

# RIVER BASIN ENERGY INC

*Solid Fuel Supplier*

**Upgraded Low Rank Coal  
Torrefied BioMass**



# Two Markets – One Technology Platform



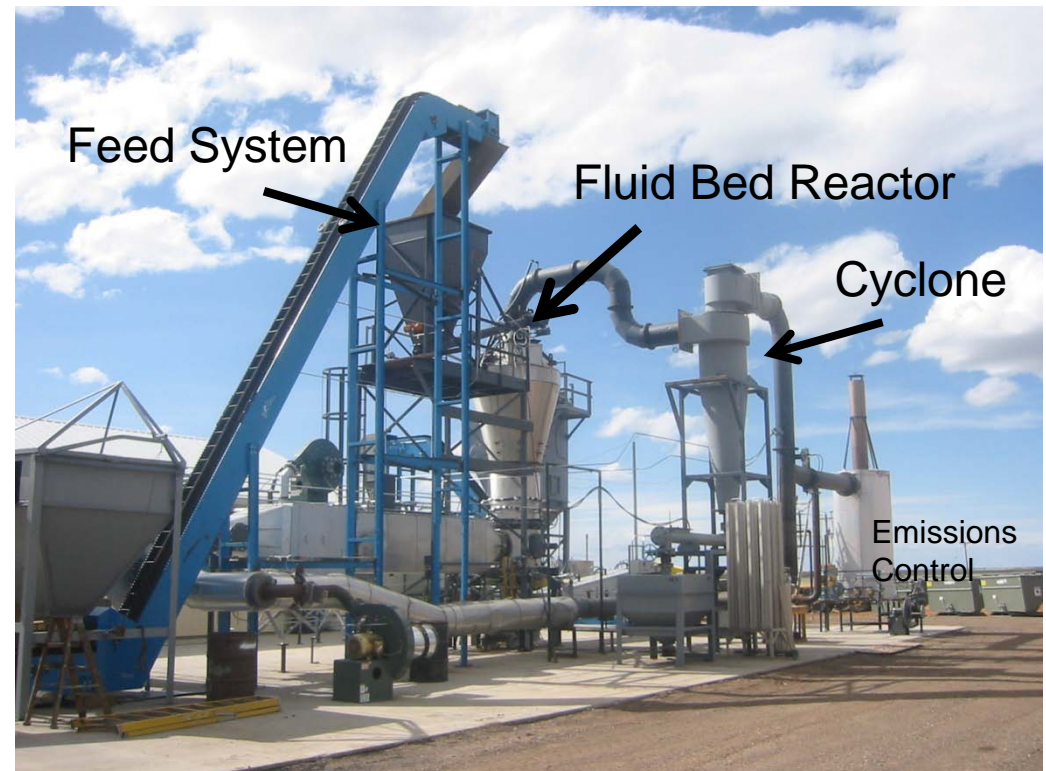
Core Technology

- Captures the arbitrage in differing value between low/high rank coal.
- Liberates biomass fuel quality & availability.
- Provides a route to very low capital, carbon neutral solutions to utilities.

# Breakthrough Coal Beneficiation and BioMass Torrefaction



- Fluidized bed-based technology
- Coal /BioMass processed in an oxidizing environment
- Increases heating value
- Continuous Process
- Homogeneous Product



# Quality Products

**Upgraded Low Rank Coal**



**Torrefied BioMass**



# Product Specs



		<b>Heating Value (HHV)</b>	<b>Moisture</b>	<b>Sulphur</b>	
<b>PRB Coal</b> →	Parent Coal	8,400	29%		
	<b>RBE Product</b>	<b>10,130</b>	<b>11%</b>	<b>Sulfur = 0.6%</b>	<b>Hg = Trace</b>
<b>Woody BioMass</b> →	Feed	5,699	36%		
	<b>RBE BioCoal Torrefied Product</b>	<b>9,485</b>	<b>2%</b>	<b>Sulphur = 0.14%</b>	<b>Ash &gt; 1% Cl – Trace</b>

