

# 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

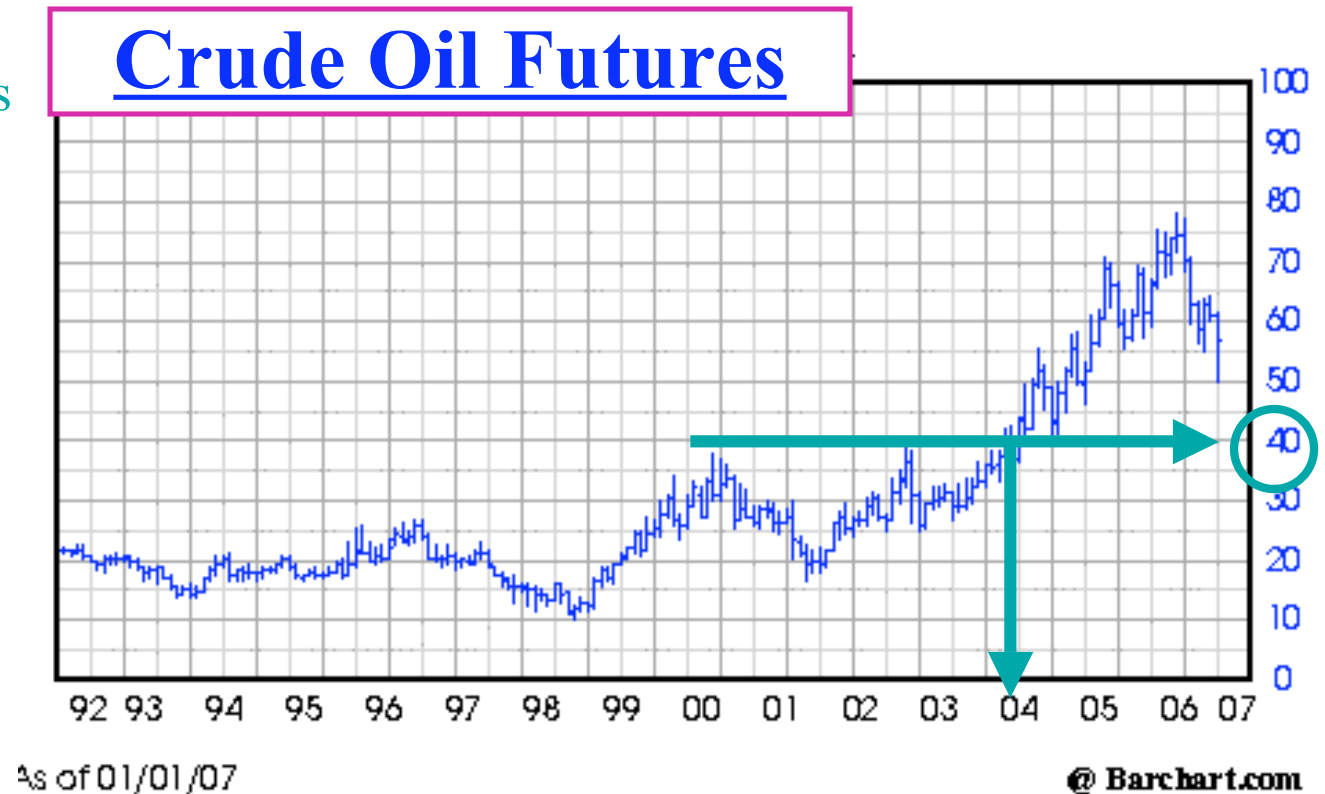
# Liquid Fuel in the U.S.

- 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



Where Corn Goes Now

**Rough Estimate of Indiana Corn Movement  
(850 Million Bu/year) 2006**

Fed in State	171m	19%
Process in State	261m	29%
Moved to S.E. or Export	468m	52%
Sum	850m	100%

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

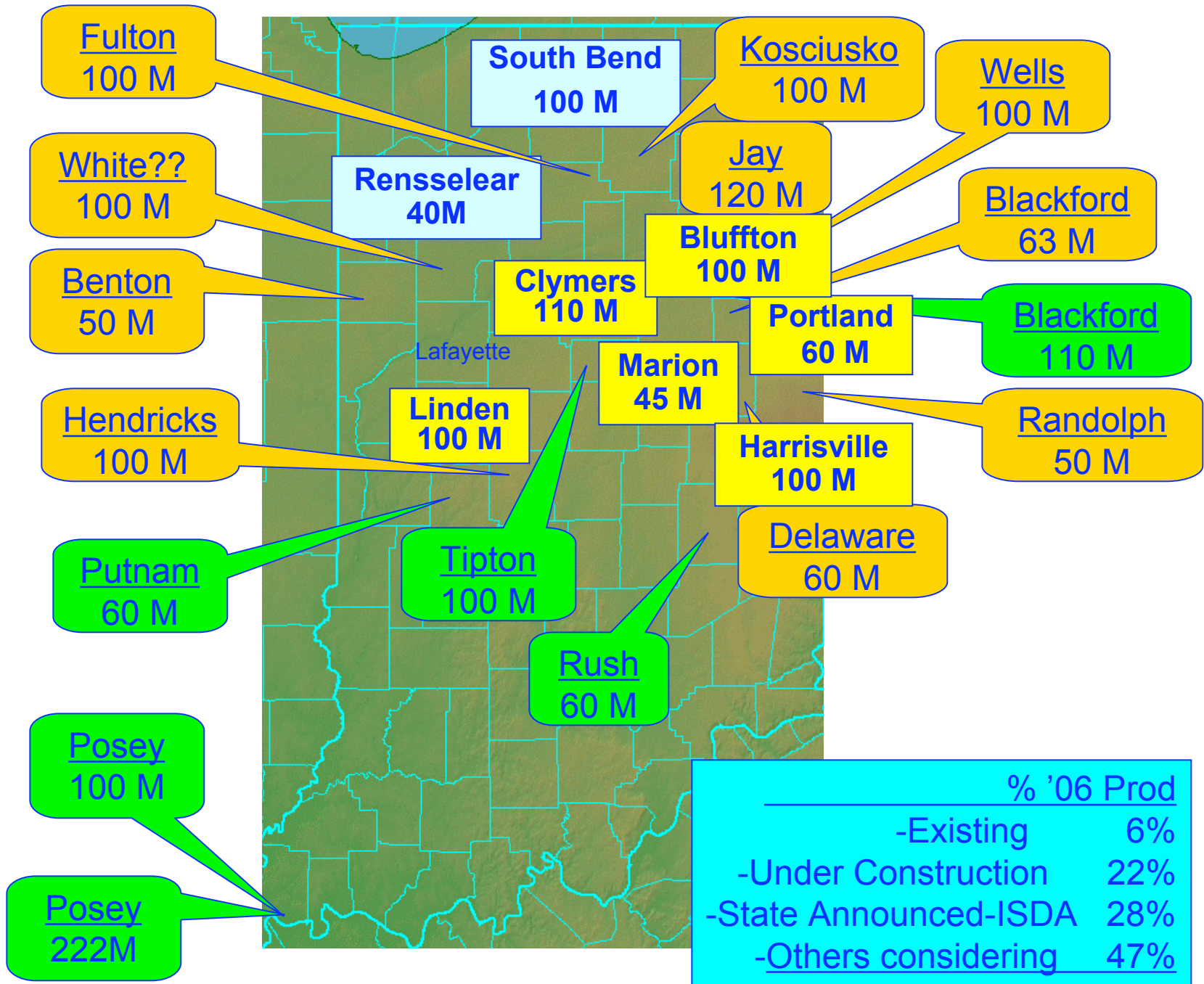
**6** plants under construction: Bluffton, Clymers, Harrisville-Randolph County, Linden, Marion, Portland: 189 million bushels of corn

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

**18** Private announcements --- to considering (*Purdue List*)

New Ethanol?



