Fuel From the Farm

Liquid Gold:
By 2008, the ethanol industry is expected to produce about 7 billion gallons a year.

Ethanol
Biodiesel America
Many Advantages of BioFuels

- Renewable—produced each year
- Reduced dependency on foreign crude oil
- Military costs of foreign dependency is enormous
- Environmental enhancements in tail pipe emissions
- Enhance demand for corn, sorghum, soybeans, etc
- American rural economic development
- Raise prices of crops
- Reduce federal farm program payments (LDP’s & CCP’s)
- Raise incomes of crop producers
- Raise land values
Liquid Fuel in the U.S.

- We use about 140 billion gallons of gasoline/year
- About 65 billion gallons of diesel, kerosene, etc.
- U.S. imports about 60% of crude oil
- About 30% of our crude is from places:
  - Not friendly to the U.S.
  - Not very politically or economically stable
- There is a movement in some countries to gain national control of oil rather than corporate control
- Oil is beginning to be used as a negotiating tool
What Changed?

• Energy Prices Moved Up Sharply
• Policy
  – Federal Renewable Fuels Standard: 7.5 b gallon by 2012
  – 25 States restrict MTBE use
  – Fed Gov’t no longer protects blenders who use MTBE
• General Tone- Less Foreign Dependence
  – Politicians
  – Car Companies
  – Consumers

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### Rough Estimate of Indiana Corn Movement

**(850 Million Bu/year) 2006**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fed in State</td>
<td>171m</td>
<td>19%</td>
</tr>
<tr>
<td>Process in State</td>
<td>261m</td>
<td>29%</td>
</tr>
<tr>
<td>Moved to S.E. or Export</td>
<td>468m</td>
<td>52%</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td>850m</td>
<td>100%</td>
</tr>
</tbody>
</table>

- **2** New Energy-South Bend and Iroquois-Rensselear 140 million gallons = 52 million bu. corn

- **6** plants under construction: Bluffton, Clymers, Harrisville-Randolph County, Linden, Marion, Portland: 189 million bushels of corn

- **6** Additional State Announced- Working with ISDA
  240 million bushels of corn

- **18** Private announcements --- to considering *(Purdue List)*
Tipton 100 M

- Existing
- Under Construction
- State Announced-ISDA
- Others considering
- Total

% '06 Prod

- Existing 6%
- Under Construction 22%
- State Announced-ISDA 28%
- Others considering 47%
- Total 103%
The New International Symbol for ‘Gas Station’
Corn Breakeven Price For Ethanol:
November 2006 Estimated Costs

- $0.25 Additive + $0.51 Subsidy
- With $0.25 Additive
- Energy Only

Subsidy Value
Additive Value
Energy Value

Corn Breakeven @ $60 Crude
Subsidy = $4.82/bu.
Additive = $3.05/bu.
Energy = $2.19/bu.

Purdue Estimates
Ethanol’s Growth?

- Lower Energy Prices
- Policy
  - Federal Subsidy
  - State:
    - MTBE Restrictions
    - State RFS
- Much Higher Corn Prices
- Higher food prices
- Technology-cheaper energy sources

U.S. Gasoline use is about 140 billion gallons per year.
Ethanol has about 70% of the energy of gasoline.
Corn Breakeven Price For Ethanol:
November 2006 Estimated Costs: Variable Subsidy

- With $.25 Additive
- Energy Only
- Variable Subsidy $65-$40
- Fixed Subsidy

Corn Price/bu.

Crude Oil: $/barrel

Purdue Estimates
Ethanol Capacity: Existing + Under Construction:
Source: Renewable Fuels Association
BioFuels Consequences
(Some Unintended)
(Many Under Reported)

- Financial losses for livestock producers in the next few years
- Higher food prices in World and U.S.
- Much higher U.S. energy costs (will depend on a host of factors)
  - Wholesale Ethanol price has been 34% HIGHER than gasoline since 2000
  - And, ethanol has about 30% LESS energy
- Federal support is dramatically:
  - Over-stimulating ethanol investment, far beyond the market signals
  - Huge consequences if politicians change their mind
- Federal Government support to ethanol will exceed average farm program payment savings by early 2008
  - Then ethanol becomes a net new costs to the federal government
For 2007: Production up 1% to 2%. Prices mid to mid-$40 this winter, then near $50 for spring and summer. 2007 and 2008 adjustment period to higher feed prices. Hog prices finally higher by late-2008 and 2009.
Indiana Farm Faces in 2007

Crops

Livestock
Markets Must Find Balance Between Food and Fuel.
1. Controled and Sustainable

Vs.

