

# The State of Biofuel Today

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# What Biofuels Do We Have?

- Ethanol
  - Corn
  - Sugar cane
- Biodiesel
  - Animal fat
  - Vegetable oil (rape and soybean)
- Palm oil renewable diesel

# Market Overview

- Sugar cane ethanol
  - Brazil cannot keep up with domestic demand
  - About 50% of vehicle fleet is now flex fuel
  - 2009 financial disaster has stalled investment
  - Prices likely to remain higher than US prices for another year or two
  - UNICA is encouraging drivers not use E100

# Market Overview

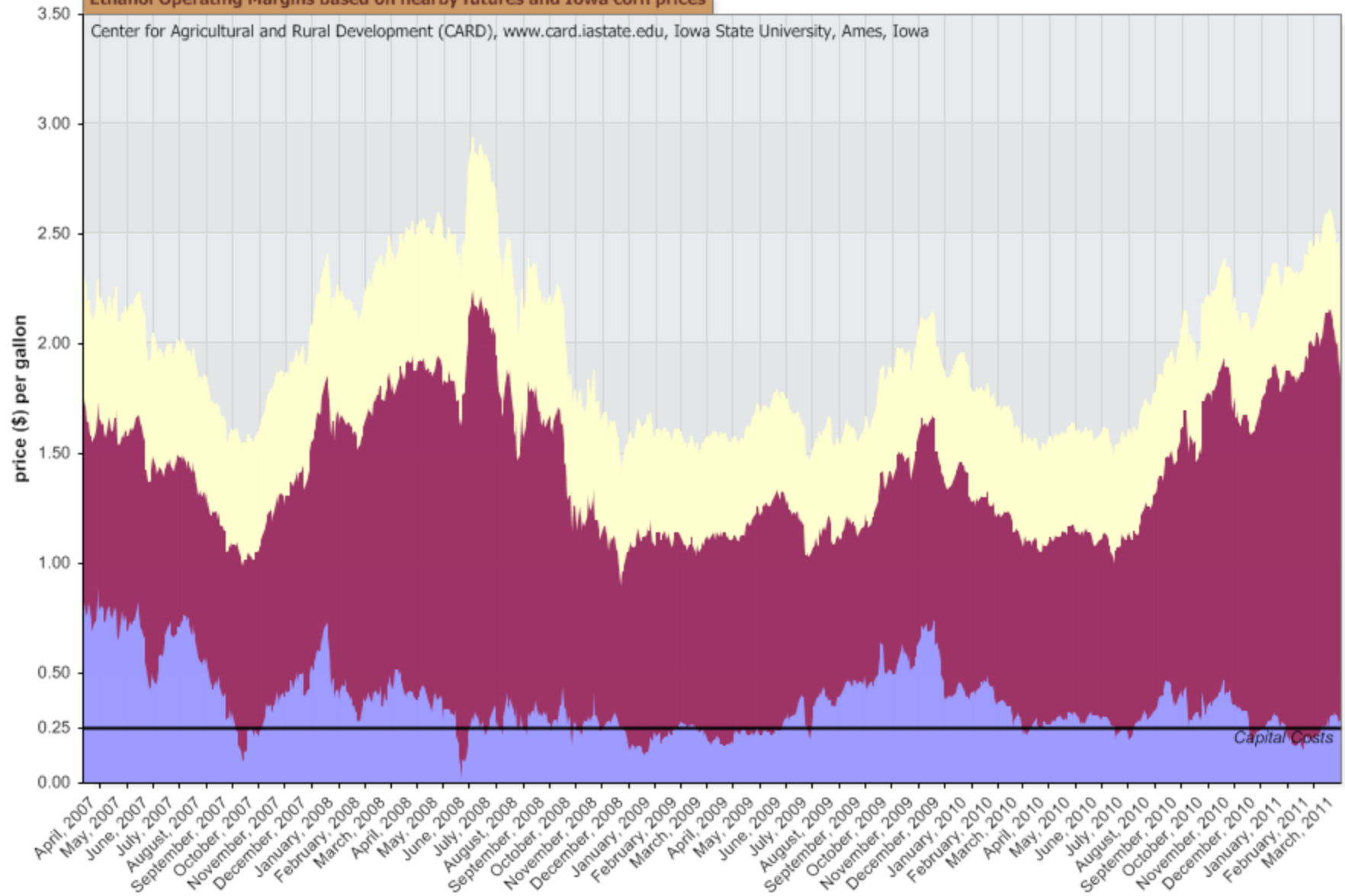
- Biodiesel
  - Margin cost of production exceeds diesel cost by \$2.00 per gallon
  - \$1.00 tax credit, \$1.00 RIN price

# Corn Ethanol

- Largely a break-even business

Ethanol Operating Margins based on nearby futures and Iowa corn prices

Center for Agricultural and Rural Development (CARD), [www.card.iastate.edu](http://www.card.iastate.edu), Iowa State University, Ames, Iowa



Return Over Operating Costs Net Cost of Corn Other Operating Costs

# Corn Ethanol

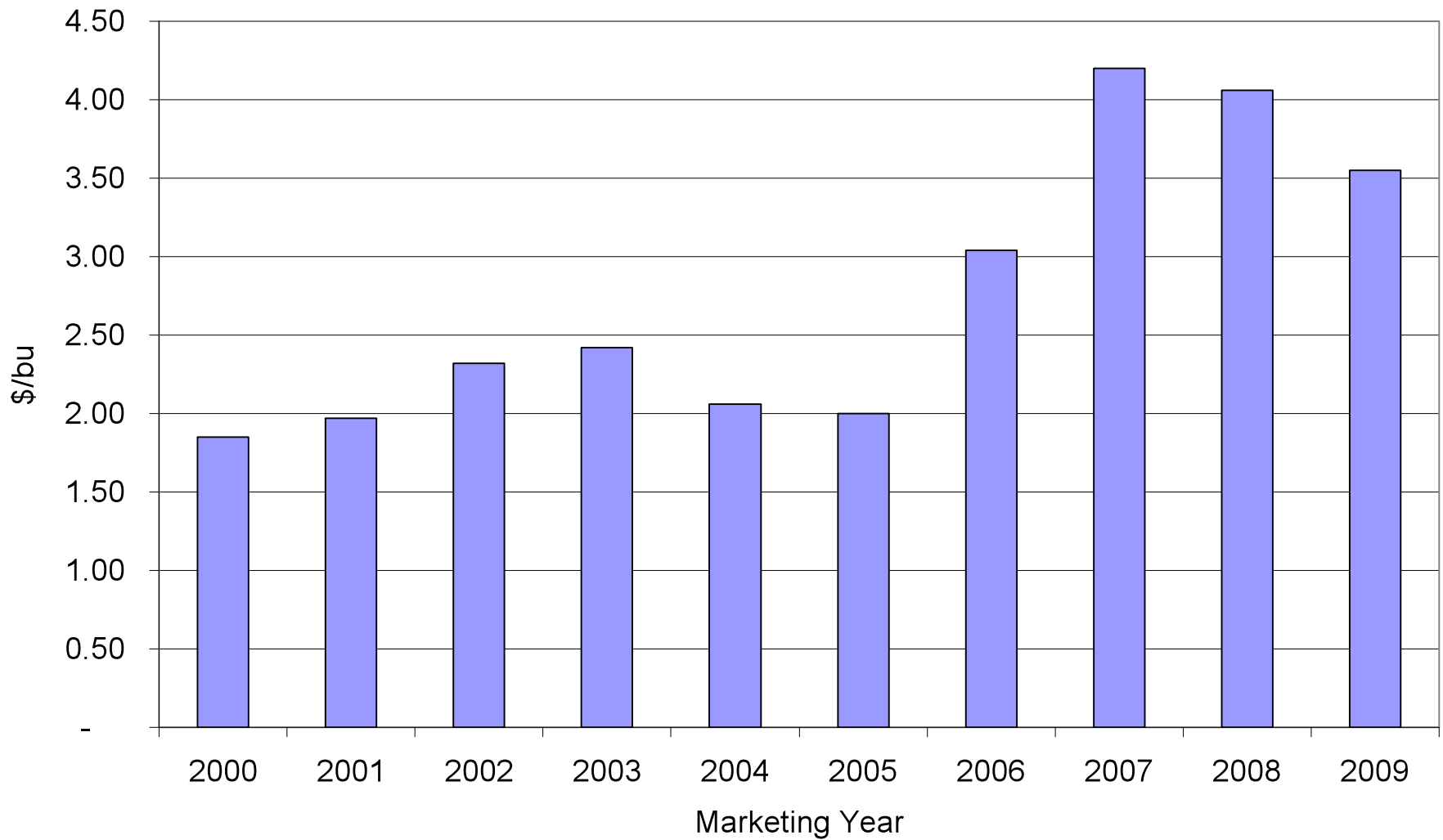
- \$0.45 VEETC keeping demand high
- Mandate creates a floor at about 11 billion gallons due to carryover RIN
- Big issues are political (ethanol is an oversubsidized, uneconomic industry that is starving the world's poor and causing loss of rainforests) and saturation of markets (blend wall of less than 14 billion gallons)

