Biofuels Outlook in an Era of Low Oil Prices

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- Future Computing Platforms
Agenda

- Global biofuels outlook and volatile oil prices
- Roadmap to success with next-generation fuels
- Identifying opportunities in the biofuels space
Next-generation biofuels are driving capacity expansion through 2018
Historical volatile spikes and dips in oil prices with a future filled with uncertainty
Agenda

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Likelihood of 25 high-profile companies to compete with cheap oil and the strategies they instill
Neste dominates the renewable diesel space with three peers following close behind.
Tapping into low-cost feedstocks reduced Neste’s production costs by nearly 15% in 2014.
Despite numerous delays, commercial cellulosic ethanol projects are now online and producing

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Capacity</th>
<th>Capital Cost</th>
<th>Feedstock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abengoa</td>
<td>U.S.</td>
<td>25 MGY</td>
<td>$500 million</td>
<td>Corn</td>
</tr>
<tr>
<td>Beta</td>
<td>Italy</td>
<td>20 MGY</td>
<td>$208 million</td>
<td>Wheat straw</td>
</tr>
<tr>
<td>GranBio</td>
<td>Brazil</td>
<td>22 MGY</td>
<td>$265 million</td>
<td>Sugarcane straw</td>
</tr>
<tr>
<td>POET-DSM</td>
<td>U.S.</td>
<td>25 MGY</td>
<td>$275 million</td>
<td>Corn stover</td>
</tr>
<tr>
<td>Raizen</td>
<td>Brazil</td>
<td>10.6 MGY</td>
<td>$100 million</td>
<td>Sugarcane bagasse</td>
</tr>
</tbody>
</table>

Image Sources: Abengoa, Beta Renewables, GranBio, POET-DSM, Iogen, DuPont
Bolt-on technology offers a capital-light approach to cellulosic ethanol production

**News Releases**

Quad County Corn Processors hits million-gallon cellulosic milestone

04.09.15

- Cellurate™ process technology helps QCCP increase ethanol production
- Bolt-on process converts corn kernel fiber into cellulosic ethanol
- QCCP recognized by the Renewable Fuels Association for advancing the use of cellulosic ethanol technology

MINNETONKA, Minn., U.S.A. — Syngenta announced today that Quad County Corn Processors (QCCP) has produced its one millionth gallon of cellulosic ethanol through the use of Cellurate™ process technology at its Galva, Iowa, ethanol production facility. This milestone puts QCCP on track to produce 2 million gallons of cellulosic ethanol per year.

![Cellulosic Ethanol (D3) Production Volumes](Image Source: Quad County Corn Processors; Data Source: U.S. EPA)

2.3 million gallons
ASTM approval of farnesene as jet fuel blendstock likely the last you hear about Amyris’ fuel ambitions

Amyris Renewable Jet Fuel Receives Regulatory Approval in Brazil

Brazil Now Cleared for Flying With Locally-Produced, Sugarcane-Derived Jet Fuel as Study Indicates That Amyris’s Renewable Fuels Greatly Reduce Greenhouse Gas Emissions Compared to Fossil Fuels

SAO PAULO, Dec. 16, 2014 (GLOBE NEWSWIRE) — Amyris, Inc. (Nasdaq:AMRS) welcomed the approval of its renewable jet fuel by Brazil’s fuels regulator, ANP, clearing the way for the commercialization in Brazil of the Amyris renewable jet fuel in blends of up to 10 percent.

Claimed Production Cost, by Fuel Type

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Claimed Cost</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diesel</td>
<td>$278/bbl</td>
<td></td>
</tr>
<tr>
<td>Gasoline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Amyris
Amyris’ high-value product and flexibility allows it to enter a wide range of markets

“We’re pleased with our continued execution towards diversifying and growing our revenue base through an expanding number of collaborations and production commercial efforts.”

– John Melo, President & CEO
Three strategies enabling next-generation alternative fuel companies to grow

- Low-cost feedstocks
- Capital-light projects
- Market flexibility
Agenda

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High-potential companies implementing similar strategies

**Low-cost feedstocks**
- Shifted from cellulosic biomass to high free-fatty acid waste oils

- Expanded feedstocks from vegetable oils to waste oils

**Capital-light projects**
- Retrofit strategy converting biodiesel facility with its ENSEL process

- Bolt-on solution to ethanol facilities to produce jet fuel

**Market flexibility**
- Established waste-to-power portfolio with options for fuels and chemicals

- Produces renewable heating oil, but JV focuses on co-refining of pyrolysis oil
Companies share qualities correlated with likelihood of success

<table>
<thead>
<tr>
<th>Company/Technology Description</th>
<th>Lux Take</th>
<th>Management</th>
<th>Partnerships</th>
<th>Momentum</th>
</tr>
</thead>
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<tr>
<td>Shifted from cellulosic biomass to high free-fatty acid waste oils</td>
<td>4X</td>
<td>✓</td>
<td></td>
<td>2.5X</td>
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<td>✓</td>
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</tr>
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Conclusion

- Global biofuels growth will come from next-generation biofuels
- Cost-reduction strategies vital in an era of low oil prices
- Statistically significant scorecard metrics identify future winners
Thank you

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