

## **Ethanol In the Motor Fuel Pool :Supply, Demand and Policy Considerations**

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At

Center For Energy Studies  
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# Introduction

- Energy Policy Research Foundation Inc. (EPRINC): successor organization to the Petroleum Industry Research Foundation Inc. (PIRINC)
  - Founded in NY in 1944
  - Re-imagined in DC in 2007 as EPRINC
  - EPRINC brings policy analysis and industry economics to bear on current energy issues

# Agenda

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- Part I: Ethanol Comes of Age
- Part II: Corn
- Part III: Vehicle Fleet Constrains Ethanol Consumption
- Part IV: Refiners
- Part V: Energy Security/ Oil Imports
- Q & A

# Part 1: Ethanol Comes of Age

# Ethanol is NOT Oil

- **Volume vs. Energy Content:** Btu content is only 2/3rds gasoline
- **Volumes do not hold comparable energy value;** current \$2.17/gal ethanol price is the energy equivalent of \$3.24 gasoline
- **Physical issues:** Mix tends to separate; attract water. Can't be shipped by pipeline
- **Expensive transport:** 75% by rail; 25% truck; oil moves by pipeline at 1/4<sup>th</sup> cost
- **Mixture has short shelf-life:** blended locally
- **Gallons vs. Barrels:** Ethanol industry measures in gallons per; petroleum in barrels per day. Optics of large numbers.

# Some Background

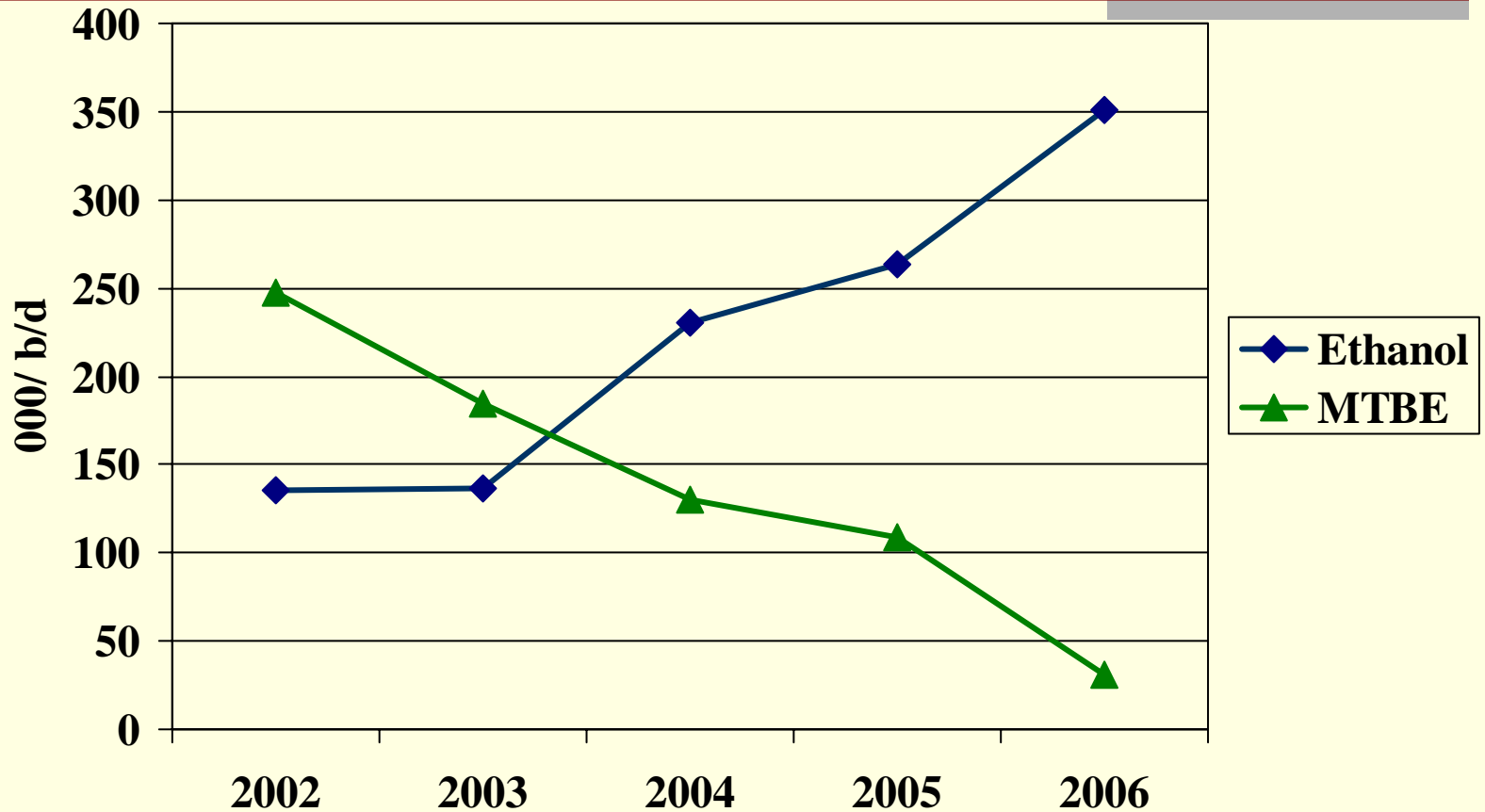
- Used as a high octane motor fuel since internal combustion invented
- Energy Tax Act of '78 started the federal tax exemption 4 cents/gal “gasohol”
- American Jobs Creation Act of 2004—51 cents per gal for ethanol blended
- EPA Act 05 mandates—4.0 bil gals in 2006; 7.5 bil gal in 2012