# Rest of Talk

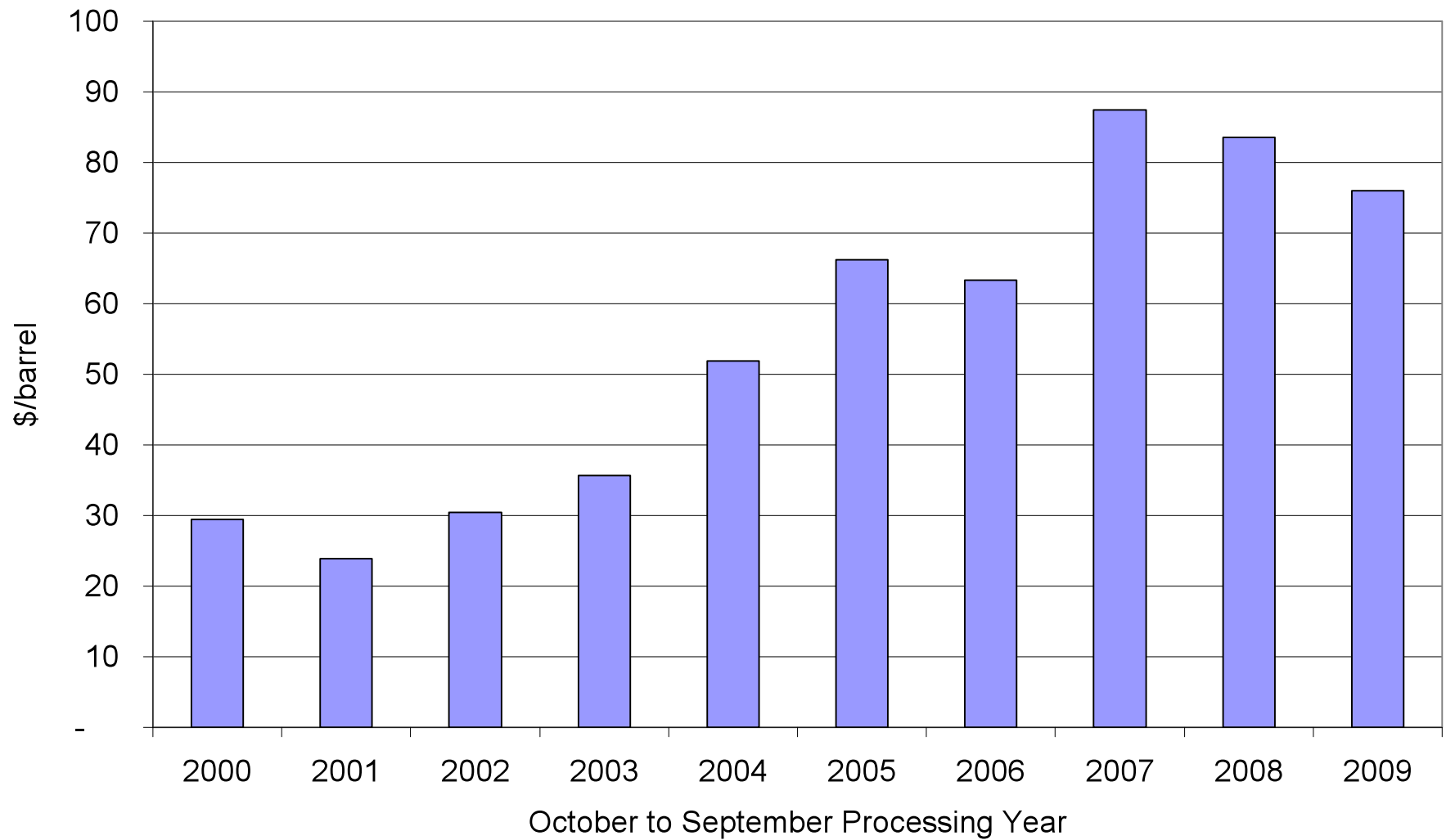
- Is corn ethanol an over-subsidized, uneconomic industry that is starving the world's poor and destroying rainforests?
- What is the outlook for biofuels given the 14 billion gallon blend wall?



