Biofuels: Implications for Prices and Production

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Executive Summary

- Ethanol mandated to reduce dependence on imported petroleum.
- Other benefits include economic development, reduction of greenhouse emissions, and support of farm incomes.
- Ethanol production is highly subsidized and the domestic industry is protected by an import tariff.
- High crude oil prices contribute to the success of ethanol.
- Ethanol production will exceed 5 billion gallons this year and 6 billion in 2007, using 2.15 billion bushels of corn in the 2006-07 marketing year.
- Ethanol demand will likely push corn prices to a higher level for an extended period.
- U.S. corn acreage will increase, but supplies will remain tight.
- Higher corn prices likely negatively impact non-fuel users, contribute to higher land values/rents, and encourage an increase in foreign production.
- Strong ethanol demand may result in significant policy changes, including income supports, trade, and conservation.
- To date, the contribution of ethanol production to the U.S. fuel supply has been modest.
- Biofuels mandates and subsidies are expected to remain, with Congress expressing a lot of support for biofuels.
- Support could be reconsidered if corn prices become punitive to other users, food prices increase, or society becomes disappointed with its contribution to the fuel supply.
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Why Ethanol?

Convert relatively abundant domestic sources of energy into a substitute for imported petroleum
Energy Conversion

Natural Gas
Electricity
Petroleum
Coal
Methane
Sunlight

Ethanol
DDGs
Other Benefits

• Economic Development
• Reduce Greenhouse Emissions
• National Security
• Support Farm Income
U.S. Ethanol Biorefinery Locations

Source: Renewable Fuels Association
Economics of Ethanol

Currently economically feasible due to:
- $.51/gallon blender tax credit
- $.54/gallon import tariff
- High crude oil prices
- Mandates
Crude Oil Prices, Cushing, OK WTI Spot Price, Jan. 2, 1986 – Nov. 21, 2006

Source: U.S. Department of Energy, Energy Information Administration
Ethanol and Unleaded Gasoline Prices, F.O.B. Omaha, Nebraska, January 2004 - October 2006

Source: Nebraska Ethanol Board; Nebraska Energy Office
U.S. Ethanol Production, 1980-2006

Source: Renewable Fuels Association and Original Calculations

*2006 Projected
U.S. Corn for Fuel Use, 1975/76-2006/07

Source: USDA *2006/07 Projected
Implications

Prices  a new higher plateau?
        impact on other users?
        impact on land values/rents?

Supply  will corn acreage increase?
         will yields continue to increase?

Stocks  will a reserve be required?

Policy  income supports, trade, conservation

Fuel Supply  a significant contribution?

Source: USDA
Central Illinois Corn Price, September 1-November 22, 2006
Function of Prices

- Make sure all acres are planted
- Bring CRP back into production?
- Shift acres to corn in the US
- Encourage foreign production
- Limit expansion of non-fuel uses of crops
U.S. Corn Exports, 1975/76-2006/07

Exports (million bushels)

Source: USDA

*2006/07 Projected
U.S. Corn Feed and Residual Use, 1975/76-2006/07

Feed and Residual (million bushels)

Source: USDA

*2006/07 Projected
U.S. Dried Distillers Grain (DDG) Production, 1975/76-2006/07

Source: Original Calculations

*2006/07 Projected
U.S. Corn Acreage, 1975/76-2006/07

Source: USDA

*2006/07 Projected
U.S. Corn Yields, 1975/76-2006/07

Source: USDA *2006/07 Projected
Ending Stocks of Corn

million bushels

79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02*03*04*05*06*
Policy Implications

• Income supports not needed?
• Alter CRP contracts?
• Allow more ethanol/sugar imports?
• Soil and water conservation?
• Mandated rationing plans?
• Re-think biofuel subsidies?
Contribution to Fuel Supply

- 6 billion gallons of ethanol requiring about 2.2 billion bushels of corn
- US consumes 140 billion gallons of unleaded/yr
- Ethanol = 2/3 BTUs of unleaded gasoline
- 6 billion gallons of ethanol = 4.02 billion gallons of unleaded, or approximately 3 percent of gasoline supply
**U.S. Ethanol Production Relative to Unleaded Gasoline Use, 1980-2005**

Source: Renewable Fuels Association; U.S. Department of Energy, Energy Information Administration
Is the Energy Balance Improving?

<table>
<thead>
<tr>
<th>USDA- Dry Milling</th>
<th>1996</th>
<th>2001</th>
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<tbody>
<tr>
<td>- Net energy w/o co-product</td>
<td>+11%</td>
<td>+10%</td>
</tr>
<tr>
<td>- Net energy with co-products</td>
<td>+37%</td>
<td>+77%</td>
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* Difference is in the magnitude of energy credit for co-products

*50% energy balance, means ethanol’s net contribution to fuel supply is smaller than gross contribution (3%)