2. Boom and Bust Cycle
2006  2007:
Corn     -  2.9%   +12%
Beans  +  3.8%  -10%
Wheat  +  1.1%  +  2%

Outside Rotation Comfort Zone
Production: Acres = +1% / yr  Yield = 1.7% / yr
Corn Yields Per Acre: 152 in 2007 then 1.7% Per Year Increase
How Quick Can Ethanol Grow?

- Feed
- FSI-NonFuel
- Ethanol
- Exports

Billion Bushels

Crop

3 4 5 6 7 8 9 10 11 12 13 14 15
Implications

• **Crop prices:**
  – Much higher across the board
  – Much more volatile

• **Government programs**
  – Government as a source of income is minimized
  – Free put from the government has little value

• **Input impacts**
  – Higher cropping incomes
  – Higher land values and cash rents
  – Price of inputs bid up as well
CORN NEAREST FUTURES... monthly OHLC plot

As of 03/01/07

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Central Indiana Cash Corn Prices 1995/96

The Record Price Year

$5.50

$5.00

$4.50

$4.00

$3.50

$3.00

$2.50

$2.00

$1.00

Sept Oct Nov Dec Jan Feb Mar Apr May June July Aug
Annualized Inflation Rates

Food
All Items
### 2007 Estimated Crop Budget:

**Indiana: March 12, 2007**

<table>
<thead>
<tr>
<th>Prices</th>
<th>Corn</th>
<th>Soybeans</th>
<th>Wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvest Futures</td>
<td>$4.0300</td>
<td>$8.0400</td>
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<tr>
<td>Expected Basis</td>
<td>-0.20</td>
<td>-0.70</td>
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<tr>
<td>Expected Cash Price</td>
<td>$3.54</td>
<td>$7.74</td>
<td>$4.13</td>
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<tr>
<td>Approximate Loan</td>
<td>$5.12</td>
<td>$2.50</td>
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</table>

<table>
<thead>
<tr>
<th>Estimated Yields and Returns/Acre Above Variable Costs</th>
</tr>
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<tbody>
<tr>
<td><strong>Land Quality</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td><strong>Low</strong></td>
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<td></td>
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<tr>
<td><strong>Average</strong></td>
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<tr>
<td><strong>High</strong></td>
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Consider tearing up wheat and seeding to corn----$35 to $90 better anticipated return.

Corn Beats Beans by $70 to $113 per acre.
• **High yielding technology**
  – Strong incentives to increase yields
  – More inputs/ which ones
  – More seed technology-genetic engineered

• **Greater crop production specialization**
  – Specific attribute genetics
    • Oil yields
    • Starch yields
    • Nutritional value-animals
  – Movement to monocultures for specific end users?
  – Compressed planting and harvest windows
    • Machinery capacity at planting and harvest
    • GPS/Monitoring systems/Auto steer
    • Human capacity at planting and harvest
    • Grain handling capacity
- Farm production systems
  - Which crops-cellulose
  - Biomass logistics
  - Rotations or monocultures
  - Which crops on which land
  - Which practices to maximize yields

- Supply Assurance
  - Utilization of distillers grains-maximizing the value
  - Production of distillers grains-fractionation
  - Increasing inclusion rates in ruminants and monogastrics
  - Impacts on animal product quality
• **Markets:**
  – Transportation issues
  – Storage issues
  – Risk management
  – Shift from a commodity industry to a specific attribute-identity preserved agriculture

• **Policy:**
  – Intersection of food policy, farm policy and national security
  – Balance between fuel and food and implications
  – Need for subsidies and role of taxpayers
  – Tradeoff between taxpayers, fuel consumers, food consumers, crop farmers, animal industries and taxpayers

• **Engagement Education**

• **Undergraduate and graduate enrollments**
**Biodiesel**

- Value in diesel as energy, lubricant, environmental
- Many other animals fats and veg oils (Soy = 73% biodiesel today)
- 75 million gallons today—63 billion gallons of diesel, etc. (distillates) (.1%)
- Growth expected to 225 million gallons by 2015

- Subsidy is $1.00 per gallon
- Feedstock costs is high:
  - Soyoil----$1.50 to $2.10/gallon  (20 cents to 28 cents oil)
  - Corn-------$.74 to $1.11/ gallon  ($2.00 to $3.00/bu.)
  - Crude oil--$1.19 to $1.67/gallon  ($50 to $70/barrel)

- 1 Gallon soyoil = 1 gallon biodiesel------7.5 pounds of oil per gallon
- Oil yield = 11.25 pounds/bu.*50 bushels =
  Soybeans = 75 gallons/acre
  Canola = 111 gallons/acre
  Castor Beans= 156 gallons/acre

*Economics not as strong as ethanol*
Take care of business in 2007 and have a little fun!