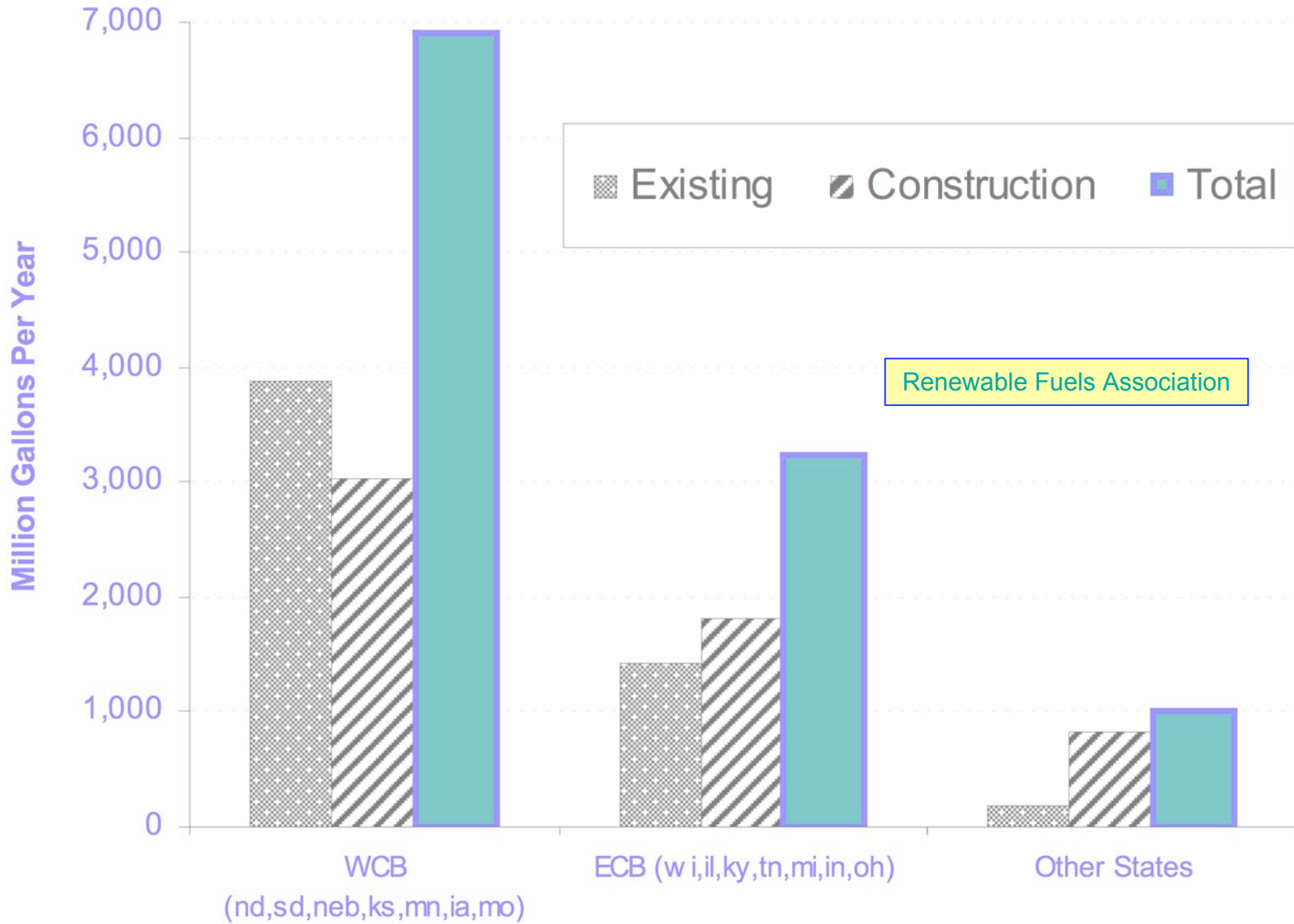


	% '06 Prod
-Existing	6%
-Under Construction	22%
-State Announced-ISDA	28%
-Others considering	47%
<b>-Total</b>	<b>103%</b>

## Ethanol Capacity Existing and Under Constuction: January 2007



## Existing and New Ethanol Capacity: 1-5-07

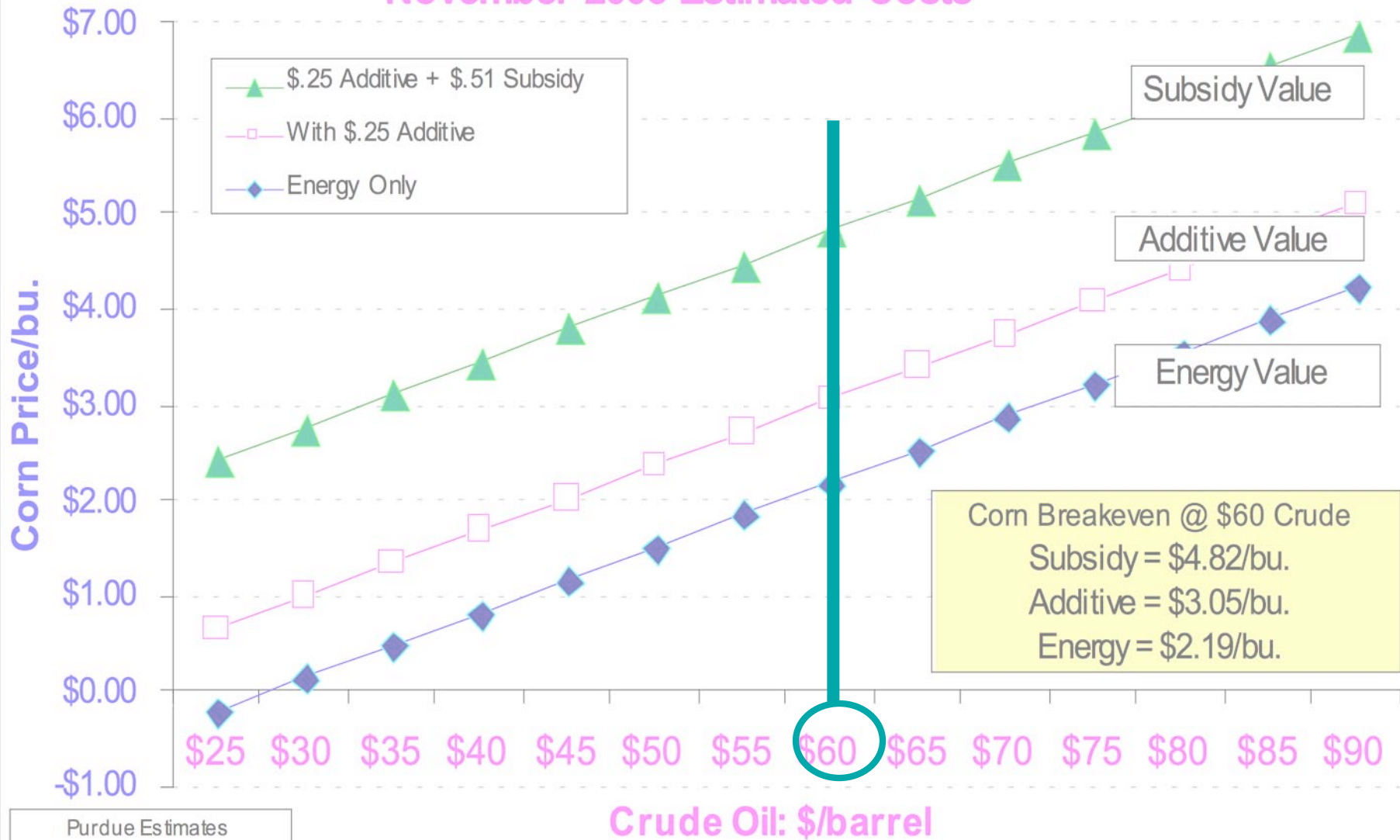






The New  
International  
Symbol for  
'Gas Station'

