BioEnergy International, LLC. a Biorefinery Company

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BioEnergy International, LLC
a Biorefinery Company

Umass TIMBR Cellulosic Conference
September 19, 2008
Management Team, BioEnergy’s X Factor

Experience
Proven track record
Recognized worldwide

Stephen J. Gatto, Chairman, CEO
Advisor to President Clinton and Bush

Dr. Lonnie Ingram, Chief Science Officer
University of Florida

Dr. Joseph P. Glas, SVP R&D
VP DuPont Biotechnology

Dr. Mohammed Moniruzzaman, VP R&D
Genencor International

Samuel McConnell, SVP Development
Project finance over $2 B

Rudy Fogleman, VP Operations
Commercial ethanol plant experience

President Bush on BioEnergy’s Chief Science Officer:
“on the leading edge of change”
Our Vision - the BioRefinery

A Day When A Pound Of Sugar Can Replace A Barrel of Crude For Everything From The Fuel We Put In Our Cars To The Plastics and Fabrics We Use In Our Everyday Lives.

www.bioenergyllc.com
Today's oil and gas bases technology

2500 °C

Oil
Natural gas
Coal
Natural gas

Naphta
Methanes
Coke
Butane

Acetylene
Maleic anhydride
1,4 diacetoxy-2-butene

1,4 Butanediol

200 °C

BioEnergy’s second generation technology – 3 years from today

25 °C

Sugar
Succinic

1,4 Butanediol

200 °C

BioEnergy’s second generation technology – 7 years from today

25°C

Sugar

1,4 Butanediol

35 °C
BioEnergy’s margin comparison

<table>
<thead>
<tr>
<th>Feedstock</th>
<th>Cost of Sugar ($ / lb)</th>
<th>Ethanol Gross Margin ($ / lb sugar)</th>
<th>Bio-polymer Gross Margin ($ / lb sugar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>$0.08-0.17</td>
<td>$0.01-0.10</td>
<td>$0.51</td>
</tr>
<tr>
<td>Sugar Cane</td>
<td>$0.08-0.10</td>
<td>$0.08-0.10</td>
<td>$0.58</td>
</tr>
<tr>
<td>Cellulosic</td>
<td>$0.03-0.08</td>
<td>$0.10-0.15</td>
<td>$0.60</td>
</tr>
</tbody>
</table>

The focus is on diversifying plant revenues while building the sustainable sugar platform. Cellulosic technology is not the end game; rather it is a means to an end.
The Market

Biofuels
→ 90 billion gallons

Bio-based chemicals and polymers
→ 350 billion pounds
Secure cash flow from traditional corn plants and cheap sugar platforms

Diversify revenue by introducing novel biocatalysts for the manufacture of green chemicals and biopolymers

Integrate cellulosic technology by retrofitting or building plants to drive down costs and move away from food-based raw materials

New Paradigm needs a Beginning, Middle and End
Our strategic business model is supported by proprietary technology; BioEnergy is a leader in the new industrial revolution.
Biorefinery Platform
Cellulosic Destination Sites

Clearfield, Pennsylvania

- 110Mgpy, Fagan EPC; ICM Design
- 5-year off-take agreement with Getty Oil (provides natural hedge against commodity fluctuations)
- $22M in grants and loans from State of Pennsylvania
- Closed $205M debt financing with WestLB, TD Banknorth & Stern Brothers Feb ’08
- Design underway for co-location of pilot plant

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Lake Providence, Louisiana

- 110Mgpy expandable to 220Mgpy
- Key permits in hand
- $20M in grants
- Site lease executed with Port Authority
- Mississippi River location provides logistics options for diverse feedstocks and product output
Led by Dr. Mohammed Moniruzzaman and a world-renowned team of molecular biologists, engineers, and chemists, BioEnergy uses its proprietary technology to advance the development of its cheap sugar platform.
Innovative, Integrated Cellulosic Platform
site as important as technology

The road to low cost fuels is in the feedstock…

1st wave technology: Grain based

2nd wave technology: Organic waste based

< Different technologies, different strategies

The gap is closing fast

Site and Business plan as important as technology >

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BioEnergy’s Biorefinery Technology

**The source**
- Bagasse
- Rice straw
- Wood chips
- Paper Sludge

**The feedstock**
- C6 sugars
- C5 sugars

**The technology**
- Metabolic Engineering
- Directed Evolution
- Process Integration

**The product**
- High value fuels & chemicals:
  - Lactic acid
  - Succinic acid
  - Butanol
  - Butanediol

BioEnergy’s “software” will convert Today’s “hardware” into Tomorrow’s biorefineries.
Revolutionary technology - BioEnergy’s “software” will convert today’s “hardware” into tomorrow’s biorefineries.

Sugar feedstock
- Bagasse
- Rice straw
- Wood chips
- Municipal waste

Cellulosic technology

Biocatalyst Fermentation
“The Cell Factory”

Products
- Biochemicals
- Bioplastics
- Biofuels

BioEnergy’s flexible microbial technology platform allows specified selection of chemicals to produce

- Ethanol
- Adipic acid
- Propanediol
- Butanol
- Succinic acid
- Lactic acid
- 3-HP

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Through the development of novel biocatalysts for use in state-of-the-art biorefineries, BioEnergy has pioneered a progressive, sustainable, and economically viable alternative to the traditional petroleum-based production of renewable fuels and high-value bio-based intermediates and polymer precursors.
Commercial D-lactic acid

- BioEnergy broke the D-lactic acid code
- Product already in the market
BioEnergy’s Novel Biocatalyst Platform
Game Changer

1,4 Butanediol

BioEnergy product

35 % THF

29 % PBT (polyester)

16% GBL

14% TPU

4% COPO
Cost versus Value

Transforming the fuels, chemicals and energy industries with biotechnical advantage to push down cost and increase value
Status Quo of Oil is Unsustainable

Basic Chemicals
- ethylene
- propylene
- Benzene
etc.

Plastics
- PET
- Polyester
- Polylols
- Polyurethanes
- Nylon

Fuels
- gasoline
- diesel
- jet fuel

CUSTOMERS

D-Lactic acid
- Succinic acid
- Propane diol
- Butanediol
- Adipic acid
- HPA

PLA
- Polyester
- Polylols
- Polyurethanes
- Nylon

CUSTOMERS

Ethanol
Butanol

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Thank You

Corinne Young, Director of Government Affairs

BioEnergy International, LLC