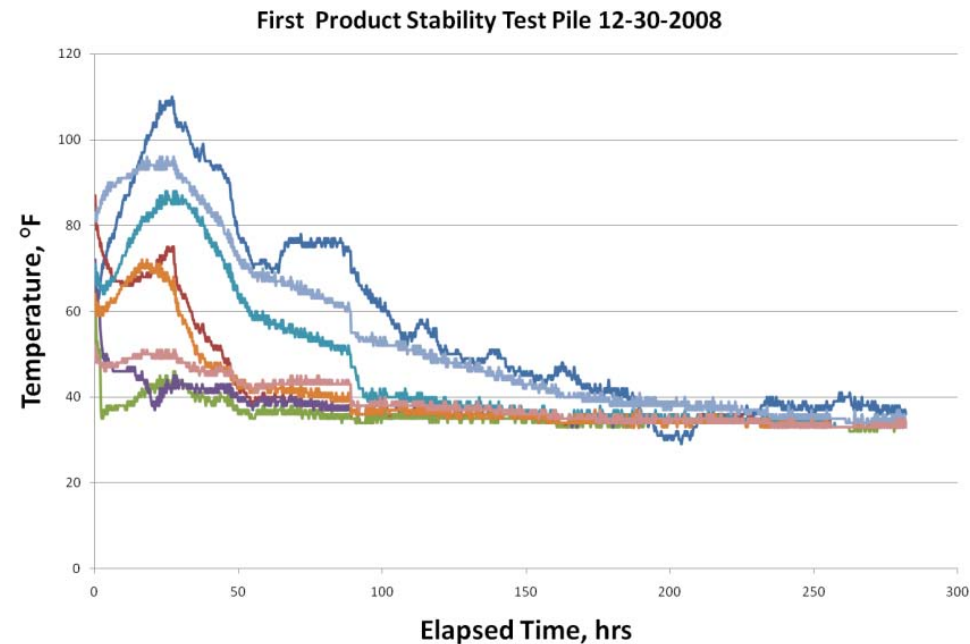
The above analyses were provided by SGS North America, Inc and Wyoming Analytical Laboratories using ASTM procedures ASTM D 5865, ASTM D 3302, and ASTM D 1412 respectively.

# Spontaneous Combustion

## PRB Coal -Test Results



- Independent and continuous monitoring of the beneficiated product storage bins and stockpiles have demonstrated a stable product that resists both self heating and spontaneous combustion.



# River Basin BioCoal - Torrefied Biomass overcomes issues with conventional wood pellets



- Wood Pellets
  - Fuel must be kept dry.
  - Limited conveyer types, weather protected and with fire detection and suppression systems.
  - Special silo design to reduce rubbing.
  - Special care for truck loading and unloading.
  - Dust collection and fire protection throughout the supply chain and the power plant.

# Torrefaction of biomass ("bio-coal") delivers significant advantages



- Green wood chips limited to 5% co-firing
  - due to pulverizing mill capacity or power output performance.
- Wood pellets limited to 10% co-firing
  - requires investments in separate fuel injection of pulverized fuel + special storage & handling.
- Torrefied biomass
  - grinds like coal
  - co-fired at up to 50% (without investment), or
  - up to 100% in a re-powered plant.
  - energy density is equivalent to low rank coal
  - No special constraints on storage and handling, minimal dust
  - Hydrophobic and can be stockpiled outside in the same manner as coal.

