Renewable Chemicals and Advanced Biofuels

Biomass 2013

July 31 2013
Brett Lund
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, as amended, for the year ended December 31, 2012 and in subsequent reports on Forms 10-Q and 8-K and other filings made with the Securities and Exchange Commission by Gevo.

This presentation is based on information that is generally available to the public and does not contain any material, non-public information. This presentation has been prepared solely for informational purposes and is neither an offer to purchase nor a solicitation of an offer to sell securities.
Company Overview

- Highly credible team with proven track record
- Isobutanol is a platform molecule with drop-in capability
- Premier technology platform with 400+ patents and patent applications
- Focused on 7 large markets
- Established partnerships across the value chain
- Commercialization -stage company

© 2013 Gevo, Inc. | 3
Cost Competitive Product Drives Market Adoption

Since 2007 >$0.80/gallon lower cost to produce than petroleum isobutanol
(Backcast, Gevo process)

Petro-IBA cost

Bio-IBA cost

Source: CMAI, Nexant, CBOT, Gevo Process Estimates
*Cash Cost FOB Plant Gate
Multiple Feedstocks; Proprietary Technology; Numerous End Markets

Feedstock

Proprietary Technology

Bio-Cracker

GIFT® Separator

Direct “drop-in”

Green Processing

Target Markets

© 2013 Gevo, Inc.
# Seven Strategic End Markets; Strong Customers

<table>
<thead>
<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>
</tr>
</thead>
</table>

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

- **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

- **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**

- **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

- **Purina, the premier brand owner, partnership to maximize value of co-products**
  - Exploring how to enhance the value of isobutanol Distillers Grains (iDGs™) or animal feed

- **Toray off-take agreement to create renewable Paraxylene for fibers and films**

- **United Airlines LOI in place**

---

Source: Company materials, IEA, EIA and Nexant

© 2013 Gevo, Inc.
The US produced 1,600 KTA of butylenes via crackers in 2007.

Switching to NGL feeds reduces butylene production to ~300 KTA.

### Historical

- Naphtha & Gas Oil
- NGLs
  - Ethylene
  - Propylene
  - C4s
  - Pyrolysis Gasoline
  - Other

### Expected

- NGL’s account for 85% of cracker feedstocks
  - Up from 65% in 2005
- <10% of ethylene produced from naphtha
  - Down from 30% in 2005
- Many crackers have completed capital projects to further maximize NGL feeds
- All new projects being announced will utilize ethane, NGL feeds (world scale plants from Dow, Shell, ExxonMobil, Chevron Phillips)
  - Over 50 new chemical projects will invest $64.5 B by 2017, nearly all driven by NGL feedstock economics with the largest proportion of projects being ethane crackers

Source: Figured adapted from CMAI, SRI Consulting, American Chemistry Council
Oil Costs Expected to Rise Faster than Carbohydrates

Source: CBOT & EIA
## Economics and Pricing Breakdown

<table>
<thead>
<tr>
<th></th>
<th>Lower Oil</th>
<th>Current</th>
<th>Higher Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil (MT)</td>
<td>$445 ($60/bbl)</td>
<td>$668 ($90/bbl)</td>
<td>$1,002 ($135/bbl)</td>
</tr>
<tr>
<td>Carbohydrate (MT)</td>
<td>$258 ($5.50/bu corn)</td>
<td>$305 ($6.50/bu corn)</td>
<td>$305 ($6.50/bu corn)</td>
</tr>
<tr>
<td>Oil / Carbohydrate Ratio</td>
<td>1.7</td>
<td>2.2</td>
<td>&gt;3</td>
</tr>
<tr>
<td></td>
<td>$10 B</td>
<td>&gt;$40 B</td>
<td>&gt;$3 T</td>
</tr>
</tbody>
</table>

**Market opportunity driven by spread between carbohydrate and oil**

Note: The lowest the ratio has been in last 10 years is 1.5 (Dec 2001 – Jan 2002)
See previous page for sources / assumptions.

Source: ICIS, CMAI, Nexant
Comparing isobutanol yield to cost of production, Gevo’s proprietary processes show a clear advantage over conventional biofuels, as well as traditional catalytic cracking oil refineries.