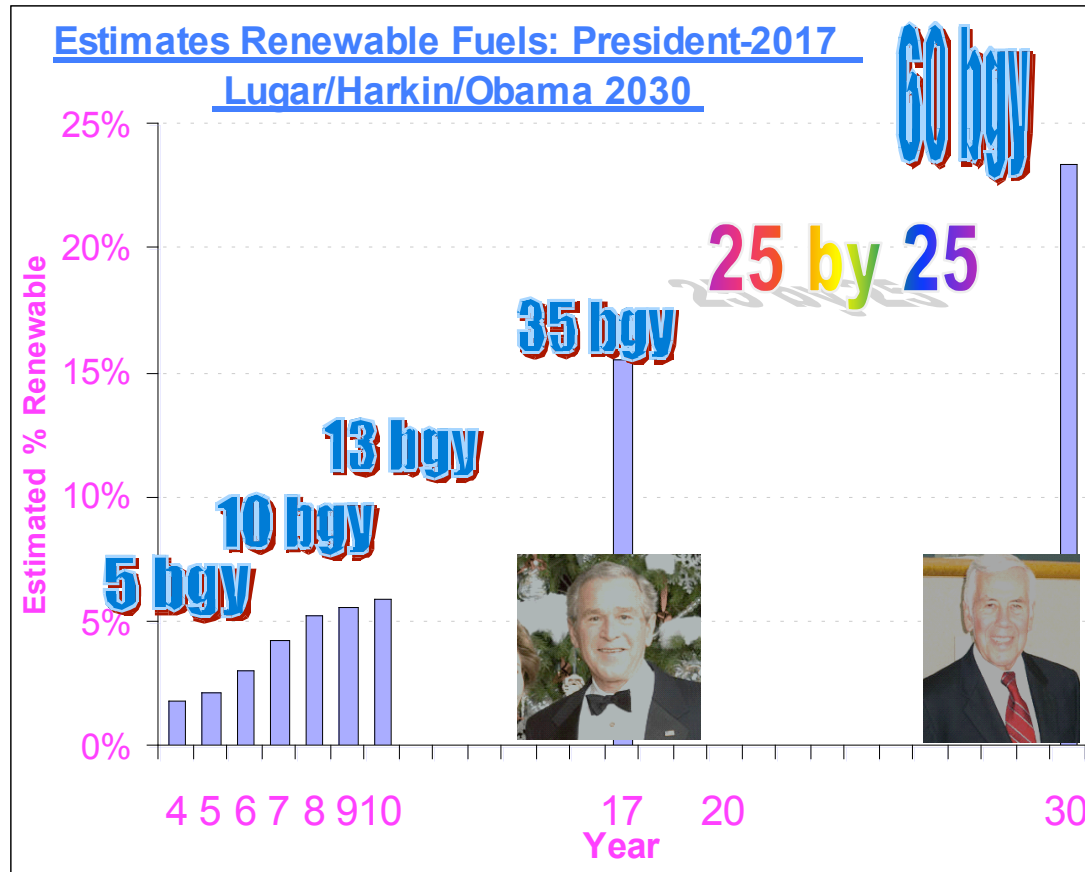
## Corn Breakeven Price For Ethanol: November 2006 Estimated Costs



# Ethanol's Growth?

Unlimited

*Vulnerable*

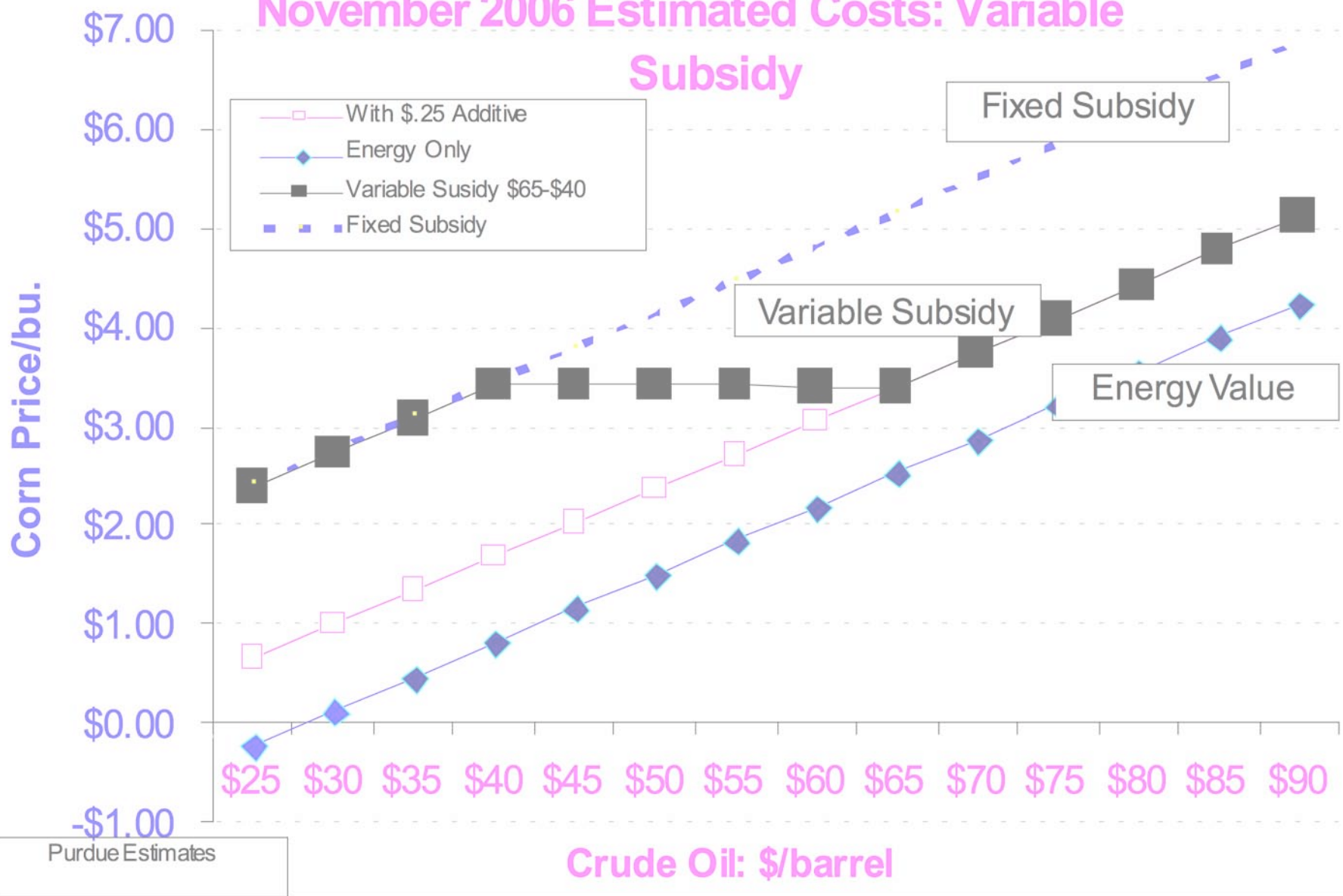


- Lower Energy Prices
- Policy
  - Federal Subsidy
  - State:
    - MTBE Restrictions
    - State RFS
- Much Higher Corn Prices
- Higher food prices
- Technology-cheaper energy sources