# River Basin Fluid Bed Technology

## CAPEX and OPEX

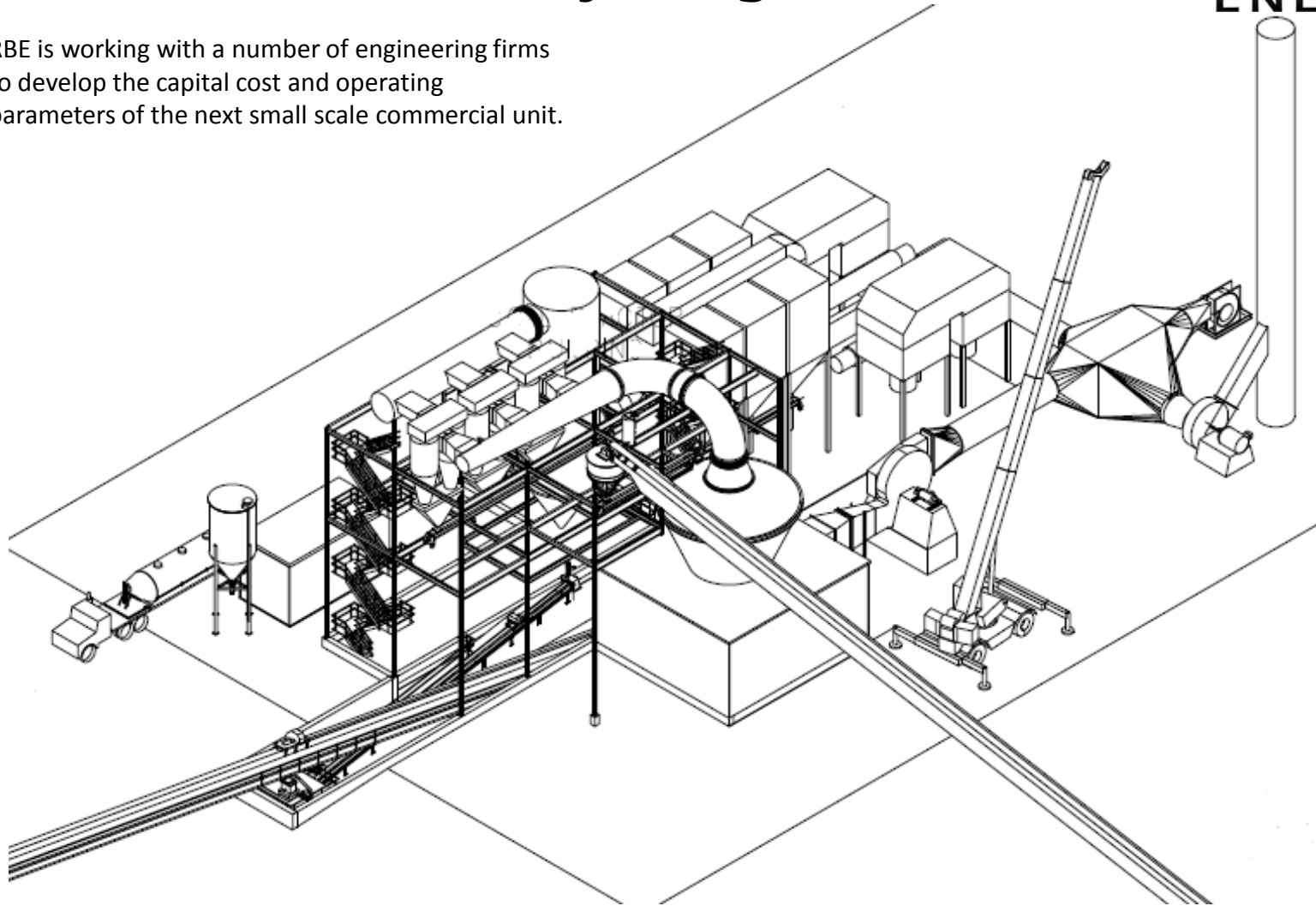


	<b>BioMass</b>	<b>Upgraded Coal</b>
<b>Commercial Tonnage</b>	100,000	1,000,000
<b>CAPEX/Product Ton</b>	\$20 - \$25	\$50 - \$60
<b>OPEX/Product Ton</b>	\$20 - \$25	\$6

# Technology Status

## First Commercial Facility Design

RBE is working with a number of engineering firms to develop the capital cost and operating parameters of the next small scale commercial unit.



# Contact

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