Capital costs based on public data, Wall Street estimates and Gevo estimates.
Isobutanol: How Gevo Displaces Oil
Benzene
Toluene
Xylenes
Aromatics
Unsaturated Polyesters
Polypropylene
Jet Fuel
Gasoline
Diesel

Source: Adapted from Nexant

Steam Cracking
Olefins

Naphtha
Aromatics

Ethylene
Propylene
Butylenes
Butadiene

Pyrolysis
Gasoline

Ethylene
Propylene
Butylenes
Butadiene

Ethylene Oxide
alpha-Olefins
Ethanol
Isobutene

Propylene Oxide
Acrylonitrile

Cumene
Ethyl Benzene

Benzene
Toluene
Xylenes

Cyclohexane
Toluene Diamine
ortho-Xylene
meta-Xylene
para-Xylene

EDC
Ethylene Glycol
MTBE
Vinyl Chloride
Poly(ethylene oxide)

Polyethylene
Polypropylene
Polypropylene
Polyester
Polyisobutylene
Polypropylene
Polyacrylonitrile
Polybutadiene
Butadiene-Styrene
Polystyrene
ABS
Methyl Methacrylate
SB Latex
Nylon 66
Nylon 6
Polyurethane
Plasticizers
Unsaturated Polyesters
Polyesters (PET)
Green Building Block Leverages Existing Processes and Businesses

\[ \text{CO}_2 + \text{sun} \rightarrow \text{Chemicals and Materials} \]

Source: Adapted from Nexant

Note: Chemicals shaded green denote those which can be made from isobutanol-derived building blocks.
Our Technology is Based on Metabolic Engineering
Technology Based on Metabolic Engineering

- Proprietary yeast biocatalyst converts sugars (carbohydrates) to isobutanol
- Combination of biotechnology and process technology leads to competitive position
- Economic focus drives innovation
- Previously demonstrated commercial targets:
  - Yield 94% (goal 92%)
  - Concentration >107 g/l (goal >105 g/l)
  - Productivity Rate 2 g/l/h (goal 2 g/l/h)
How We Produce Isobutanol (GIFT®)

- Our patented Gevo Integrated Fermentation Technology® (GIFT®) continually separates isobutanol during fermentation.
- Gevo owns the patent covering ethanol plants retrofitted to produce isobutanol.

Standard Fermentation Process

START: Feedstock

- Feedstock
- Fresh & Recycled Water
- Jet Cooker
- Steam
- Enzymes
- CO₂
- Beer

Fermentation

New Isobutanol Recovery

Molecular Sieves

Distillation System

Syrup

Animal Feed

Drum Dryer

Thin Stillage

Evaporation System

Wet Grain

Isobutanol

Water
High Yield Drives Low Cost

Yield defined by molecule & process

Overall Yield*
Gevo: \(41\% \times 94\% = 38.5\%\)
Company A: \(25\% \times 75\% = 18.8\%\)

Feedstock = ~70% of net cash cost to produce

Feedstock Contribution Cost
Sugar ($/lb) \div \text{Overall Yield} \times \text{Density (lbs/gal)}
Gevo: \(\$0.10 \div 38.5\% \times 6.7 = \$1.74/gal\)
Company A: \(\$0.10 \div 18.8\% \times 6.7 = \$3.57/gal\)

Higher yield = less sensitivity

Sensitivity to $0.01/lb change in sugar cost
@ 38.5\% = $0.18/gal $7.56/bbl
@ 18.8\% = $0.37/gal $15.54/bbl

*Overall Yield = Pathway Yield \times Process Yield
Source: Gevo Process Estimates

© 2013 Gevo, Inc. | 17
Our Plants

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

Redfield Energy, SD - Joint Venture
- ~40 MGPY commercial isobutanol facility
- Entered into JV with 650 member Co-op in 2011 with economics, post retrofit, to be split approximately 50/50
ATJ Demonstration Facility near Houston
- Delivered >10K 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
Feedstocks
Gevo yeast technology converts any carbohydrate feedstock to isobutanol

Provides world wide opportunity for isobutanol manufacture

Provides risk reduction via multiple feedstocks versus oil price volatility

**Cost of Feedstocks**

![Graph showing the cost of feedstocks over time](image)

