Future of the Bioeconomy and Biofuels: Overview, Industry, and Agriculture?

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Ethanol Explosion

Source: Renewable Fuels Association and preliminary CARD projections

Billion Gallons

Source: Renewable Fuels Association and preliminary CARD projections
Renewable Fuels Standard

Source: Renewable Fuels Association and the State of the Union Address

Billion Gallons


Source: Renewable Fuels Association and the State of the Union Address
Use of Iowa corn – 2005-2006

Source: Iowa Corn Growers Association
### Possibilities for Increasing Corn Acreage?

<table>
<thead>
<tr>
<th>State</th>
<th>2000-2006 Average Corn (acres)</th>
<th>2000-2006 Average Soybeans (acres)</th>
<th>Percentage of Acreage in Corn</th>
<th>If the States Followed a 2/1 Rotation Corn (acres)</th>
<th>If the States Followed a 2/1 Rotation Soybeans (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>11,421</td>
<td>10,236</td>
<td>53%</td>
<td>14,438</td>
<td>7,219</td>
</tr>
<tr>
<td>Indiana</td>
<td>5,657</td>
<td>5,571</td>
<td>50%</td>
<td>7,486</td>
<td>3,743</td>
</tr>
<tr>
<td>Iowa</td>
<td>12,386</td>
<td>10,450</td>
<td>54%</td>
<td>15,224</td>
<td>7,612</td>
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<tr>
<td>Kansas</td>
<td>3,314</td>
<td>2,850</td>
<td>54%</td>
<td>4,110</td>
<td>2,055</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1,217</td>
<td>1,279</td>
<td>49%</td>
<td>1,664</td>
<td>832</td>
</tr>
<tr>
<td>Michigan</td>
<td>2,221</td>
<td>2,036</td>
<td>52%</td>
<td>2,838</td>
<td>1,419</td>
</tr>
<tr>
<td>Minnesota</td>
<td>7,214</td>
<td>7,257</td>
<td>50%</td>
<td>9,648</td>
<td>4,824</td>
</tr>
<tr>
<td>Missouri</td>
<td>2,864</td>
<td>5,050</td>
<td>36%</td>
<td>5,276</td>
<td>2,638</td>
</tr>
<tr>
<td>Nebraska</td>
<td>8,307</td>
<td>4,743</td>
<td>64%</td>
<td>8,700</td>
<td>4,350</td>
</tr>
<tr>
<td>Ohio</td>
<td>3,371</td>
<td>4,493</td>
<td>43%</td>
<td>5,243</td>
<td>2,621</td>
</tr>
<tr>
<td>South Dakota</td>
<td>4,350</td>
<td>4,179</td>
<td>51%</td>
<td>5,686</td>
<td>2,843</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>3,636</td>
<td>1,610</td>
<td>69%</td>
<td>3,497</td>
<td>1,749</td>
</tr>
</tbody>
</table>
Outlook for Crude Oil Prices

- Crude oil futures contract prices for delivery through 2011 – $60-65/bbl
- Energy prices likely in $60-68/bbl range – Global Insight
  - Real and perceived risk
  - Surplus production capacity
  - Economic growth
  - Growing global demand
- Important caveat with rapid ethanol supply expansion
Biofuel Industry Issues

- Corn-based ethanol facing increasing capital costs with rapid expansion
- Ethanol and co-product transportation challenge
- Structural change and industry “shake-outs”
  - Initially, fragmented local firms for local growth
  - Growing spatial, vertical, and product integration
  - Few large firms will likely drive the industry
- Local economic growth and job tradeoffs
- Food, feed, and fuel tradeoffs
- Environmental and climate impacts
Is Biomass Feedstock the Answer and When?

- Significant R&D challenges for biomass feedstock?
  - Yield, fertility, and soil?
  - Biomass harvesting, transport, and storage?
  - Enzymes, catalysts?
- Conversion platform and biofuel form?
- Production from pilot plants beginning in 2009
- Select most efficient platform for commercialization in 2013
- Scale-up industry with commercial impact about 2015
- Impacts corn price when significant to fuel market
Outlook for Biofuel Industry

- Potential of corn-based ethanol industry to contribute to energy security
  - CARD long run equilibrium ~30B gal at $4 corn
  - 14B gal constraint with conventional engine; FFV?
- Biofuel industry maturing
  - Large integrated businesses
  - Efficient local firms
  - More stable biofuel market
- Biomass feedstock important after 2015
Current Iowa Policies and Incentives

Ethanol Infrastructure Cost-Share Program
Alternative Fuel Vehicle Grants
Ethanol and Biodiesel Tax Credits
Biofuels Infrastructure Grants
Alternative Fuel Loan Program
E85 Fuel Exclusivity Contract Regulations
State Renewable Fuels Standard
Alternative Fuel Vehicle Acquisition Requirements
Alternative Fuel Use Policies
Alternative Fuel Tax Rates
Alternative Fuel Labeling Requirements