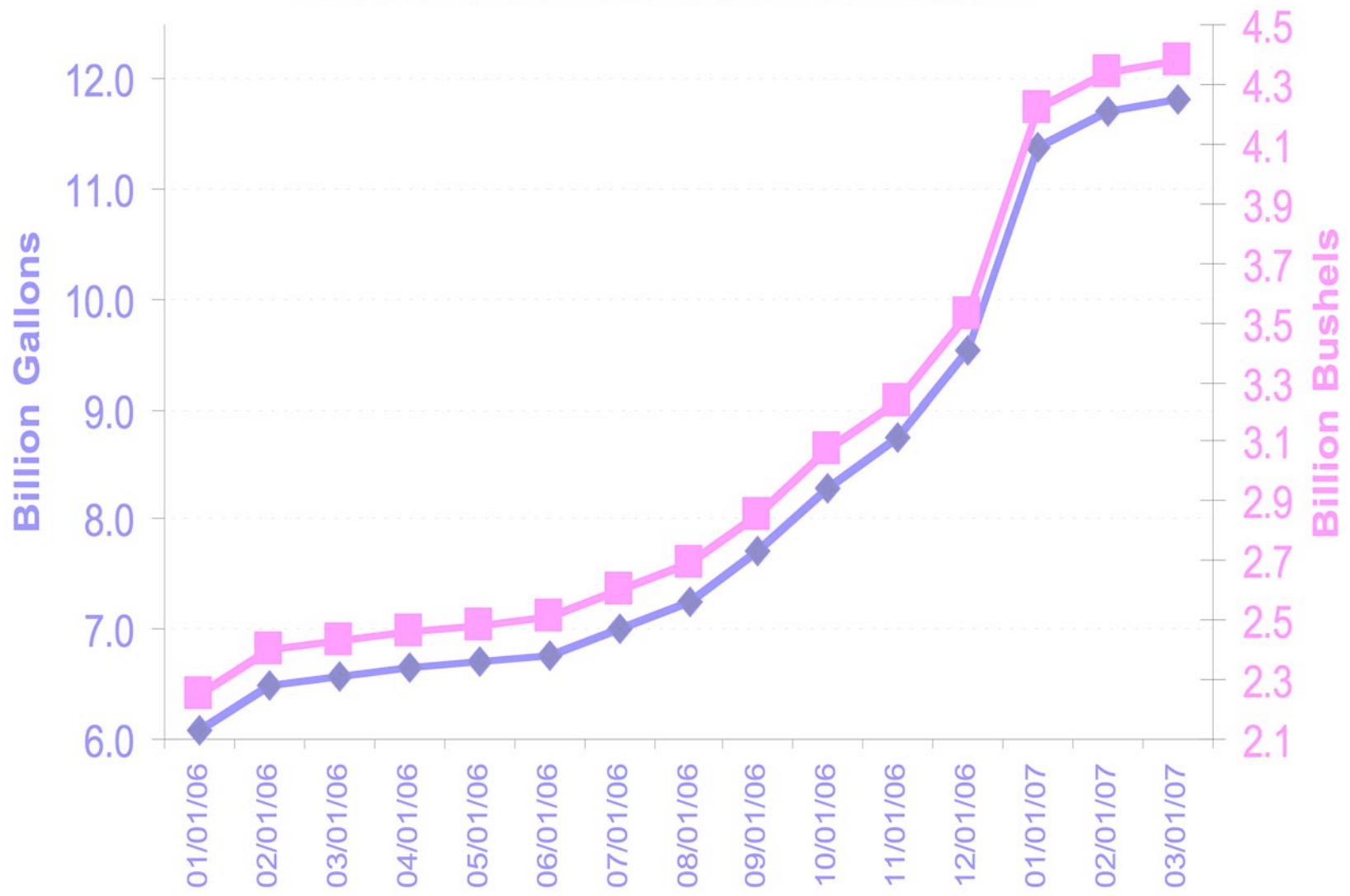
*U.S. Gasoline use is about 140 billion gallons per year.*