# Some Background

*(continued)*

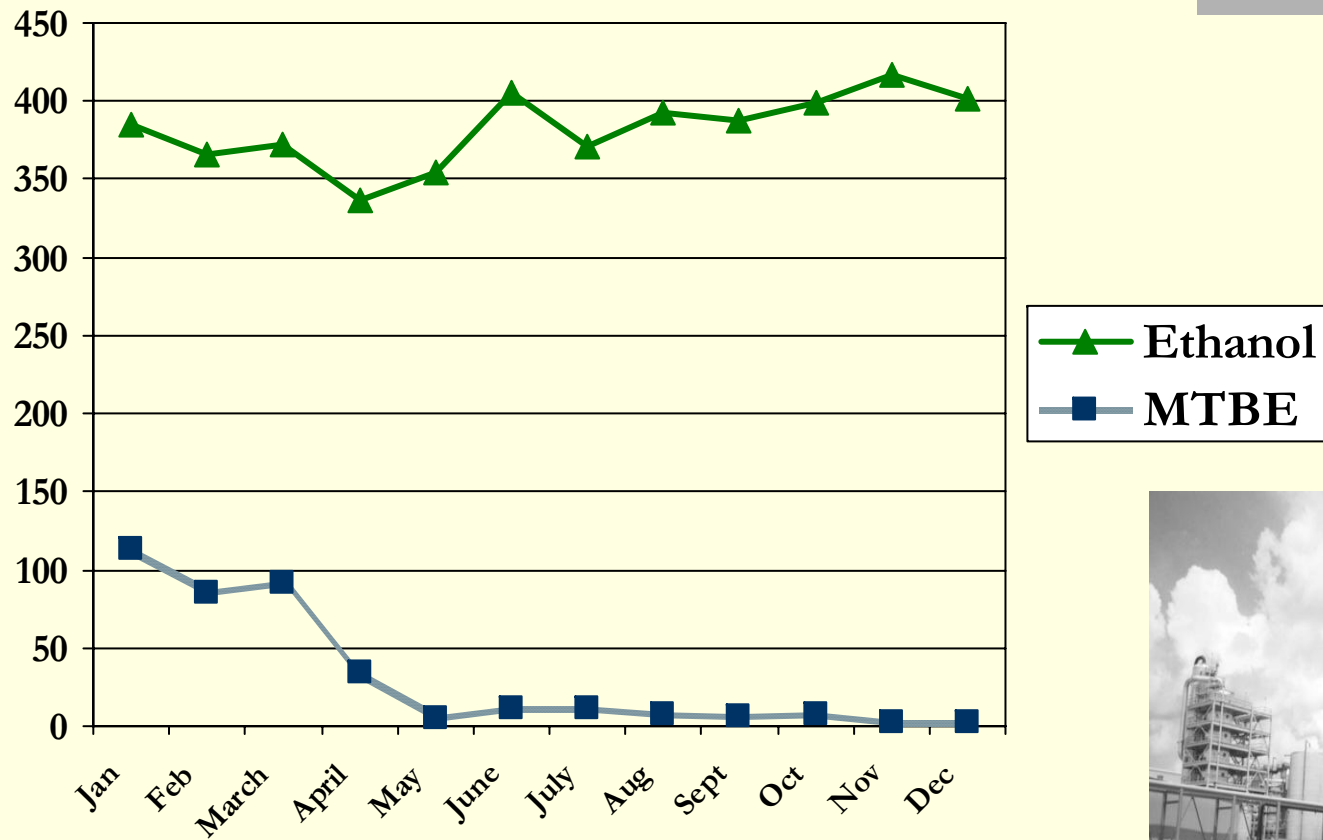
- MTBE was a blending component of choice, adding oxygen content and boosting octane. Needed to make oxygenated gasoline.
- MTBE Phase-out:
  - In process since 2000
  - Consumption peaked at about 300,000 b/d
  - Zeroed-out in 2006
- Essential and complimentary to making gasoline
- Max MTBE use: ~300,000 b/d
- Now replaced with ~400,000 b/d ethanol