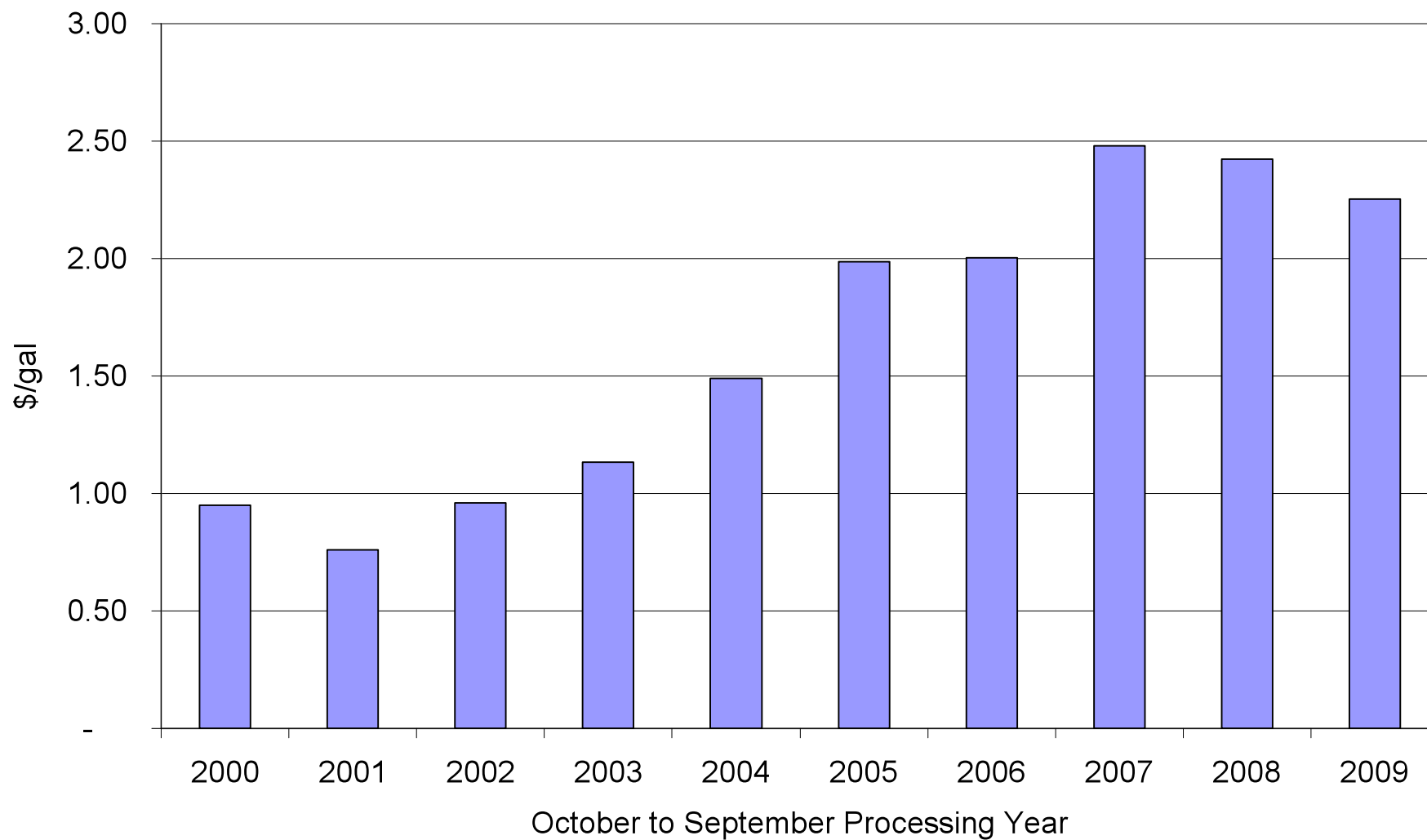
# Corn Prices



# Crude Oil Prices



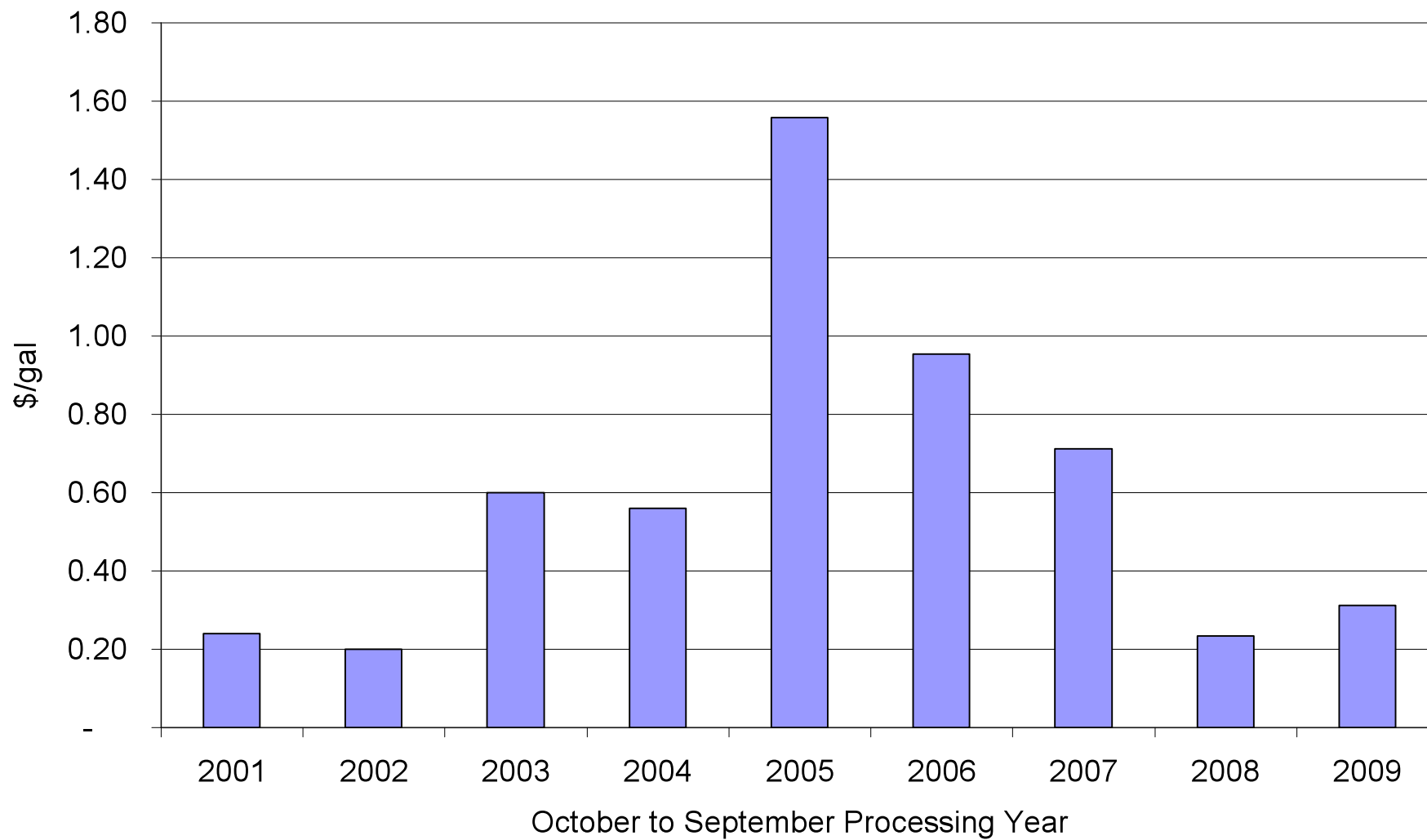
# Wholesale Gasoline Prices



# Plant Payback

- A 100 million gallon ethanol plant cost about \$125 million to build in 2005.
- If margins are \$1.25 could pay for the plant in one year of operation

## Ethanol Margins



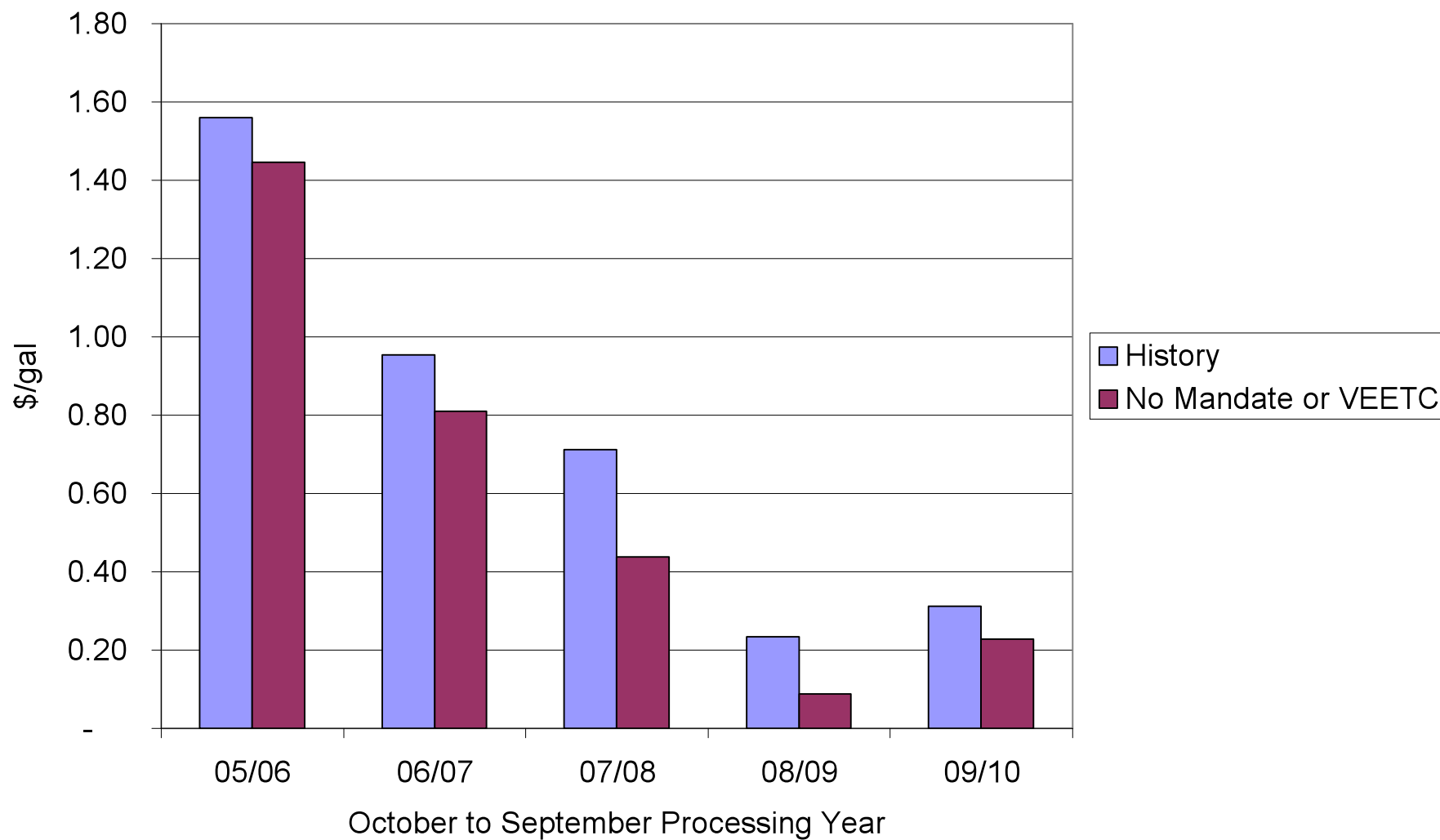
# Was Corn Ethanol a Good Investment?