*Ethanol has about 70% of the energy of gasoline.*

# Corn Breakeven Price For Ethanol: November 2006 Estimated Costs: Variable



# Ethanol Capacity: Existing + Under Construction: Source: Renewable Fuels Association



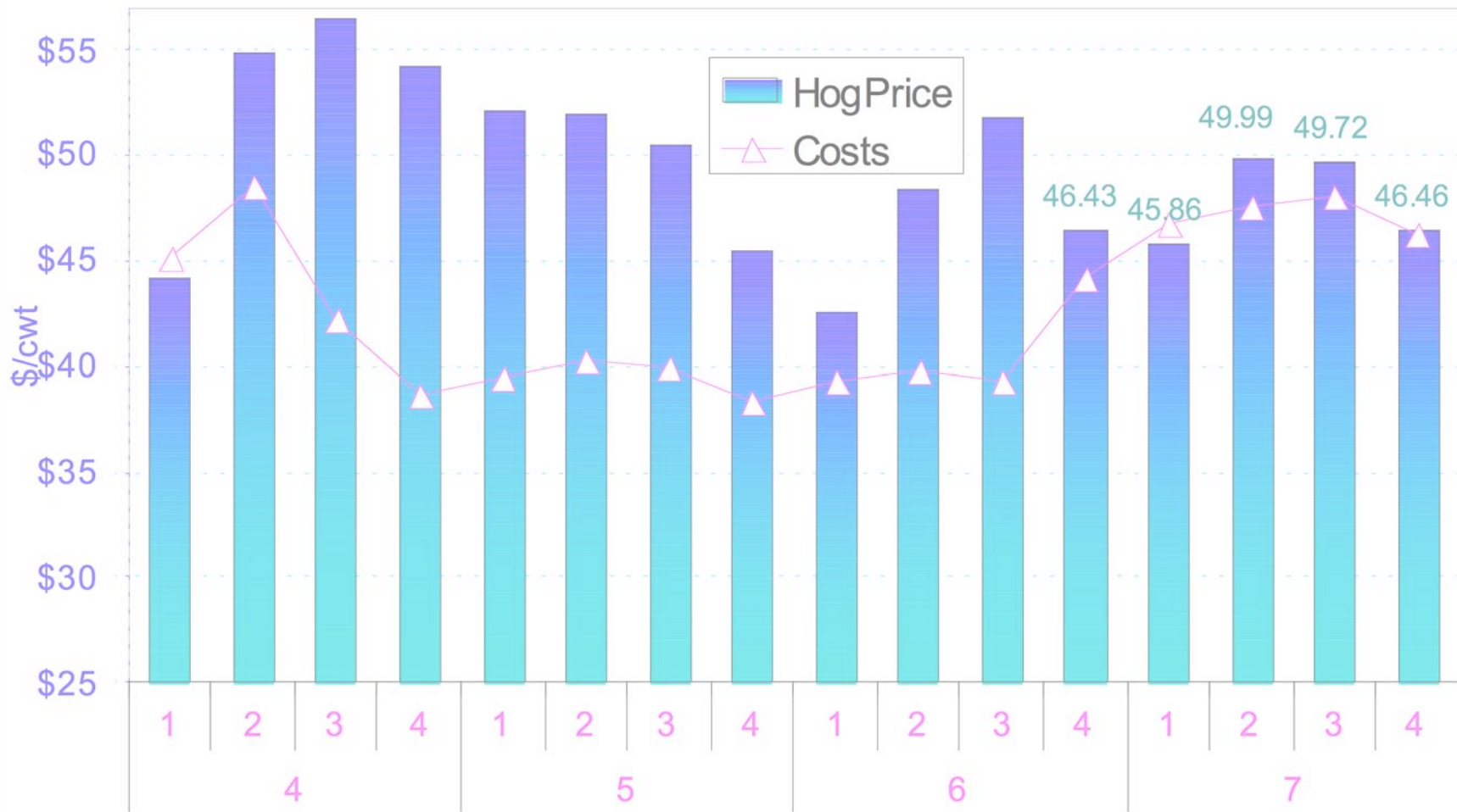


# BioFuels Consequences (Some Unintended) (Many Under Reported)



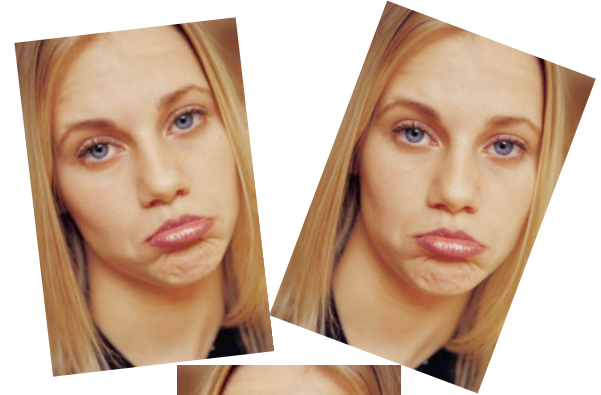
- Financial losses for livestock producers in the next few years
- Higher food prices in World and U.S.
- Much higher U.S. energy costs (will depend on a host of factors)
  - Wholesale Ethanol price has been 34% HIGHER than gasoline since 2000
  - And, ethanol has about 30% LESS energy
- Federal support 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

Estimated Hog Costs and Price (\$/cwt.):

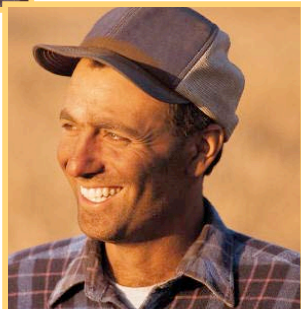


For 2007: Production up 1% to 2%. Prices mid to mid-\$40 this winter, then near \$50 for spring and summer. 2007 and 2008 adjustment period to higher feed prices. Hog prices finally higher by late-2008 and 2009.

