Ultimate Session Question: How Much Can Ethanol Help Reduce Dependence on Oil?

Major Issues Need To Be Addressed

- Feedstock Supply and Costs (Corn and Other Cellulosic Feedstocks)
- Competition for the Land for Other Uses
  - Food
  - Biomass for Co-Firing with Coal or Dedicated Biomass Gen
  - Growing Commercial, Residential and other Industrial Facilities
- The State of the Technology and “Learning”
- Infrastructure Investments Necessary and Risks Perceived – How Fast Can Investments Grow and What Returns Will Be Required BY Investors?
Ultimate Session Question: How Much Can Ethanol Help Reduce Dependence on Oil?

- Consumer Acceptance - how can we assure that E85 and Gasohol will be demanded if produced?
- Fuel Availability, vehicle range, getting the fuel to market
- Net energy balance for ethanol production - how much of the energy that we put in do we get out as ethanol? Is it different for other petroleum technologies like CTL, GTL, Oil Shale?
- Will a large increase of ethanol production and consumption result in lower Persian Gulf imports?
Speakers and Topics

- Tony Radich - Brief Summary of EIA’s Ethanol Outlook (5 Min)
- Hosien Shapouri – US Grain Ethanol Industry Outlook (20 Min)
- Kevin Lindemer - Future of Oil and Implications on Ethanol (20 Min)
- Bob Dineen – Helping Break America’s Oil Addiction (20 Min)
- John Felmy – asks the first question of the speakers (3 min)
Outlook for U.S. Biofuels

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Foreign Low-Sulfur Light Crude Price Cases

The graph shows the price per barrel of foreign low-sulfur light crude oil from 2003 to 2028. The price is measured in 2004 dollars. There are three lines on the graph:

- **High Price** (red line)
- **Reference Price** (blue line)
- **Low Price** (green line)

The graph indicates that all three prices started at a similar level in 2003 and have trended upwards over the years. The high price has been the highest throughout the period, followed by the reference price and then the low price.
U.S. Ethanol Use By Crude Oil Price Case (billion gallons per year)
Economic Potentials for Biofuels Production in AEO2006

- Yellow Grease Biodiesel
- Soybean Biodiesel
- Corn Ethanol
- Cellulose Ethanol

(billion gallons per year)
### Ethanol Cost by Technology, 2012 (2004 dollars)

<table>
<thead>
<tr>
<th></th>
<th>Corn Dry Mill</th>
<th>Cellulose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Material</td>
<td>Corn</td>
<td>Crop Residue, Switchgrass</td>
</tr>
<tr>
<td>Co-product</td>
<td>Distillers’ Dried Grains with Solubles</td>
<td>Electricity to Grid</td>
</tr>
<tr>
<td>Plant Size</td>
<td>50 million gallons per year</td>
<td>50 million gallons per year</td>
</tr>
<tr>
<td>Capital Cost</td>
<td>$65 million</td>
<td>$369 million</td>
</tr>
<tr>
<td>Raw Material Cost</td>
<td>$0.90 per gallon</td>
<td>$0.49 per gallon</td>
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<tr>
<td>Non-energy Operating Cost</td>
<td>$0.25 per gallon</td>
<td>$0.63 per gallon</td>
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<tr>
<td>Cost of Delivered Energy</td>
<td>$0.21 per gallon</td>
<td>$0.00 per gallon</td>
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<tr>
<td>Co-product Value</td>
<td>-$0.16 per gallon</td>
<td>-$0.12 per gallon</td>
</tr>
<tr>
<td>Variable Cost</td>
<td>$1.20 per gallon</td>
<td>$1.00 per gallon</td>
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</tbody>
</table>
Comparison: West North Central Division Ethanol Costs Including Tax Credit Versus Gasoline

- Conventional Gasoline
- Cellulose, maximum of 0.17 Bgal/yr
- Dry Mill, maximum of 9.1 Bgal/yr

(2004 dollars per gallon)