- At 2007/08 margins of \$0.75 per gallon, could pay back the plant and plant cost increase to \$150 million, could pay back the plant in two years
- Of course margins did not turn out the way that investors had hoped

# Role of Subsidies

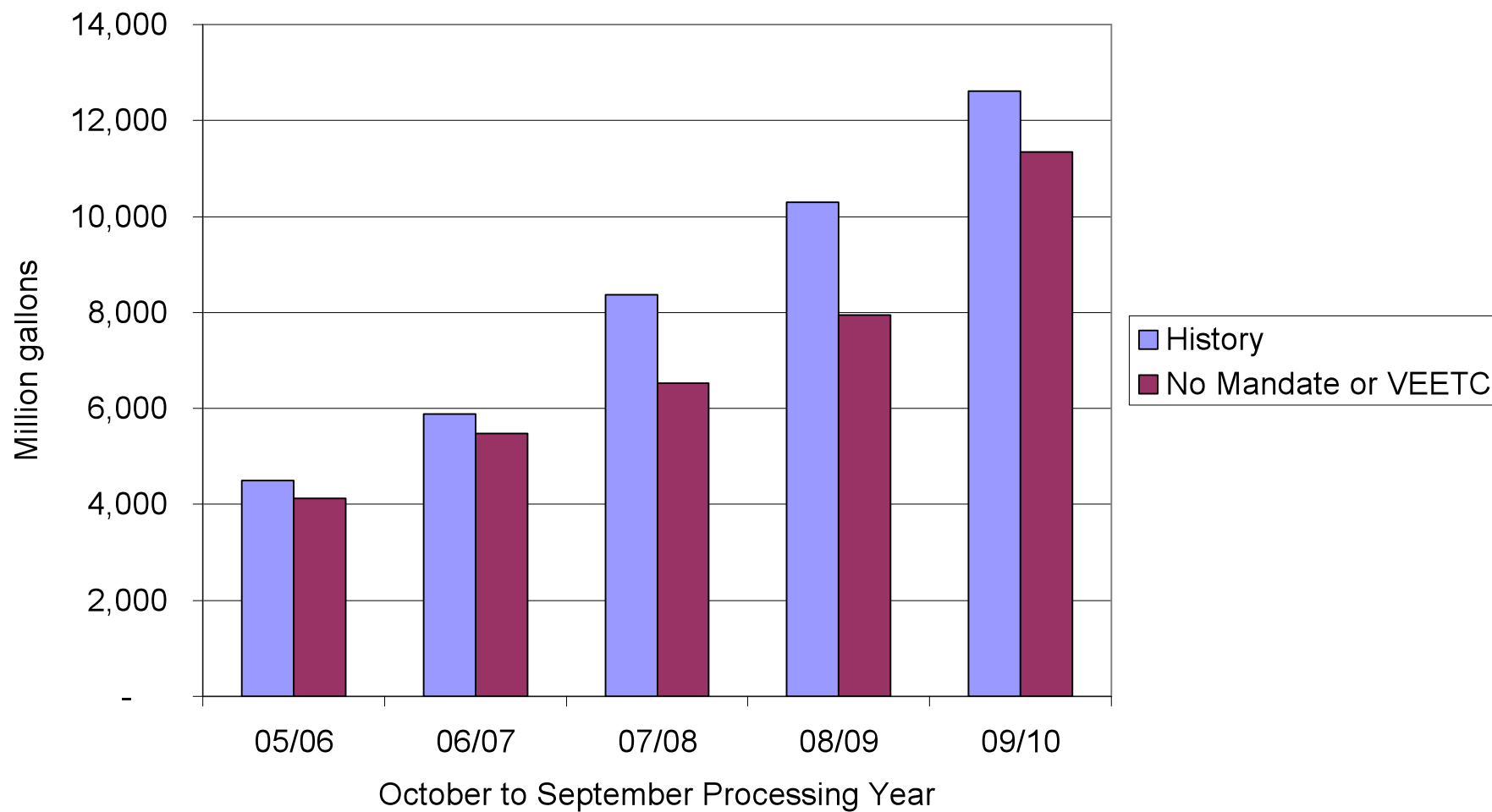
- Were the high margins a result of subsidies or basic economics?
- Answer: We calibrated out FAPRI model to actual observed prices and quantities to recreate historical record.
- Then we re-ran model without subsidies after 2004/05 year allowing all markets to adjust.
- No accounting for role policy might have played in reducing uncertainty that could drive investments