# Ethanol and MTBE Consumption 2002-2006



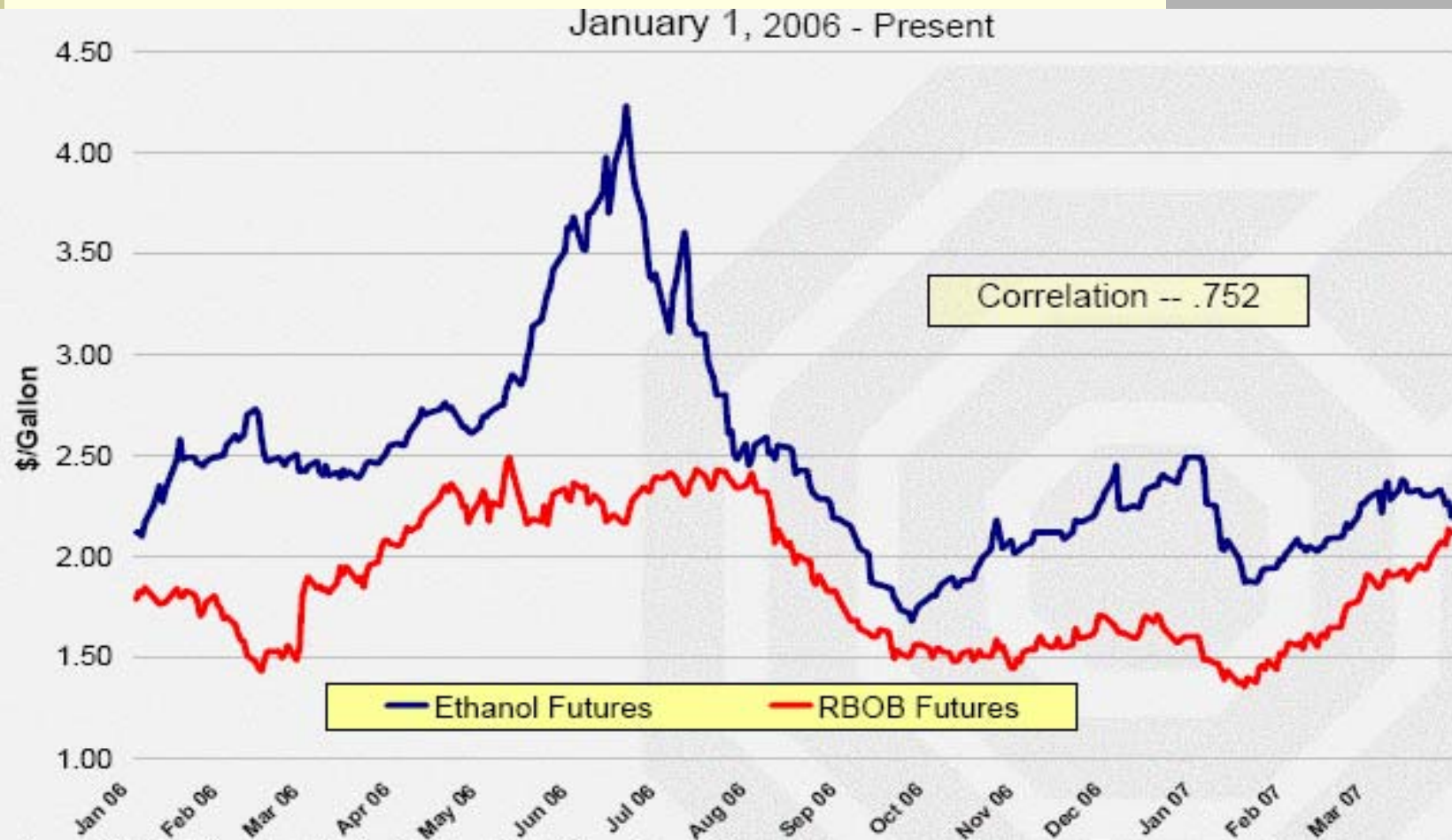


# Ethanol Replaces MTBE - 2006