Source: NYMEX, CBOT, WSJ, Cosan
**Net Carbohydrate Costs**

1 bushel
Corn

2.2 gallons
Isobutanol

17 lbs
Animal Feed

---

**Example Calculation**

<table>
<thead>
<tr>
<th>Description</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$/bu corn</td>
<td>$6.50</td>
</tr>
<tr>
<td>Less: Animal feed co-product netback ($/bu corn)</td>
<td>(1.48)</td>
</tr>
<tr>
<td>Net starch cost ($/bu corn less co-product netback)</td>
<td>$5.02</td>
</tr>
<tr>
<td>$/MT Fermentable Sugar (based on net starch cost)</td>
<td>$292</td>
</tr>
<tr>
<td>Feedstock contribution cost / gal</td>
<td>$2.31</td>
</tr>
<tr>
<td>Gallon/bushel yield</td>
<td>2.2</td>
</tr>
</tbody>
</table>

**Sensitivity Table**

<table>
<thead>
<tr>
<th>Description</th>
<th>$4.00</th>
<th>$5.00</th>
<th>$6.00</th>
<th>$7.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn Cost ($/bu)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-product netback ($/bu)</td>
<td>$0.91</td>
<td>$1.14</td>
<td>$1.37</td>
<td>$1.59</td>
</tr>
<tr>
<td>Feedstock Contr. ($/gal)</td>
<td>$1.42</td>
<td>$1.78</td>
<td>$2.14</td>
<td>$2.49</td>
</tr>
<tr>
<td>$/MT Fermentable Sugar</td>
<td>$179</td>
<td>$224</td>
<td>$269</td>
<td>$314</td>
</tr>
</tbody>
</table>

A 10% change in iDGs™ = $0.09/gal ▲ EBITDA

---

Note: Gevo expected gal/bu isobutanol yield. Lbs/bu animal feed adapted from Iowa Corn Growers Association estimate for ethanol.
We believe our technology will allow us to make isobutanol with any cost-competitive carbohydrate source, not just corn

- Crop residues
- Forest products
- Wood
- Energy Crops
- Waste product residues

More biomass should increase the available pool of carbohydrates and keep costs relatively lower.
Today, U.S. is Advantaged in Feedstocks

Advantaged over Brazil in Infrastructure...

Transportation Infrastructure

Pipeline Infrastructure

Advantaged over Brazil in Price...

Cost of Feedstocks

Advantaged over Brazil in Scale and Protein Production...

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
<th>Carbohydrate Production</th>
<th>Protein Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largest Sugar Producer in Brazil</td>
<td>1.7MM</td>
<td>14 B lbs./yr.</td>
<td>0</td>
</tr>
<tr>
<td>Redfield Co-op, SD, USA</td>
<td>10MM</td>
<td>15 B lbs./yr.</td>
<td>7 B lbs./yr.</td>
</tr>
</tbody>
</table>

If only 1/3 of land is corn

Source: NYMEX, CBOT, WSJ, Cosan
Next steps – a look forward

Financial overview
Pathway to commercial production at Luverne

Q2 2013

Single Train Mode testing

- Complete bio-burden testing validating contamination reduction in Single Train Mode (STM)
- Run STM in batch mode demonstrating ability to produce batches with low contamination rates
  - Fermentation using dextrose
  - Demonstrate GIFT® system
- Deliver renewable isobutanol for conversion to ATJ and bio-PX

Q3 2013

Validate entire operation

- Run STM in batch mode
  - Fermentation runs using corn mash
  - Test operating systems throughout the plant
  - Operate with consistency
  - Complete commissioning

Q4 2013

Commercial operations

- Operate plant at initial commercial scale
  - Increase scale of production
  - Deliver product to customers
  - Produce and deliver iDGs™

2014

- Deliver renewable isobutanol for conversion to ATJ and bio-PX
Market Customer Commitment Timeline

2013

- Off-take agreement to sell to Sasol’s $1B international solvent business
- Partner with Mansfield Oil to market to the marine industry
- VP Racing Fuels agreement targets the small engine market
- Land O’Lakes Purina Feed, LLC off-take & marketing agreement to sell high-protein animal feed

2014

- Gevo addresses C4 void with LANXESS and others as Petro-chem feedstock shifts from oil to NGL resulting in 80% shrink in C4 yield
- Sell ATJ Fuel directly to DOD & Commercial Air carriers
- Gevo aligns with Total to evaluate second-gen biofuel blendstock

2015

- IBA conversion into Bio-PX
- JDA with Coca-Cola who aims to use PlantBottle® packaging for all their PET plastic bottles by 2020
- Toray to use Gevo’s PX and commercial renewable MEG to produce fully renewable PET for fibers and films