## Impact of VEETC and Mandate on Ethanol Margins

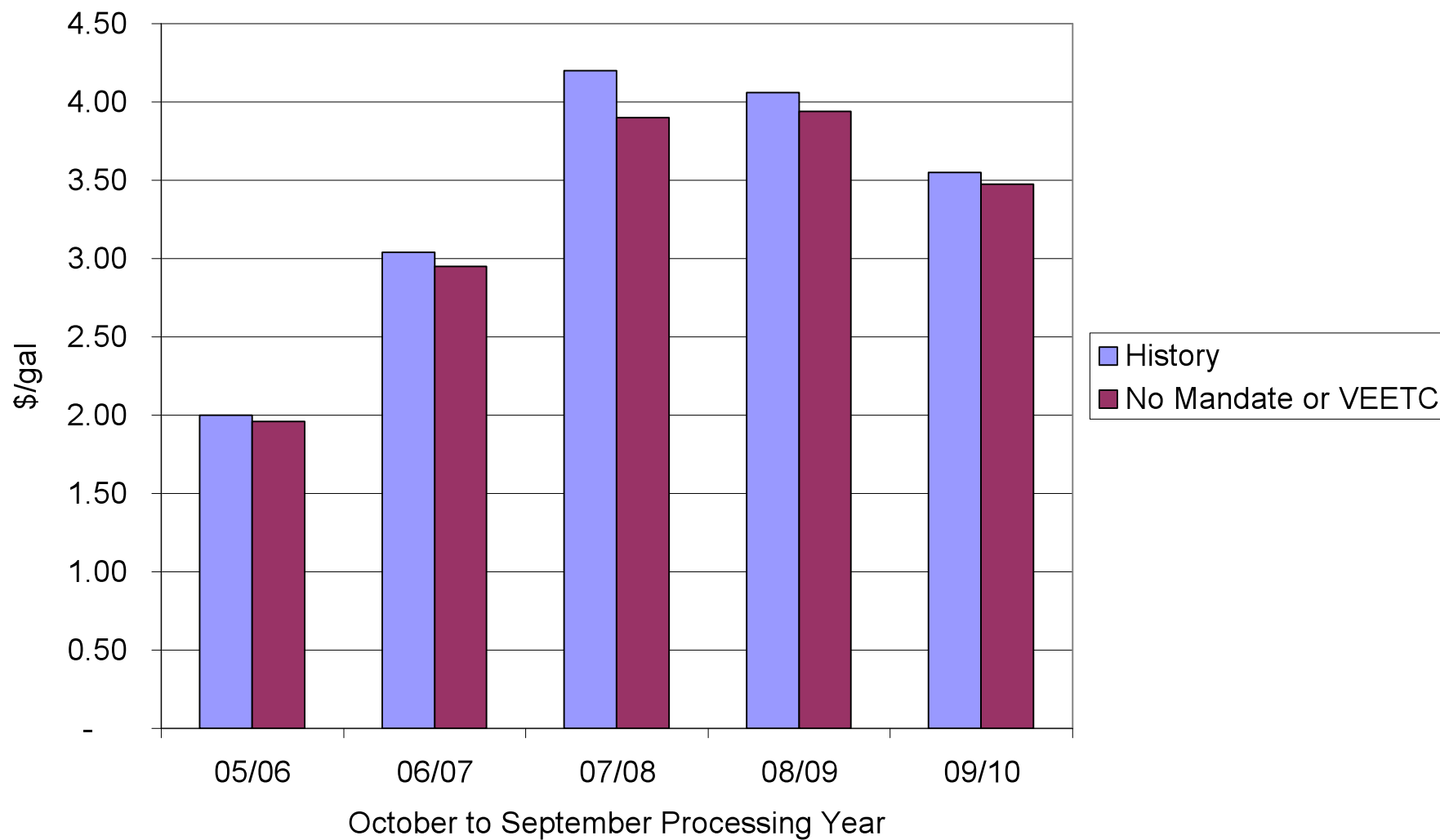




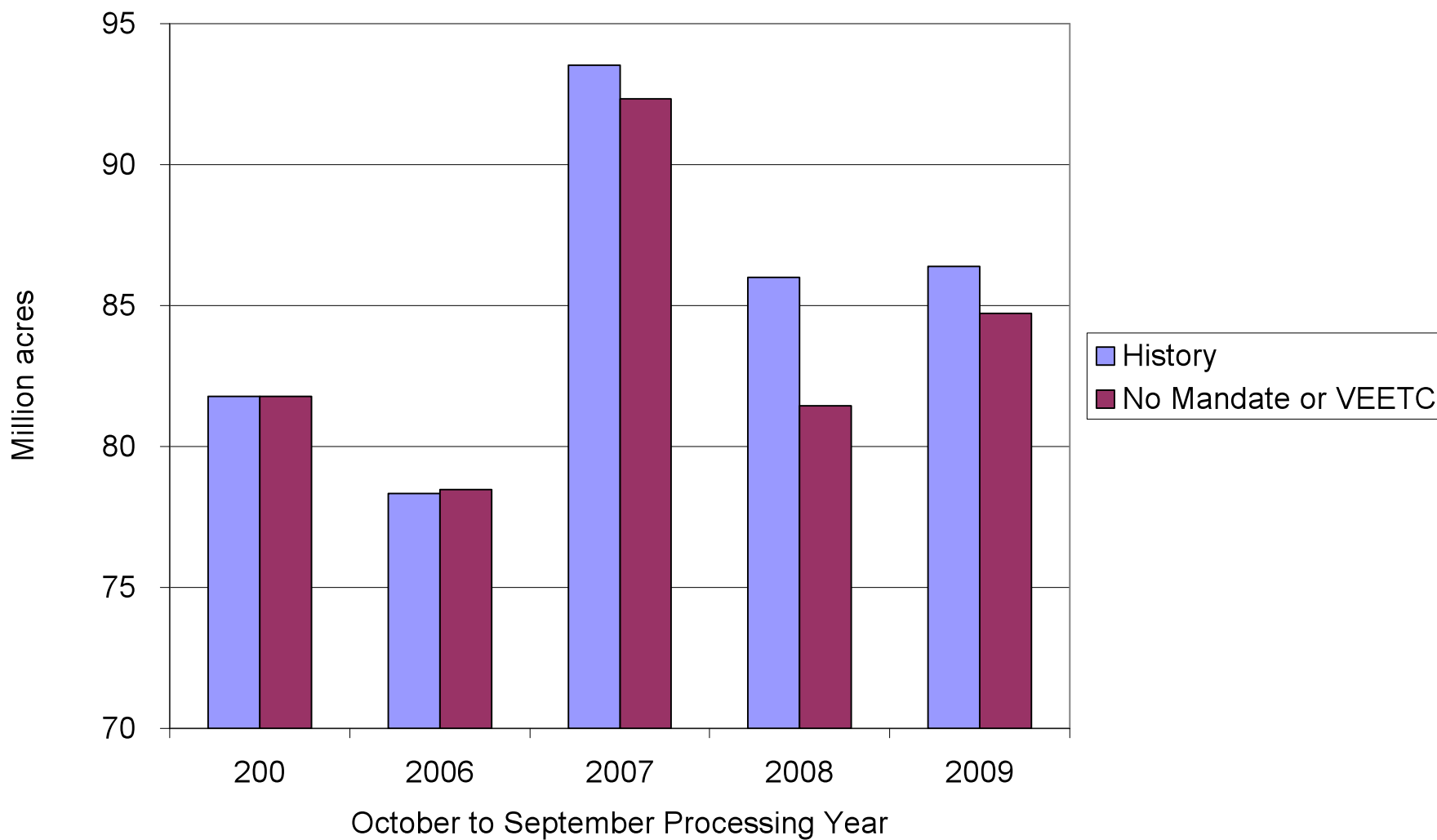
## Impact of VEETC and Mandate on US Ethanol Production



## Impact of VEETC and Mandate on Corn Prices



## Impact of VEETC and Mandate on Corn Acreage



# Impact on Food Prices

- My rule of thumb: For each \$1/bu increase in the price of corn, U.S. food expenditures increase by 0.6%
- Average impact of ethanol subsidies and mandates from 2005 to 2009: 12 cents per bushel
- Average impact on food prices: 0.1%