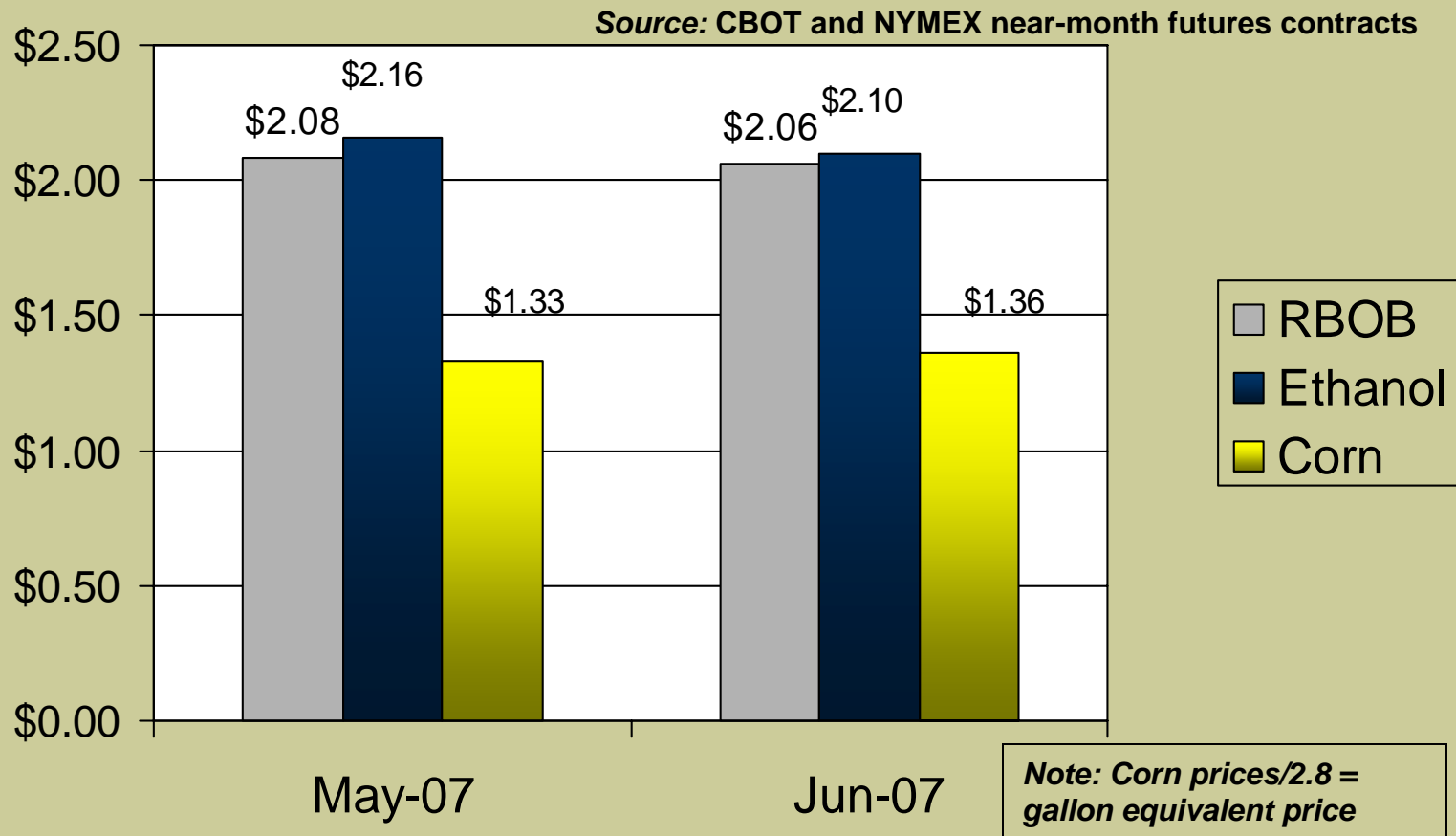
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# Ethanol and Gasoline Prices Compared



