AGRICULTURAL OUTLOOK FORUM 2012
MAKING MARKETS FOR BIOMASS
FEBRUARY 23, 2012

ROBERT M. AMES
SOLAZYME – VP FUELS COMMERCIALIZATION
ADVANCED BIOFUELS ASSOCIATION – CHAIRMAN
KEY ISSUES

- What potential end use markets exist for biomass?

- What factors drive those markets?
AGENDA

- AFBA members cracking the code

- Solazyme’s technology platform

- Key policy initiatives needed to seal the deal
1. Technology neutrality

2. Feedstock agnosticity / sustainability

3. Subsidy parity
ABFA REPRESENTS VIRTUALLY ALL ADVANCED BIOFUEL COMPANIES
<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>FEEDSTOCKS</th>
<th>OUTPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasification</td>
<td>Corn</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>Hydrolysis</td>
<td>Sugars</td>
<td>- Diesel</td>
</tr>
<tr>
<td>Hydroprocessing</td>
<td>Wood</td>
<td>- Jet</td>
</tr>
<tr>
<td>Synthetic biology</td>
<td>Grasses</td>
<td>- Gasoline</td>
</tr>
<tr>
<td>Fermentation</td>
<td>Municipal waste</td>
<td>- Triglyceride oils</td>
</tr>
<tr>
<td>Catalyst</td>
<td>Algae</td>
<td>- Tailored by chain length and saturation for markets</td>
</tr>
</tbody>
</table>

- Alcohol
  - Ethanol
  - Butanol
- Ether
  - ETBE
  - MTBE
- Ester
  - Biodiesel
<table>
<thead>
<tr>
<th>PRODUCTS</th>
<th>ABFA MEMBER COMPANIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>Osage, GeoSynFuels, DDCE</td>
</tr>
<tr>
<td>Butanol</td>
<td>Gevo, Butamax</td>
</tr>
<tr>
<td>Diesel</td>
<td>Solazyme, Amyris, LS9, UOP, Sundrop, Rentech, Neste, Tyson, Elevance, Viesel, Virent, Triton, SGC</td>
</tr>
<tr>
<td>Gasoline</td>
<td>Virent</td>
</tr>
<tr>
<td>Jet Fuel</td>
<td>Solazyme, Tyson, UOP, LS9, Rentech, Amyris, Virent</td>
</tr>
<tr>
<td>Oil feedstocks</td>
<td>Solazyme, Sapphire, LiveFuels, UOP, KiOR</td>
</tr>
<tr>
<td>Chemicals</td>
<td>All member companies</td>
</tr>
</tbody>
</table>
FUEL BENEFITS

- Energy Content
- Environmentally Advantaged
- Fungibility (drop in fuels)
- Economically Competitive
- Scalability
AGENDA

- AFBA members cracking the code
- Solazyme’s technology platform
- Key policy initiatives needed to seal the deal
WE MAKE OIL

WE CONVERT LOW COST PLANT SUGARS
TO HIGH VALUE RENEWABLE OILS – FOR FUEL, FOR FOOD, FOR LIFE
BREAKTHROUGH BIOTECHNOLOGY PLATFORM

FLEXIBLE INPUT

- Sugarcane
- Corn and Stover
- Miscanthus
- Switchgrass
- Forest Residue
- Waste Streams

MULTIPLE HIGH-VALUE MARKETS

- Fuels
- Chemicals
- Nutritionals
- Skin & Personal Care

HIGHLY PRODUCTIVE MICROALGAE

> 80% oil*

*The average wild algae only has a 5-10% oil content

OIL DESIGNED TO SPECIFICATION
TAILORING OUR 'CROP' TAKES MONTHS NOT YEARS

- **Months not years**
- **Orders of magnitude trait enhancement, not incremental**

---

**GMO Oilseed Trait**

<table>
<thead>
<tr>
<th>years</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Genetic Engineering/ Seed Production Trials
- Environmental Stability / Multi-Location Trials
- Large Scale Field Trials/ Commercial Seed Production

---

**Solalyze Tailored Oils**

<table>
<thead>
<tr>
<th>months</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Genetic Engineering
- Process Development
- Scale-Up
TAILORING OILS ENHANCE VALUE, MEET CUSTOMER NEEDS, AND REDUCE RISK

**CHAIN LENGTH CONTROL**

**SATURATION LEVEL**

**FUNCTIONAL GROUPS**

---

**Chain Length Engineering**
(C10 – C14)

**Saturation Engineering**

<table>
<thead>
<tr>
<th>Percent of Total</th>
<th>Natural Host</th>
<th>Optimized Strain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent of Total</th>
<th>Natural Host</th>
<th>Optimized Strain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*Advanced Biofuels Association*
LOW COST PRODUCTION NOW PROVEN AT SCALE

- Commercial scale since 2007
- Linear performance at all scales
- Produced > 500,000 liters of oil
  \((1/10 - 2/11)\)
- Commercial / commercial-ready process in all markets
WORLD CLASS COMPANIES THAT HAVE CHOSEN TO PARTNER WITH SOLAZYME

FUELS & CHEMICALS
- Bunge
- Chevron
- Dow
- Ex-xon
- Unilever
- United

NUTRITIONALS
- Roquette
- Solazyme
- Garden of Life
- Whole Foods

SKIN & PERSONAL CARE
- Sephora
- Qvc
- Space.nk
REPEAT BUSINESS EARNED FROM THE WORLD'S LARGEST FUEL PURCHASER

- Delivered over 360,000 liters of HRD-76 Naval marine diesel fuel and HRJ-5 Naval jet fuel to the U.S. Navy

- Will produce over 280,000 additional liters of fuel for current contract by second half of 2012

- Awarded Greenstrike bid with Dynamic Fuels to >2 M liters of HRD-76 Naval marine diesel fuel and HRJ-5 Naval jet fuel for the U.S. Navy by May 1, 2012
WIDE COMMERCIAL INTEREST IN SOLAZYME’S PLATFORM AND FUELS

- SoladieselRD® powered US Navy destroyer in 20 hour trip along California coast
- Largest single advanced biofuel Navy test in history
- 1st U.S. Commercial flight on advanced biofuels in November 2011
- Maersk tests SoladieselRD® in 6,500 nautical mile commercial voyage
- Greenstrike: Navy awards Solazyme a 4th contract for > 2 mm liters of fuel
- 100% of SZYM oil commitments delivered ahead of schedule
• South San Francisco: Pilot plant fully operational, sampling oils
• Peoria: Demonstration / Commercial facility online within 6 months of acquisition
• Scaled up algal oil production to 75,000 L scale
AGENDA

- AFBA members cracking the code
- Solazyme’s technology platform
- Key policy initiatives needed to seal the deal
RFS2 is the single most important policy tool for our industry.

Renewable Fuel Standard
RFS2

- Total: 36 BG
- Conventional: 15 BG
- Advanced: 21 BG
- Cellulosic: 16 BG
- Biomass Diesel: 1 BG

BG = Billion Gallons
CONCLUSION

- We need you now more than ever
- We applaud and encourage collaboration
- Policy certainty is vital
- Let American consumers pick winners and losers
- Let’s grow it here and make it here!