# Indiana Farm Faces in 2007



Crops



Livestock

# Markets Must Find Balance Between

FOOD



FUEL



**1. Controlled and Sustainable**

**Vs.**

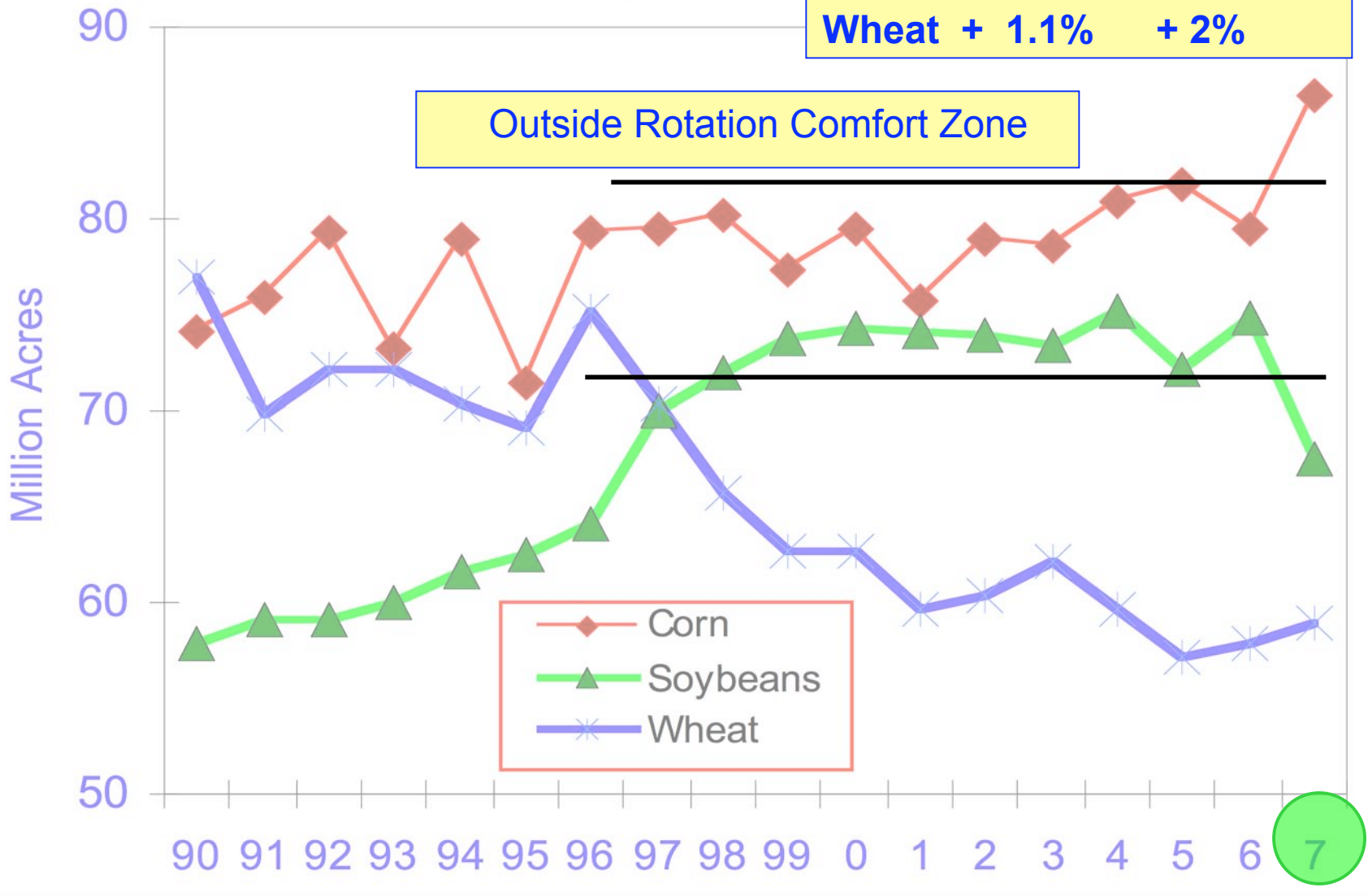
**2. Boom and Bust Cycle**



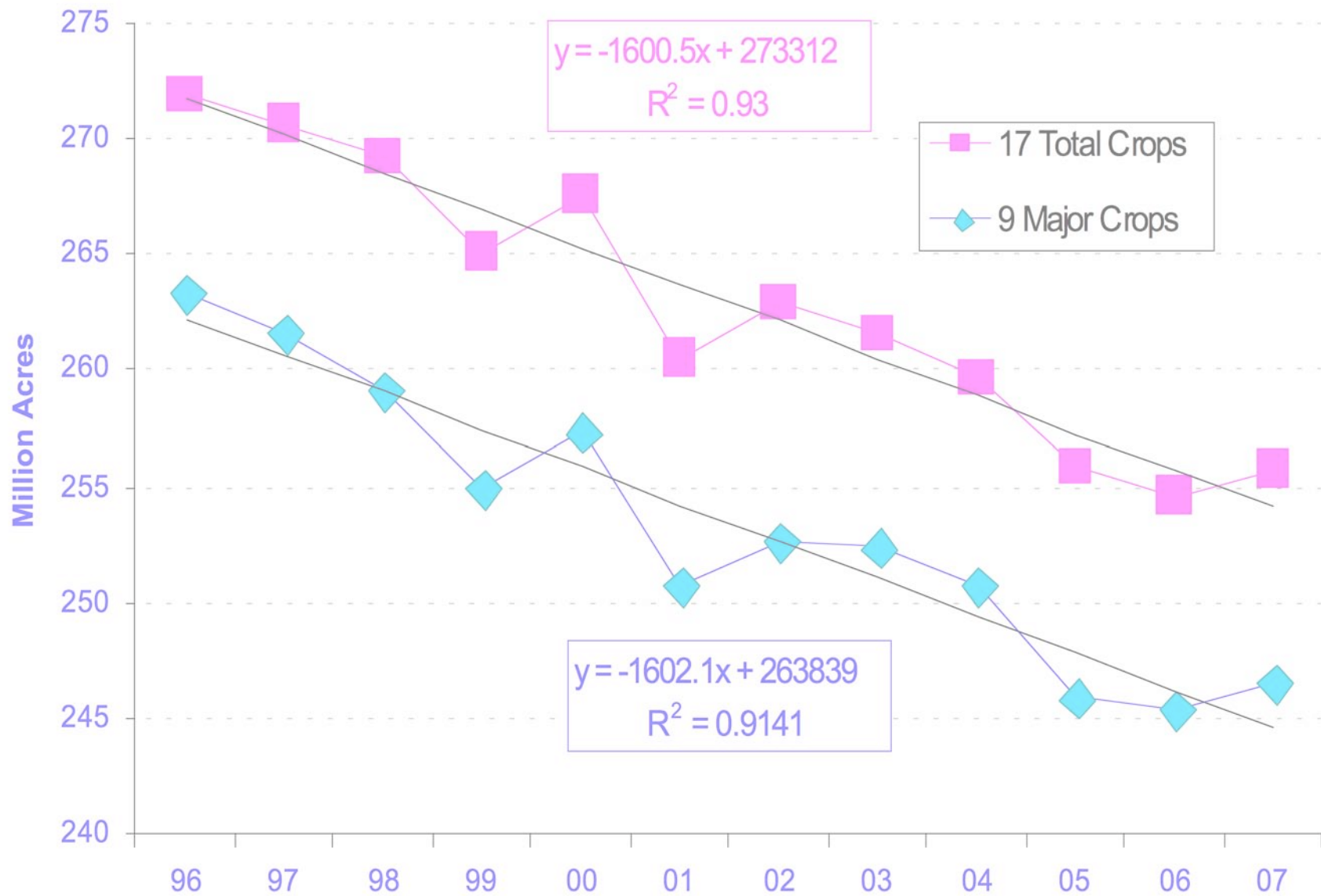