Source: Oil Price Information Service (OPIS) and The Chicago Board of Trade

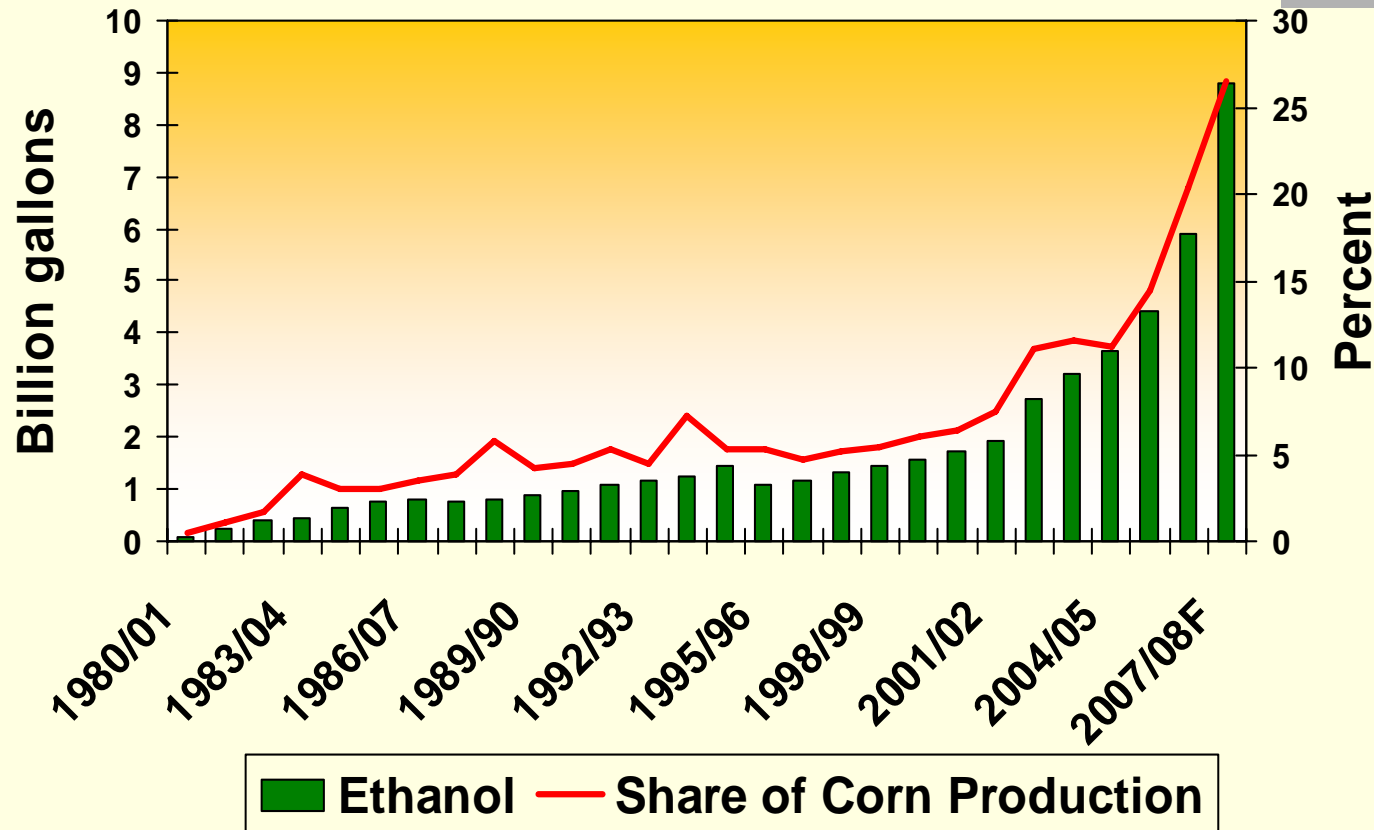
# Price Update: Ethanol, Mogas, Corn



# Part II: Corn

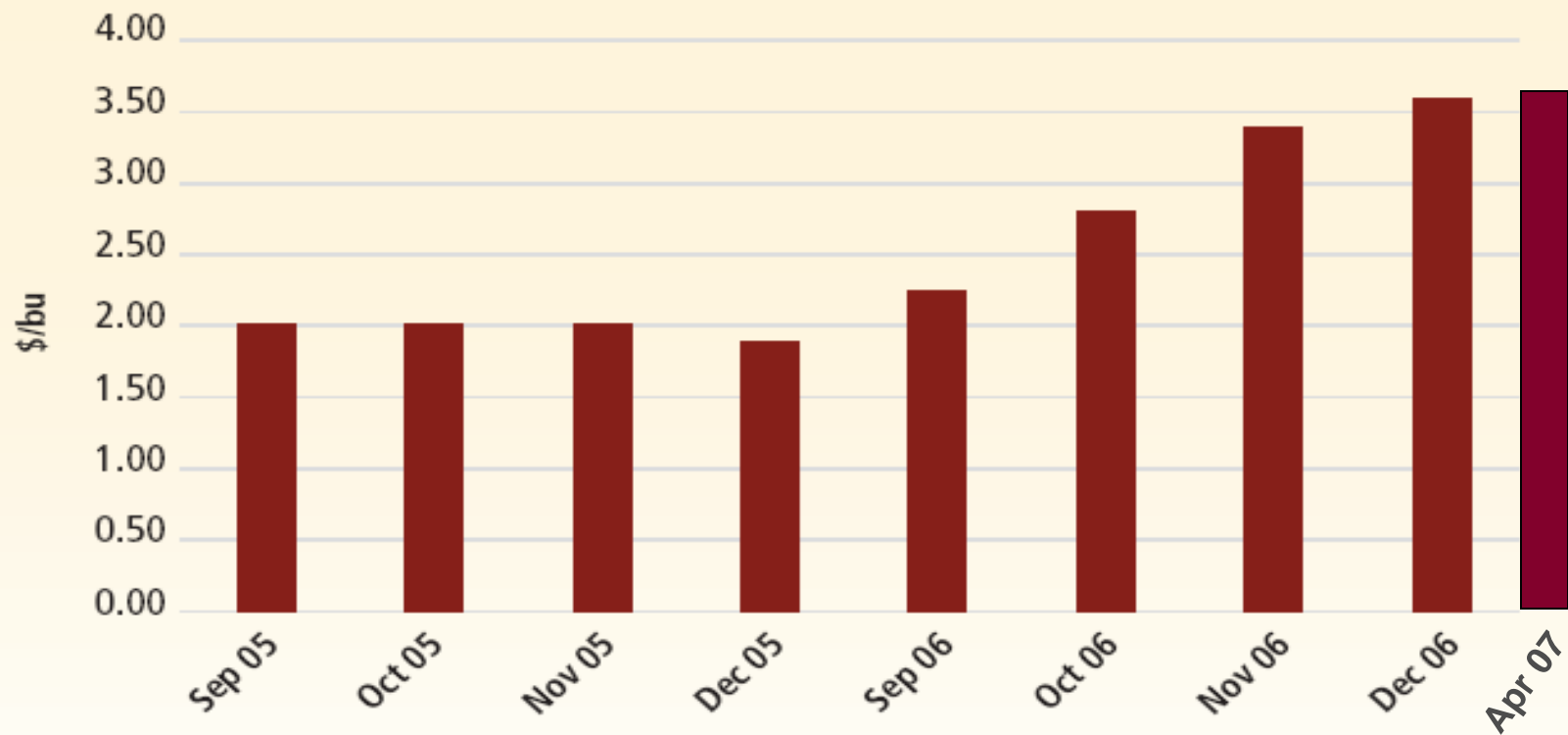
# Corn Ethanol Production 2007...

*expect to use 27% of '07 corn crop for nearly 9 bil. gal.*



Source: Keith Collins, Chief Economist, USDA. Presentation at the EIA Outlook Conference 3/07

# Corn Prices: 2005 - 2007



Source: USDA; CBCT

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formerly PIRINC

# Farmers Respond to High Corn Prices - 2007

- Record Corn Plantings - Highest Since 1944

- Corn acreage increased 15%

Using land from:

- *Cotton*—acreage down 20%
- *Soybeans*—acreage down 11%

- Price Implications

- Corn prices fell ~\$0.50 per bu on report release.
- Cotton and soybean prices will rise because of smaller plantings

Source: USDA, *Prospective Plantings*. Mar.2007

# High Agricultural Product Prices

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- Between 2006 and 2007 Corn prices rose by \$1.50 to \$2.00
- Record corn prices increased consumers food cost by an estimated \$15 to \$20 billion
- Cotton and Soybean prices will rise as a result of acreage reallocation to corn
- These higher prices will impact the rate of inflation, with adverse macroeconomic impact



