Ethanol 2008

Ethanol: Producing Food, Feed and Fuel

Presentation by Todd Sneller,
Nebraska Ethanol Board/Governors’ Ethanol Coalition

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Marketing Advanced Biofuels: Lincoln, NE- 1933; Governor fills ‘er up with corn alcohol gasoline (E-10)
For 100 years the Biofuels debate has been about market share.

For 10 decades the debate has been about public policy.

“Food vs Fuel” is contrived.

Public Policy is clear: Biofuels will constitute a portion of world transportation fuels.
Introduction

- A popular **myth** is that “Ethanol production requires a choice between food and fuel.”

  **This is demonstrably false.**

- Crop genetics, agronomic practices and technology provide agriculture the means to produce more food and biofuel. Sugar crops and refined products yield ethanol.

- Grain ethanol production technology continues to yield greater output of food, feed and fuel each year.

- **The steep rise in petroleum price is the primary reason for increased food crop prices.** 500% price increase in past decade.
Corn in the Crosshairs

- KEY FACTORS in supply & demand:
  - Acres
  - Yield (weather, genetics, etc)
  - Exports
  - Feed use
  - Inventory

- Sufficient supply; speculation = price

- Impact on food price minor compared to:
  - Energy costs up 60%
  - Food prices within historical 2-4% (5.5%)?
U.S. Corn Utilization

- Ethanol is only a fraction of corn usage

Source: USDA, ERS; Feed Outlook, June 13, 2007
Note: Percentages based on Total Supply
Converting Corn to Food and Fuel: Ethanol Production Processes

- Ethanol Production: the Dry Mill Process
- Ethanol Production: the Wet Mill Process
- Approximately 18% of U.S. corn production used for ethanol in 2007 (equal to exports).
Allocation of Corn Kernel

Components of Yellow Dent Corn

- Moisture: 9.5%
- Starch: 15.0%
- Protein: 9.5%
- Fat: 4.0%
- Fiber: 62.0%

Source: Corn Chemistry and Technology, 1999
Note: Wet Weight
Food AND Feed

- Distillers feed products contain the protein fraction of the grain.
- Distillers feeds replace corn in livestock diets.
- Distillers feed products can be adjusted to meet any livestock feed ration.
- Distillers feed products can incorporate readily available, poor quality roughage that perform well in livestock rations, in wet or dry form.
- Distillers feeds yield better gain at lower cost than conventional corn diets.
Corn and Oil Price Trends

- The real price of oil has increased dramatically, especially relative to corn.
  - If corn prices increased by the same level as oil prices in the past 20 years, corn would now cost $13.50 per bushel.
  - Inflation adjusted price of Dec '73 corn futures would be $16.16/bu in 2008 dollars.

- Higher gas and oil prices leaves less disposable income for consumers.
- Energy cost increases in the past year far outpaces historical inflation.
Higher Energy Prices = Higher Food Costs

- Average corn price for 2007 = $3.40/bu. An 18 oz. box of corn flakes includes about 5 cents of milled corn.

- At retail, the box of corn flakes costs $2.49. Transportation and energy costs associated with processing constitute the majority of price to the consumer.

- It is a short distance to the farm gate; it’s a long road to the grocery shelf.
The Cheap Corn Policy

- U.S. agricultural policy historically promotes cheap corn. Livestock feeders and food processors have profited.
- Cheap corn is expensive to taxpayers. To ensure sufficient corn supplies, corn producers and exporters are subsidized.
- In 2007 the corn market became demand driven; export demand, biofuels, feed, food...
- Market demand reduces the cost of government farm programs.
Intended Consequences

- A primary goal of state and national ethanol policy has been to stimulate the price of corn and other commodities via “new uses” and “value-added” programs. LB 776-1971
- “…study examines what would happen if we were to discontinue present farm subsidy programs and use this money to subsidize energy production.” APIUC brochure-1972
- President Bush about Ag Secretary Johanns: “a strong proponent of alternative energy sources, such as ethanol…we’ll continue policies that are pro-growth, pro-jobs and pro-farmer.” 2004
The Cost of Energy: Oil Prices