# U.S. Planted Acreage

	2006	2007:
Corn	- 2.9%	+12%
Beans	+ 3.8%	-10%
Wheat	+ 1.1%	+ 2%

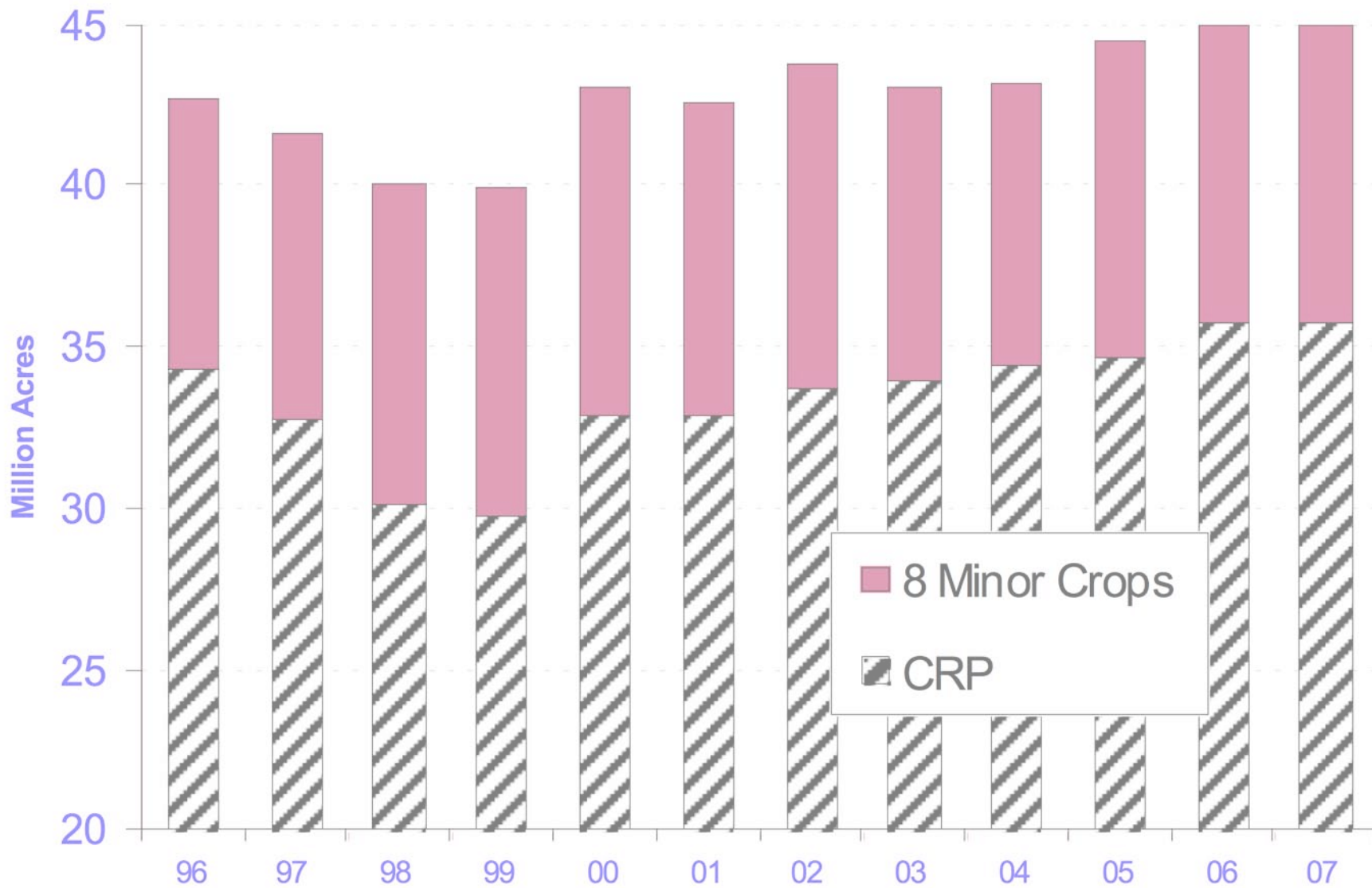
Outside Rotation Comfort Zone



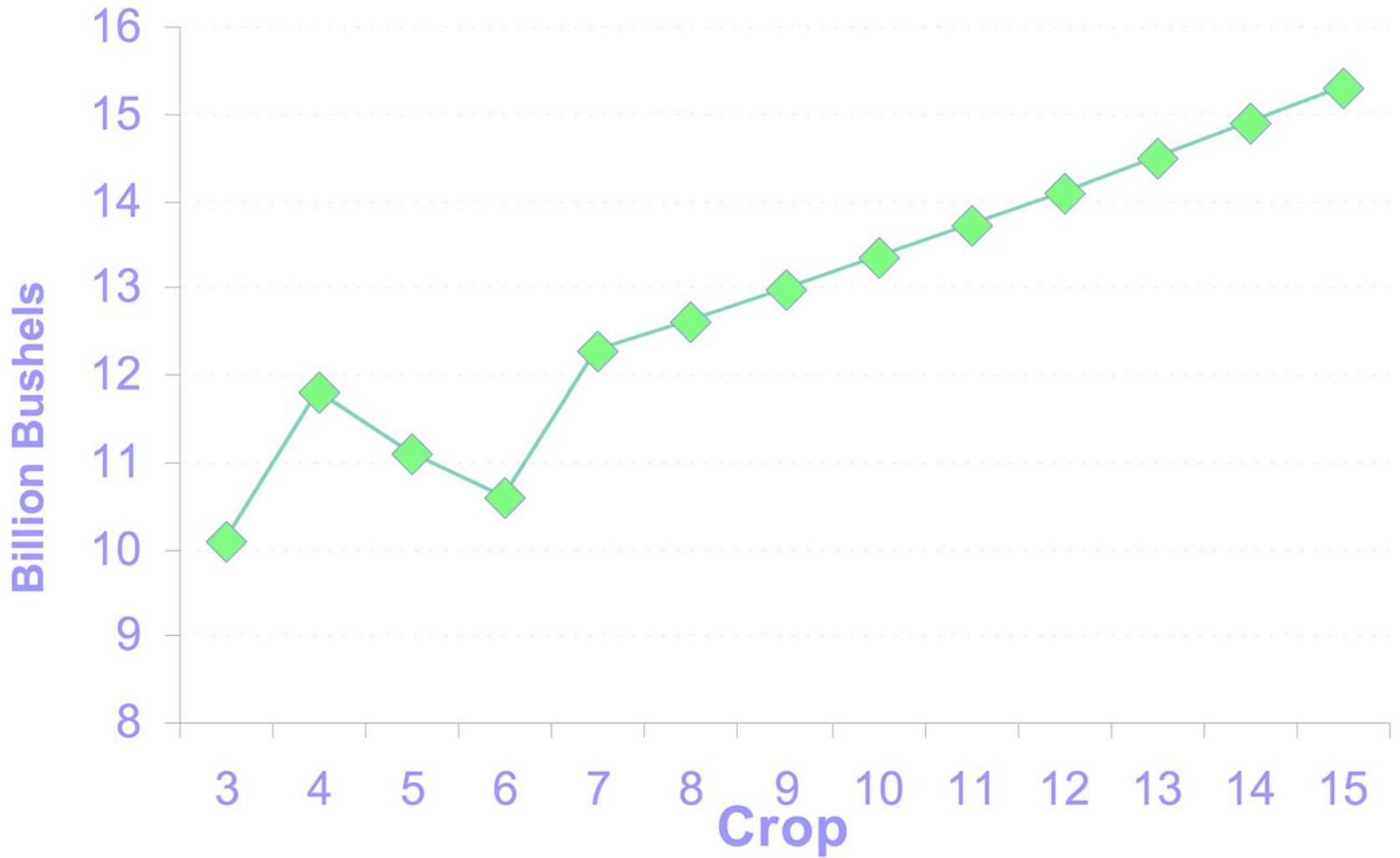
## U.S. Planted Acres Since Freedom to Farm



