Financing Growth of the Bio-fuel Industry

Dr. Cole Gustafson, North Dakota State University
The Role of Woody and Agriculture Biomass for Energy Workshop
March 19, 2009
Morris

Sponsored by:
University of Minnesota Extension, WesMin RC&D; Minnesota Department of Natural Resources
www.extension.umn.edu/agroforestry
Financing Growth of the Bio-fuel Industry

Dr. Cole Gustafson
North Dakota State University

Morris, MN
Mar 19, 2009
Historical Path

- 2005 Renewable Fuel Standard
- Low corn prices
- Rising oil prices
- Production standards

Rapid Expansion
$3 billion New Investment
## 2007 Energy Independence and Security Act

<table>
<thead>
<tr>
<th>Year</th>
<th>Conventional Biofuel</th>
<th>Advanced Biofuel</th>
<th>Cellulosic Biofuel</th>
<th>Biomass-based Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>9.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>10.5</td>
<td>0.60</td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>2010</td>
<td>12.0</td>
<td>0.95</td>
<td>0.10</td>
<td>0.7</td>
</tr>
<tr>
<td>2011</td>
<td>12.6</td>
<td>1.35</td>
<td>0.25</td>
<td>0.8</td>
</tr>
<tr>
<td>2012</td>
<td>13.2</td>
<td>2.00</td>
<td>0.50</td>
<td>1.0</td>
</tr>
<tr>
<td>2013</td>
<td>13.8</td>
<td>2.75</td>
<td>1.00</td>
<td>*</td>
</tr>
<tr>
<td>2014</td>
<td>14.4</td>
<td>3.75</td>
<td>1.75</td>
<td>*</td>
</tr>
<tr>
<td>2015-2022</td>
<td>15.0</td>
<td>5.50-21.0</td>
<td>3.00-16.0</td>
<td>*</td>
</tr>
</tbody>
</table>
2008 Economic Emergency Stabilization Act

- Extension of numerous biofuel credits
- 50% write-off for cellulosic facilities
- $10/ton CO2 (oil recovery)
- $20/ton CO2 (permanent)

GAO estimates $1.1 bil. over decade
Iowa Ethanol Spread
Gross Revenue - Feedstock+NG

<table>
<thead>
<tr>
<th>Date</th>
<th>$-</th>
<th>$0.25</th>
<th>$0.50</th>
<th>$0.75</th>
<th>$1.00</th>
<th>$1.25</th>
<th>$1.50</th>
<th>$1.75</th>
<th>$2.00</th>
<th>$2.25</th>
<th>$2.50</th>
<th>$2.75</th>
<th>$3.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct-06</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></td>
</tr>
<tr>
<td>Jan-07</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></td>
</tr>
<tr>
<td>Apr-07</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></td>
</tr>
<tr>
<td>Jul-07</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></td>
</tr>
<tr>
<td>Oct-07</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></td>
</tr>
<tr>
<td>Jan-08</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></td>
</tr>
<tr>
<td>Apr-08</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></td>
</tr>
<tr>
<td>Jul-08</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></td>
</tr>
<tr>
<td>Oct-08</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></td>
</tr>
</tbody>
</table>

Source: Wells Fargo Ag Economics, USDA AMS
Creditors are Monitoring

- **AgCountry Farm Credit Services** (DeVos, 2008)
  - Financed 44 of 174 plants operating
  - Three (3) plants closely watched
  - One (1) plant in difficult position

- **VeraSun** (5 plants sold to Valero, $280 million)
How Can This Guy Be Optimistic About Industry’s Future?
California Secures Renewable Energy Future

- Dec. 11, 2008  California Air Board adopts “Scoping Plan”
- 33% of all energy must be renewable by 2020
- New homes must be energy self-sufficient
- Carbon footprint back to 1990
- Adopted in state with greatest economic problems (housing, $48bil. deficit)
California Market Limits
Corn Ethanol


<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Carbon (g/mj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>95.86</td>
</tr>
<tr>
<td>Corn ethanol</td>
<td>69.40</td>
</tr>
<tr>
<td>+ Land Use</td>
<td>30.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>99.40</strong></td>
</tr>
</tbody>
</table>
2009 Biofuel Work Plan

- Corn Cob Harvest
- Sugarbeet to Biofuel
- Spiritwood Biomass Contracting
Spiritwood Biomass Contract

• What, When, Where?
• Moisture
• Premiums/Discounts
  – Foreign matter (dirt)
  – Purity
  – Spoilage
Bio-Fuel Industry Challenges

• Few Lenders/Sweeps/Wall Street
• Lack of Production Benchmarks
• Federal Policy Doesn’t Align w/ Industry
Can Bio-Fuels Avoid Future Road Bumps?
Questions?

cole.gustafson@ndsu.edu
(701) 231-7096