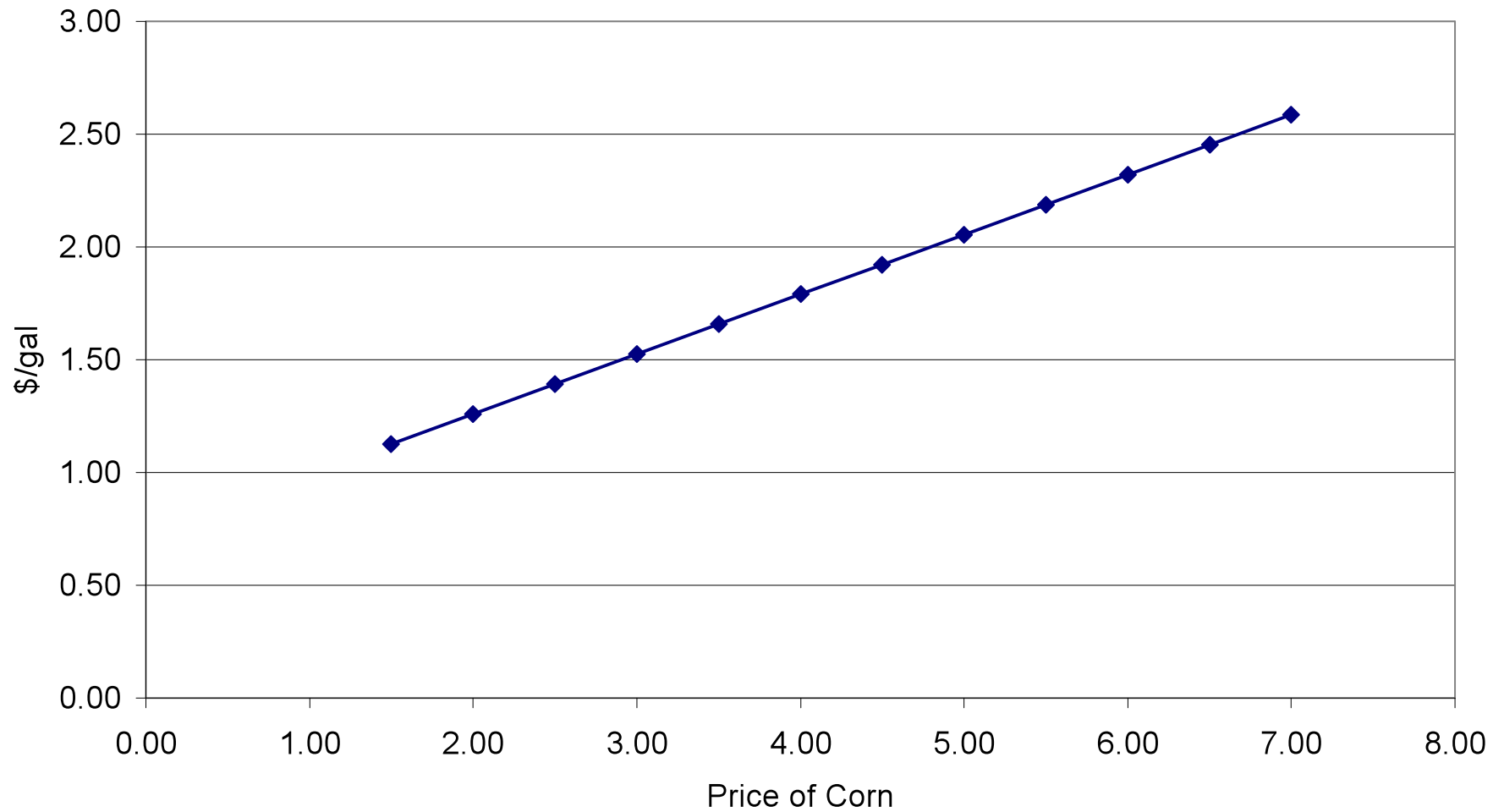
# My Conclusions

- Ethanol may be over-subsidized, but the subsidies have had minimal impact on corn price and US food prices.
- Existence of ethanol has impacted corn prices and food prices

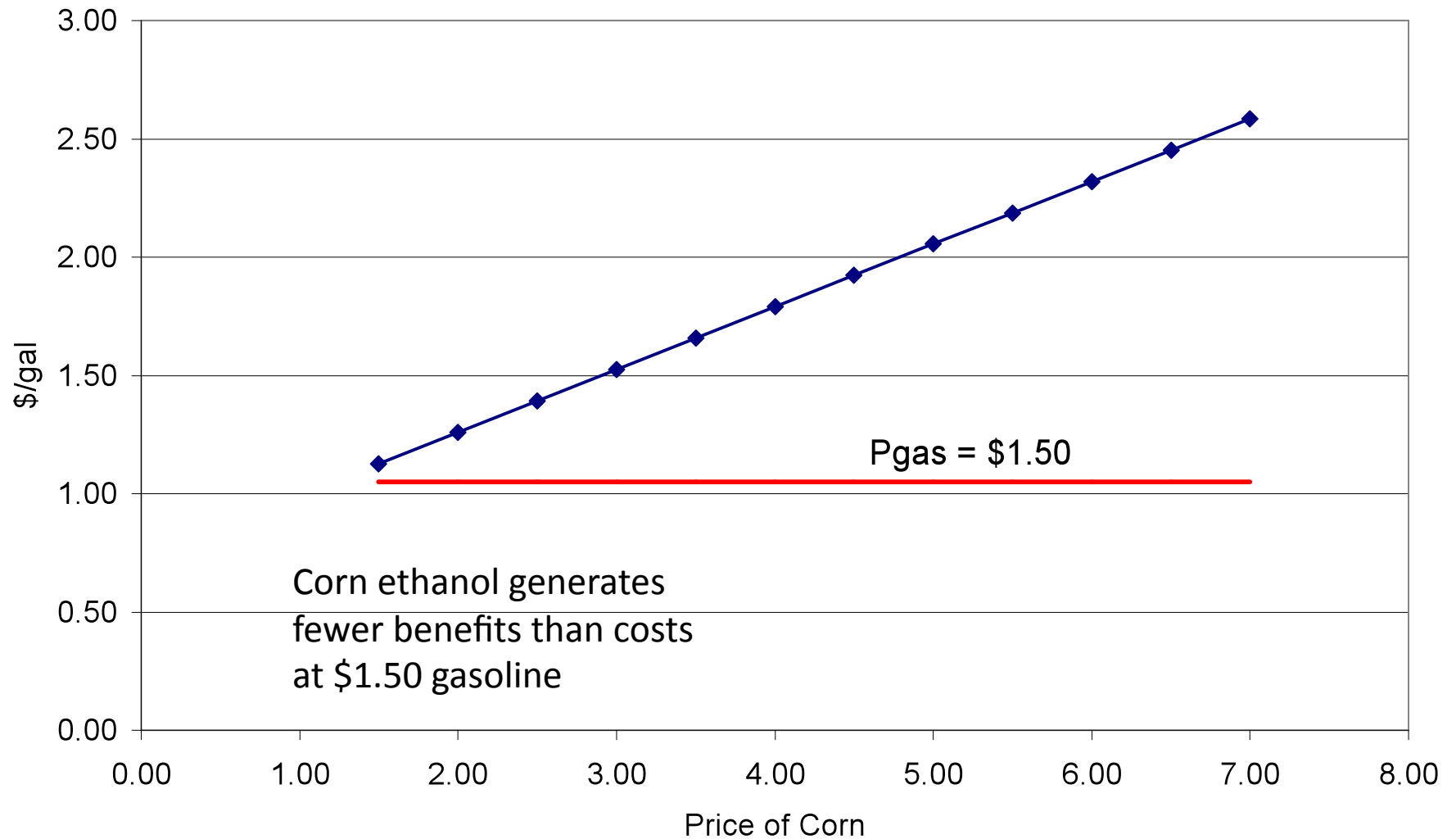
# Is Corn Ethanol a “Good Idea?”

- Depends on if costs exceed benefits
- Production Costs
  - Capital, Labor, Energy, and Corn
- Externality Costs
  - Some additional nutrient pollution from additional corn production
- Source of transportation fuel and octane
  - 70% of the price of gasoline
- Externality Benefit
  - Wean U.S. marginally from reliance on fossil fuel

