual NOx
  - \$40 to \$50/ton Seasonal NOx
  - \$32 -\$34/ton SO2
- EPA has indicated high likelihood of acceptance of NGBF's fuel to reduce emissions under CAIR or NOx SIPCall
  - Petition EPA under 40 CFR Part 75 Appendix D Methodology

# NGBF Feedstock Position

No one is better positioned than  
**New Generation Biofuels** to  
optimize feedstock supplies.

*Why?*

- Formulation Technology-
- Feedstock Flexibility-
- Partnerships-
- Our Business Model-

# NGBF Feedstock Position

## Partnerships

- NGBF Has Relationships With Global Reach
- Feedstock Flexibility Creates More Partnership Opportunities →
  - Generates More Sources → Not Locked In to Limited Suppliers
  - Allows Us to Reach Non-Traditional Supply Sources
- Unique Opportunities
  - Emerging Supply Sources/Technologies
  - Integration

# NGBF Feedstock Position

## NGBF Business Model = Viability

- Low Cost of Capital for All Involved
  - NGBF Blending Facilities → < \$0.30/Gallon of Production Capacity
    - Ethanol → \$2.00/Gallon of Capacity
    - Biodiesel → \$1.00-\$1.15/Gallon of Capacity
  - Customer Conversions
    - Solid Biomass → Potentially Huge Investments
    - NGBF → Minor, Quick, Inexpensive

# NGBF Feedstock Position

## NGBF Business Model = Viability

- Supply Chain Advantages
  - Multiple Feedstocks/Sources = More Options for Logistics
  - Our Technology Can Be Stand Alone or Co-Located
- Overall Costs
  - Low Cost Manufacturing/Low Energy Inputs
  - Formulation Technology

# NGBF Feedstock Position

## Examples of NGBF Feedstock Options

- Traditional
  - Soybean Oil
  - Palm Oil
  - Recycled Vegetable Oils
- Typically More Challenging...For Others
  - Off Spec Plant Refined Oils
  - Animal Fats
  - Used Commercial Cooking Oils
- New Upcoming Technologies
  - Jatropha
  - Algae
  - Pyrolysis