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# Part III: Vehicle Fleet Constrains Ethanol Consumption

# Vehicle Fleet Will Slow Ethanol Uptake

- Auto fleet designed to use 10% ethanol; it can't use more
- Ethanol transport constraints prevent universal distribution
  - Not all gasoline blenders can get ethanol
  - Less than 100% mogas can be E-10
- If higher blends are to be consumed, more E-85 (FFVs) needed in fleet

E-85 vehicles have sold poorly:

- Out of 237 million vehicles on the road, **only 6 million** are FFVs
- Detroit makers pledged half 2012 output will be FFVs; foreign makers not showing interest
- In 2017, 280 million vehicles on the road: How many will be FFVs?

***Implication: if Detroit succeeds, only 25% of new vehicles sold will be FFVs***

# Recap: Role of Ethanol in the Gasoline Pool

<b>% Ethanol</b>	<b>Billions Gallons/ Year</b>	<b>B/D (000)</b>	<b>Fundamental Factor</b>	<b>Price Implication</b>
~ %5	~8	500	Necessary- Complimentary—The current situation; replacing MTBE	Higher than Gasoline
5% - 8%	~12	750	Enhancing Gasoline Performance and Increasing supply Volumes	Converging on Gasoline Price
10%	~15	1,000	Max % current vehicles can use  Limited by Distribution Infrastructure	Price Competition among Ethanol Producers
Much greater than 10%	35	2,300	Exceeds likely Auto Fleet Capability	Market Oversupplied— Serious Price Erosion

# Part IV: Refiners

# Investment: Ethanol Plant vs. Oil Refining

## ■ Refining---2003-2006

- Refining capacity grew by 0.6 mbd
- Imports of refined oil product grew by 1.0 mbd
- U.S. refining capacity continues to lag consumption growth
- Results in very high refinery utilization w/o capability to deal with outages, scheduled maintenance, etc.
- Current gasoline price situation--\$2.15 in January; \$2.85 in April due to refinery outages

## ■ Ethanol Capacity Grew Rapidly

- 115 plants operating; 375,000 b/d capacity
- 86 plants under construction; 400,000 b/d capacity

## ■ Ethanol and oil compete for capital and for the same materials and services

## ■ Ethanol may be crowding out investment in petroleum refining

# Gasoline Consumption 2017 (mbd): "20 in 10" Changed Perceptions for Refiners

	2006 Actual	2017 Reference	"20 in 10"
EIA Base	9.24	10.48	10.48
Ethanol	0.28	0.78	1.52
CAFE Change	—	—	0.55
Net Conv. Gas Supply	9.02	9.70	8.41

Source: EPRINC estimates.

- 2017 Gasoline Consumption  
- 1.3 mbd below expected  
- 0.7 mbd less than 2006
- DOE just reduced 2006 estimates of refinery growth—0.7 mbd less capacity in 5 years

# Part V: Energy Security/ Oil Imports

# Ethanol Fuels Program Is Costly

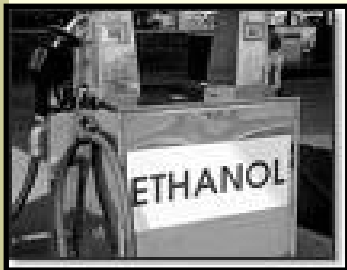
- \$0.51 blender tax credit costs \$3 bil per year at today's rate of consumption. Costs rise as ethanol blending increases.
- Because of lower energy value, a gallon of ethanol replaces 2/3rds of a gallon of imported gasoline.
  - At \$2.19 per gallon of ethanol, this is the equivalent of ~\$3.25 for each gallon of import saving. The tax credit adds to this.
- Should the higher cost of corn to consumers be attributed to the reduction of oil imports?
- Should costs arising from price increases in other crops resulting their displacement by corn acreage be attributed to oil import reduction?



# Energy Security Goals: Minimizing Risk

- Control Growth/Reduce Petroleum Imports
- Buffer Economy from Price Shocks Caused By Adverse World Market Events
- Encourage U.S. Refinery Capacity Catch-up With Consumption
  - Reduce risk from refinery mishaps

**BUT Depending on An Agricultural Commodity For Energy Supply Introduces New Risks Associated with Crop Cycle**



# Thank you

## Q & A

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