# Cost of Producing Ethanol (Net of Distillers Grains Value)

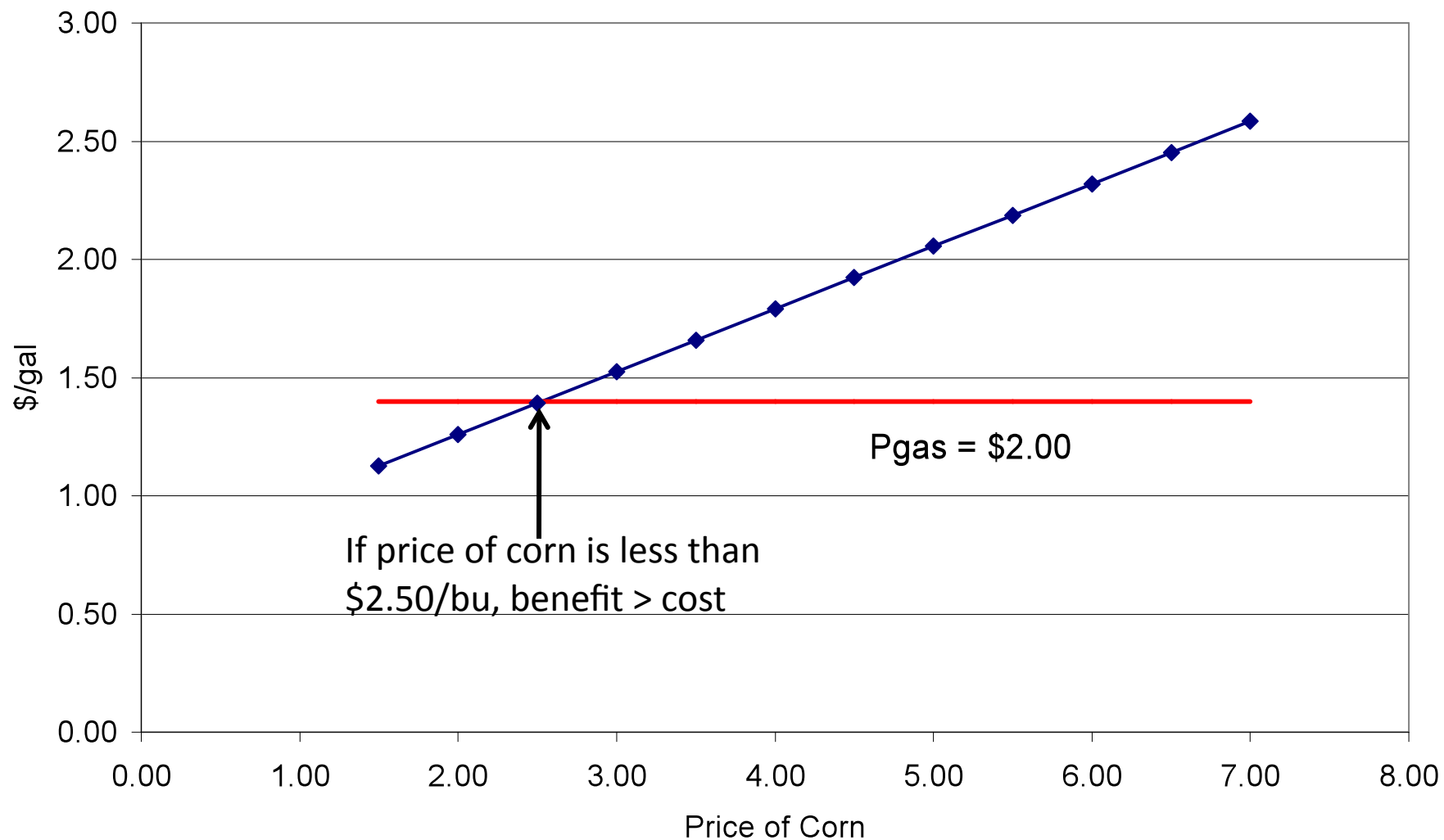


## Production Cost vs Ethanol Value

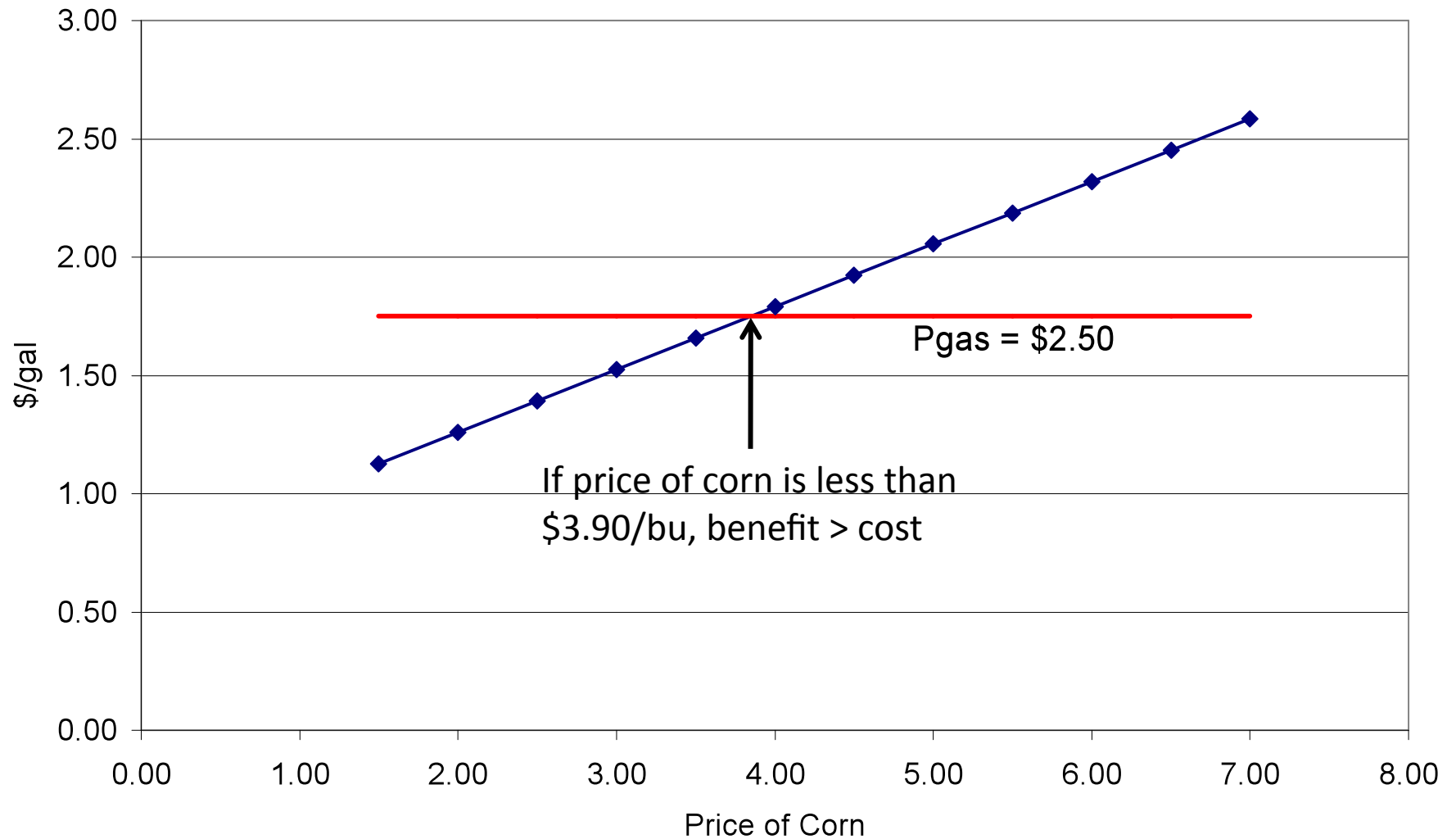




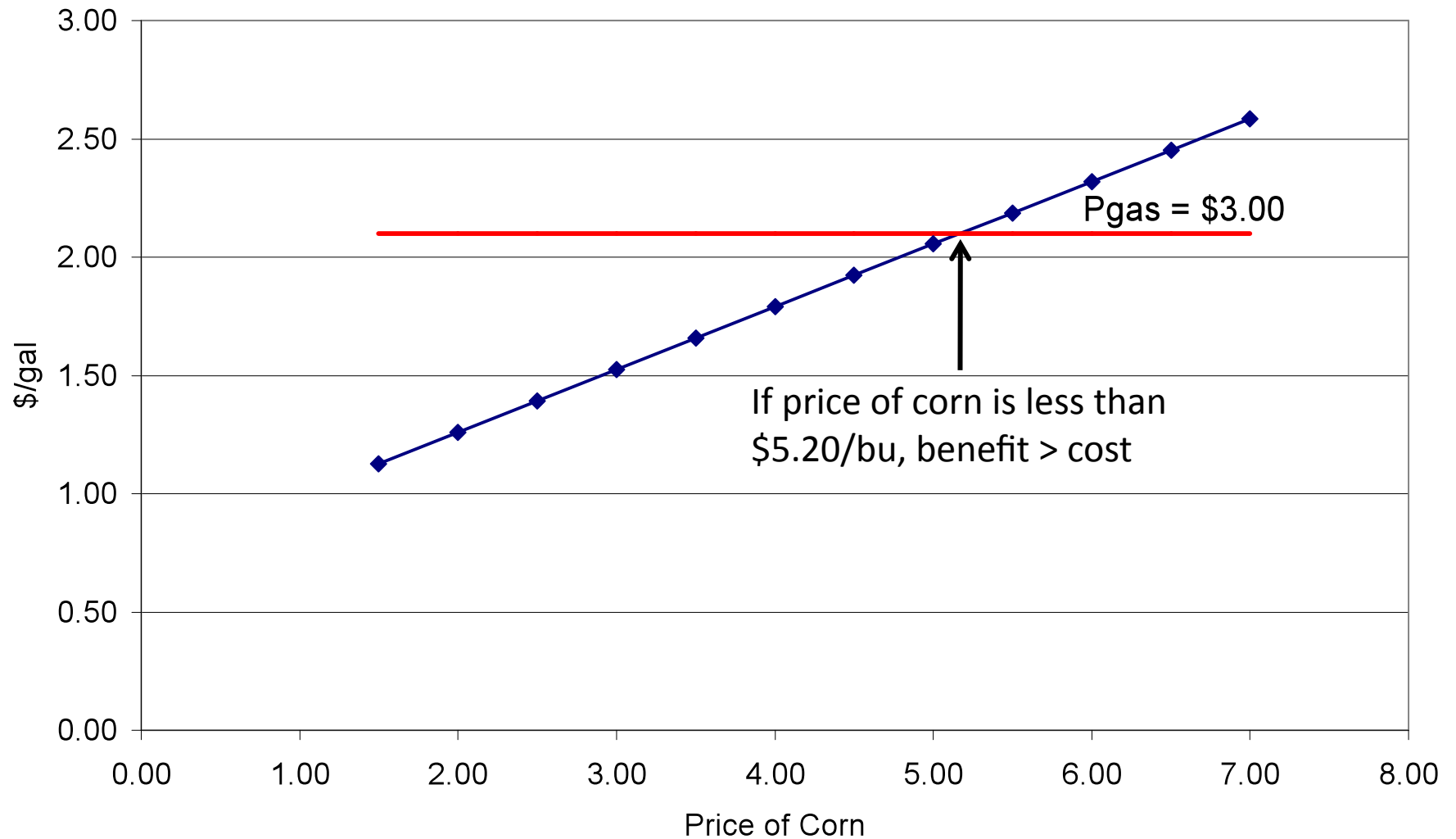
## Production Cost vs Ethanol Value



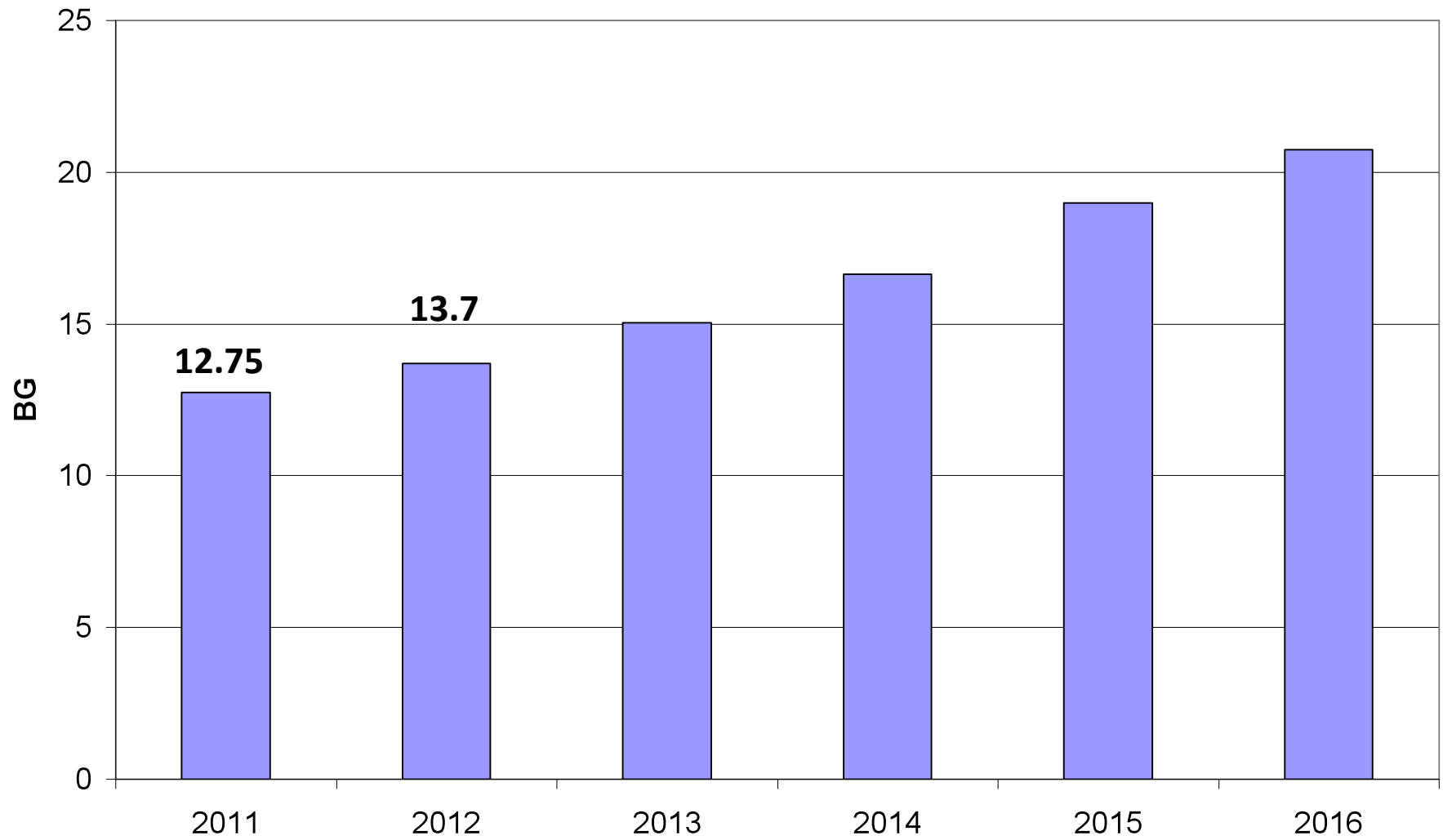
## Production Cost vs Ethanol Value



## Production Cost vs Ethanol Value



## RFS for Biofuels other than Biodiesel



# Can US consume 15 BG of ethanol?

- No. At 140 BG fuel consumption, 10% blend with 100% market penetration is about 14 BG

# Outlook for 2013

- 15 BG of ethanol is greater than 10% blend
- Three options
  - Cap RFS down to 14 BG
  - Keep RFS and hope for drop-in fuels
  - Adopt policies to facilitate use of higher ethanol blends

# Cap RFS at 14 BG

- Preferred choice of some in Congress (and some Berkeley professors)
- Likely choice of EPA if E15 is not adopted
- Creates no room for cellulosic ethanol

# Hope for Drop-in Biofuels

- Conversion of ethanol plants to bio-butanol plants
- Expansion of bio-crude
- Synthetic gasoline



# Why Does E15 Make Sense?

- Only path to meeting RFS with ethanol thereby creating room for cellulosic ethanol
- Push by existing ethanol producers because it will cause the value of existing corn ethanol plants to increase
  - Political deal in exchange for VEETC elimination?
- Cars can run on it

# Why Does E15 Make No Sense?

- If corn production stays short of expectations, allowing expansion of production will only keep pressure on livestock industry and wheat processors
- Belief that corn ethanol is an unmitigated disaster that needs to be stopped now.



