- “These higher (oil) prices will flow throughout the economy ... increased shipping costs will almost certainly be passed on to consumers.”
  - Tim Evans, Energy Analyst, Citigroup
- Products made from petroleum itself ... are likely to be more expensive, and that in turn could push up the cost of food.
  - Associated Press
- A $1 increase in the gallon price of gas has 2 to 3 times the impact on food prices as a $1 increase in the bushel price of corn.
  - National Corn Growers Association
- “…everything by truck...at $3.79 diesel.”
  - Seward grain truck driver
The Cost of Energy: Ethanol Reduces Gasoline Prices

- There is no chance of lower energy prices “absent a severe recession or depression.” Oil prices could top $200 a barrel in the next decade.” Philip Verleger, Energy Economist

- “During the past seven years the rack price for ethanol blends at Nebraska terminals has been below the price of 87UNL for all but five months.” S. Sorum, Analyst
Increased Ethanol Production = Lower Prices

- U.S. Gasoline Demand Trend:
  - 1.3% annual increase from 1971-2007
  - 0.6% annual increase in 2007
  - 0.4% annualized increase in early 2008
  - “Ethanol boom may stifle U.S. gasoline demand.” Reuters, 2/14/08
  - “Ethanol blending could help ease U.S. refining bottlenecks and that could be ultimately reflected in lower prices at the pump.” AG Edwards Analyst E. Wittenauer 2/14/08
  - “…oil and gasoline prices would be about 15% higher than they are now if not for biofuels.”
  - Francisco Blanch, Merrill Lynch analyst
Ethanol Acceptance by Consumers

- 50+ % of all gasoline sold in the US contains ethanol.
- In several states >75% of gasoline contains ethanol.
- Ethanol blend prices are generally 10 cents lower.
- Net Ethanol price at wholesale today is more than $1.50+/gal lower than gasoline.
- Higher blends may emerge in the marketplace.
- E-85 sales are increasing; infrastructure needed.
- More than 7 million FFVs on road in US.
Corn Ethanol: Bridge to the Future

- Ethanol from corn
- Ethanol from cellulose
- Higher alcohols (butanol), green gasoline/diesel
- True biorefineries
  - Biobased products
  - Chemicals
  - Petroleum substitutes

Source: GM, University of Toronto
Seven Key Points to Take Home

- High oil prices raise all other prices
- Average oil prices will continue to increase as oil production has already peaked
- Ethanol lowers gasoline prices
- Energy prices affect food prices more than grain price
- Food selling price fluctuation is a function of food supply and demand, not a function of food input costs. In the U.S. food prices rose 4.5% during past year; without ethanol demand price increase would have been 4.25%
- Market corrections will eventually moderate the price of commodities like corn; corn price down $2/bu
- Increased cellulosic ethanol production will help mitigate the “food vs. fuel” myth
Putting Water Use in Context

- Virtually all types of manufacturing use water at some point in the production process.

- Current ethanol processing technology uses approximately 3 gallons of water for each gallon of ethanol.

- Ethanol process improvements indicate water use can be reduced to 1.5 to 1.
Water Conservation Opportunities

- Reduce Energy Consumption (less cooling tower evaporation & blowdown)
- Recycle waste and blowdown streams
- Treat makeup water (less blowdown)
- Use air or groundwater to reject heat (less evaporation and blowdown)
Water Conservation Opportunities

Gallons Fresh Water/ Gallon Ethanol less than:

• <3 - Current Best Practice
• 1.5 - Achievable with proven technology at extra capital cost
• 0 - Possible in future with new technologies
Putting Water Use in Context
(or The End?)

- 22 ethanol plants are currently operating in Nebraska; 4 plants are actively under construction; 37 additional plants have been proposed for Nebraska sites. If ALL current and proposed plants were operating, they would use about two-tenths of 1 percent of the water pumped in the state.*
- 94% of corn produced in U.S. in rain fed.

*Based on USGS estimates.
A large (100 mgy) ethanol plant uses the same amount of water annually as it takes for four center-pivot irrigation systems to water a section of land.

In water-short area, ethanol plant developers buy land that has irrigation wells and convert the water use from irrigation to ethanol production.
Ethanol production requires less than one-twelfth of the water needed to refine crude oil into energy products like gasoline.

A barrel of crude oil yields 19.5 gallons of petroleum, using 1,851 gallons of water in the process. The water needed to produce one gallon of gasoline would produce more than 30 gallons of ethanol.*

*USGS estimates