Getting to Chemicals and Advanced Biofuels from Cellulosic Feedstocks

2013 BIO World Congress on Industrial Biotechnology

June 17, 2013
Certain statements within this presentation may constitute “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements relate to a variety of matters, including but not limited to: the timing and costs associated with and the availability of capital for Gevo’s scheduled retrofits of existing ethanol production facilities, its future isobutanol production capacity, the timing associated with bringing such capacity online, the availability of additional production volumes to seed additional market opportunities, the expected applications of isobutanol, including its use to produce renewable paraxylene, PET, isobutanol-based fuel blends for use in small engines, and ATJ bio-jet, addressable markets, and market demand, Gevo’s ability to produce commercial quantities of isobutanol from cellulosic feedstocks, the suitability of Gevo’s iDGs™ for the animal feed market, the expected cost-competitiveness and relative performance attributes of isobutanol and the products derived from it, the strength of Gevo’s intellectual property position and other statements that are not purely statements of historical fact. These forward-looking statements are made on the basis of the current beliefs, expectations and assumptions of Gevo’s management and are subject to significant risks and uncertainty. All such forward-looking statements speak only as of the date they are made, and Gevo assumes no obligation to update or revise these statements, whether as a result of new information, future events or otherwise. Although Gevo believes that the expectations reflected in these forward-looking statements are reasonable, these statements involve many risks and uncertainties that may cause actual results to differ materially from what may be expressed or implied in these forward-looking statements. For a discussion of the risks and uncertainties that could cause actual results to differ from those expressed in these forward-looking statements, as well as risks relating to the business of the company in general, see the risk disclosures in Gevo’s Annual Report on Form 10-K for the year ended December 31, 2011, as amended, and in subsequent reports on Forms 10-Q and 8-K and other filings made with the Securities and Exchange Commission by Gevo.

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Multiple Feedstocks; Proprietary Technology; Numerous End Markets

Feedstock

Bio-Cracker

GIFT® Separator

Direct “drop-in”

Target Markets

Proprietary Technology

Green Processing
# Seven Strategic End Markets; Strong Customers

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<tr>
<th>Specialty Chemicals</th>
<th>Gasoline Blendstock</th>
<th>C4 Market</th>
<th>Bio-PX/PET</th>
<th>Bio-Jet</th>
<th>Hydrocarbon Fuels</th>
<th>Co-Product Revenues</th>
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<td>Sasol</td>
<td>Mansfield</td>
<td>LANXESS</td>
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- "Lower Cost, Drop-In" ~$7bln TAM
- "Cleaner Performance" ~$100bn TAM
- "Structurally Short Supply" ~$8bn TAM
- "Green Supply Chain" ~$100bn TAM
- "High Performance" ~$200bn TAM
- "Fully Renewable" >$1trl TAM
- "Food First" ~$6bn TAM

**Sasol off-take and distribution agreement in place**
- Accounts for majority of Luverne and Redfield capacity
- Sasol has begun customer sampling of Gevo’s isobutanol

**Mansfield agreement, with their 900+ supply points, will initially focus on Marine**
- VP Racing Fuels to evaluate a wide array of fuel applications
- LOI with Total to evaluate isobutanol as a second-gen biofuel blendstock

**LANXESS 10-year exclusive global supply agreement in place**
- Negotiating terms for Canadian supply agreement
- Toray off-take agreement to create renewable Paraxylene for fibers and films

**Coca-Cola partnership to create fully renewable PET for plant-based packaging**
- U.S. Air Force’s (USAF) initial volume delivered with testing underway
- USAF interested in energy security / alternative jet fuel supply
- USAF test flight end of June
- United Airlines LOI in place

**Mansfield agreement, with supplier network in place, will support regional distribution rollout strategy**
- Exploring how to enhance the value of isobutanol Distillers Grains (iDGs™) or animal feed

Source: Company materials, IEA, EIA and Nexant

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Historical Oil:Corn Relationship

Ratios determined using EIA Brent Oil, CBOT corn
Net Corn determined with DDGs value at 80% of corn, DDG yield of 17 lb/bu and dextrose yield of 36 lb/bu

Sources: CBOT, EIA
## Economics and Pricing Breakdown

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<th>Lower Oil</th>
<th>~Current Oil</th>
<th>Higher Oil</th>
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<tr>
<td>Oil (MT)</td>
<td>$445 ($60/bbl)</td>
<td>$742 ($100/bbl)</td>
<td>$1,002 ($135/bbl)</td>
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<tr>
<td>Carbohydrate (MT)</td>
<td>$104 ($60/MT biomass)</td>
<td>$144 ($80/MT biomass)</td>
<td>$184 ($100/MT biomass)</td>
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<tr>
<td>Oil / Carbohydrate Ratio</td>
<td>4.3</td>
<td>5.2</td>
<td>5.5</td>
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<tr>
<td>Addressable Market</td>
<td>$10 B</td>
<td>&gt;$40 B</td>
<td>&gt;$3 T</td>
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**Market opportunity driven by spread between carbohydrate and oil**
Our Technology is Based on Metabolic Engineering
Retrofit Commercial Ethanol Yeast to Make Isobutanol
Cellulosic Sugar Converting Yeast

Conversion of C5 & C6 sugars to butanol

Titer of iBuOH (g/l)

- glucose
- manose
- xylene
- arabinose
- galactose
Customers are very excited about cellulosic feedstocks sustainability advantages and avoidance of “Food vs. Fuel” Discussion

Cellulose has the potential to significantly impact our feedstock cost and ultimately the cost of production of isobutanol

Gevo looks to suppliers of cellulosic sugars in any of a number of possible relationships
  – Gevo will not develop cellulosic sugar technology
Could be Cellulosic Sugar with Lignin Co-Product
Cellulosic sugar technologies that are or have started commercial operations are easily converted or can be designed using the identical GIFT as those using corn dry mill sugar.

Other emerging cellulosic sugar technologies potentially offer different opportunities for integration with Gevo Technology.
Gevo – as a sugar consumer is open to multiple feedstocks which are obviously more of a design issue to the converter of Biomass to sugar, but will most likely impact the supplied sugar stream.

Feedstocks that we’ve Tested Include:

- Arundo Donex
- Douglas Fir
- Douglas Fir Slash
- Corn Stover

We are a proponent of campaigning feedstocks to minimize storage and risk of supply disruptions.

- Campaigns would allow for adjusting of processing to accommodate differences.
Commercial Production
Our Plants

1st Commercial Plant: Luverne, MN
- ~18 MGPY commercial isobutanol production facility
- Purchased in 2010 & 100% owned by Gevo

2nd Commercial Plant: Redfield, SD
- ~40 MGPY commercial isobutanol facility
- Entered into JV with 650 members in 2011 with economics, post retrofit, to be split approximately 50/50
Leveraging Petrochemical & Refinery Assets

- ATJ Demonstration Facility near Houston
- Delivered >17K gallons ATJ to AFRL
- Alcohol-to-Fuel US Patent 8,193,402
  - Covers C2-C6 alcohols to hydrocarbon fuel
June 28, 2012 40th Flight Test Squadron made history flying Gevo’s 50% ATJ and 50% JP-8 fuel blend

“It flew like a usual A-10 without any issues.”
  – Maj. Olivia Elliott, A-10 pilot

“You won’t be able to determine the difference and you won’t care, because all perform as JP-8.”
  – Jeff Braun, Chief for the Air Force Alternative Fuel Certification Division