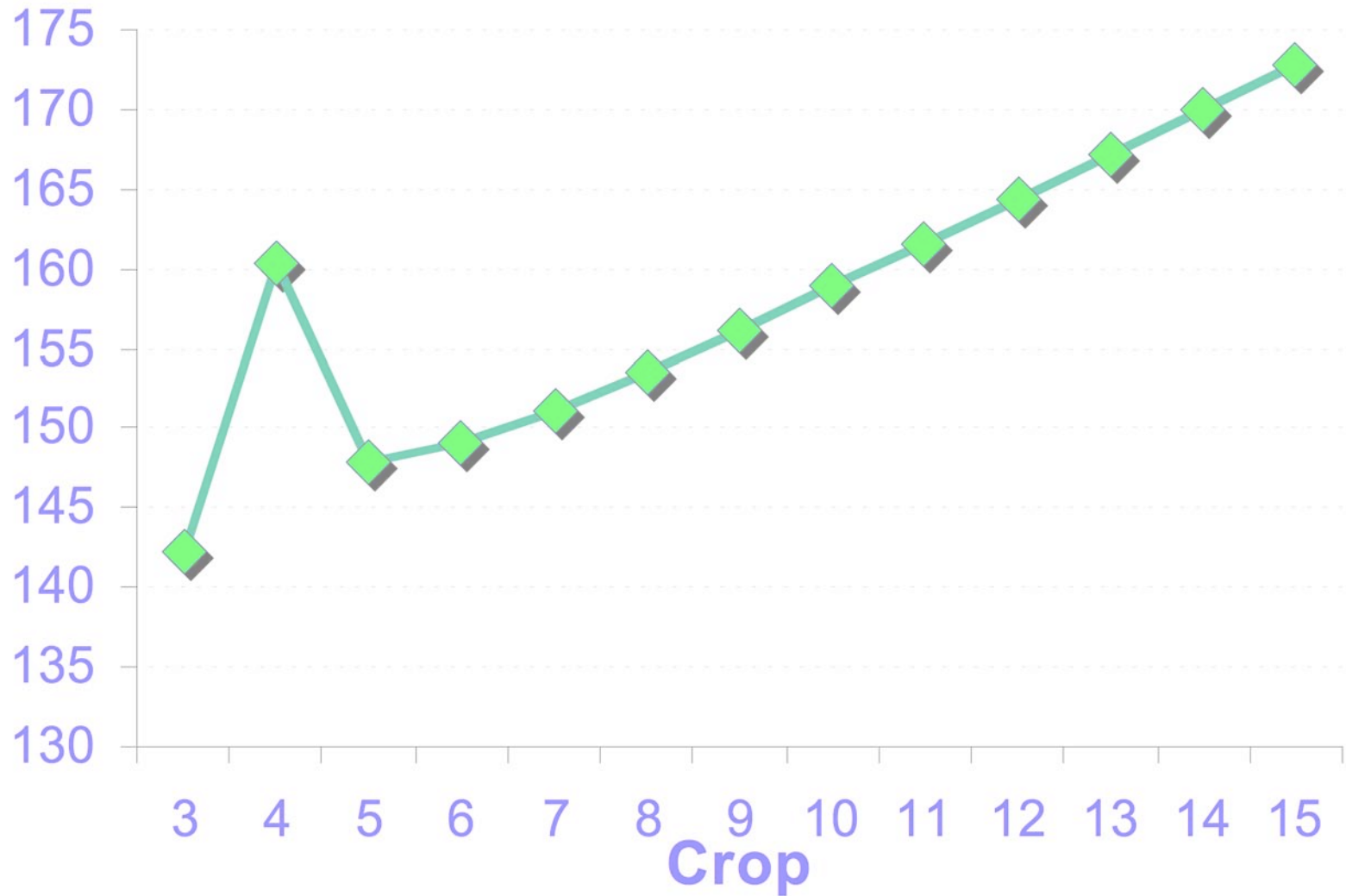
### Minor Crops and CRP



**Production: Acres= +1%/yr Yield=1.7%/yr**

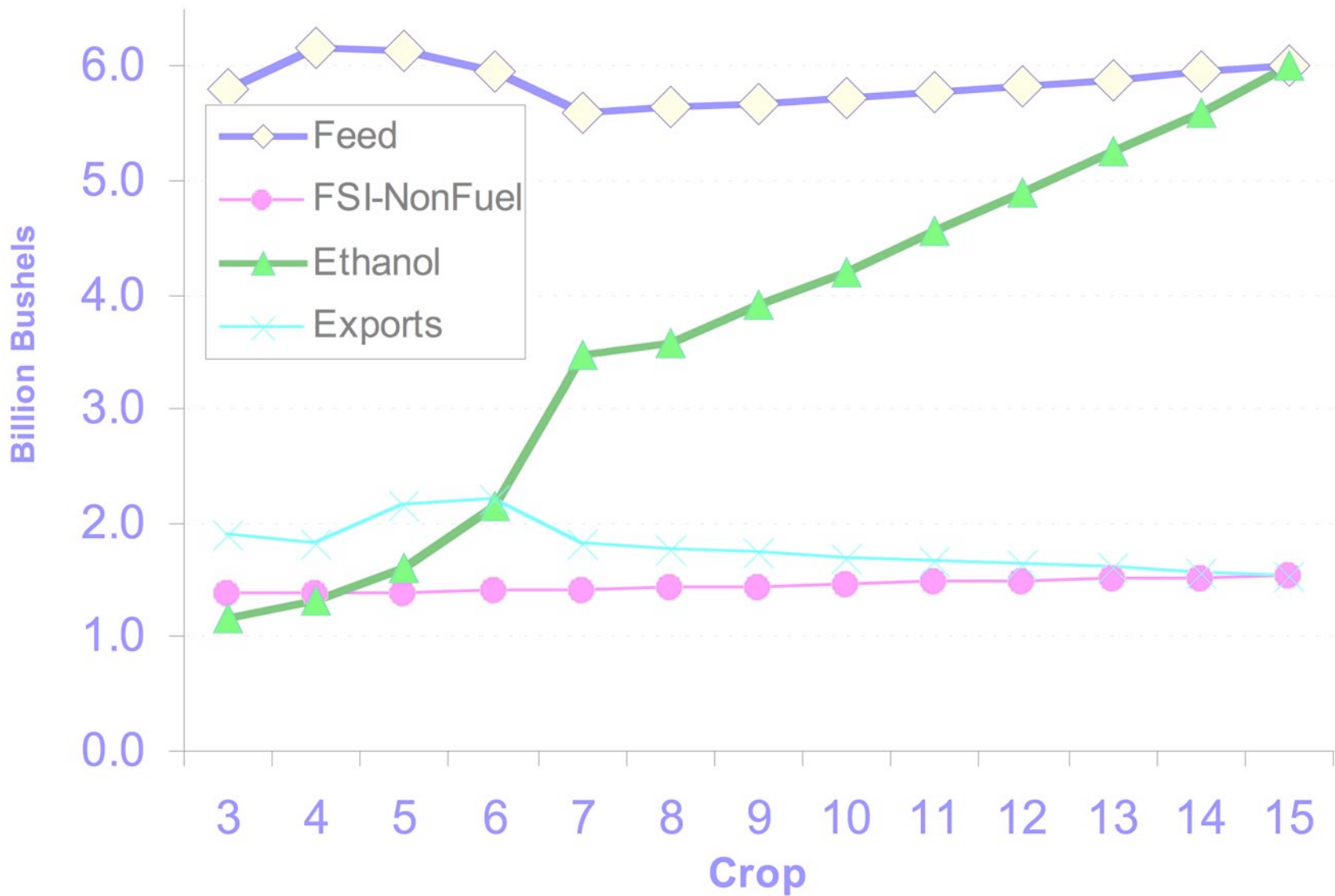


## Corn Yields Per Acre: 152 in 2007 then 1.7% Per Year Increase





## How Quick Can Ethanol Grow?



# Illustration Boom Bust Cycle



# 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

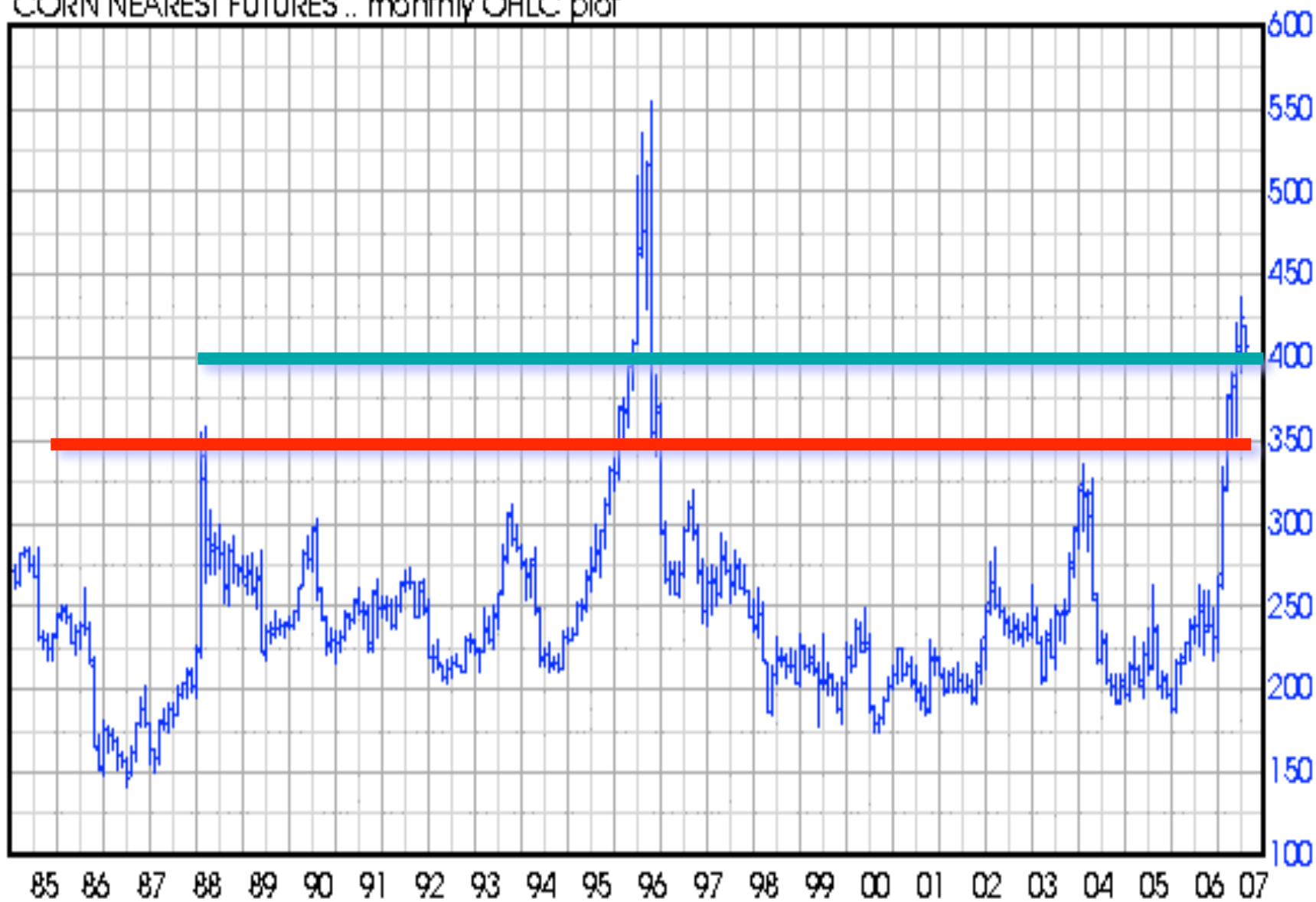
CORN NEAREST FUTURES .. monthly OHLC plot



As of 12/01/86

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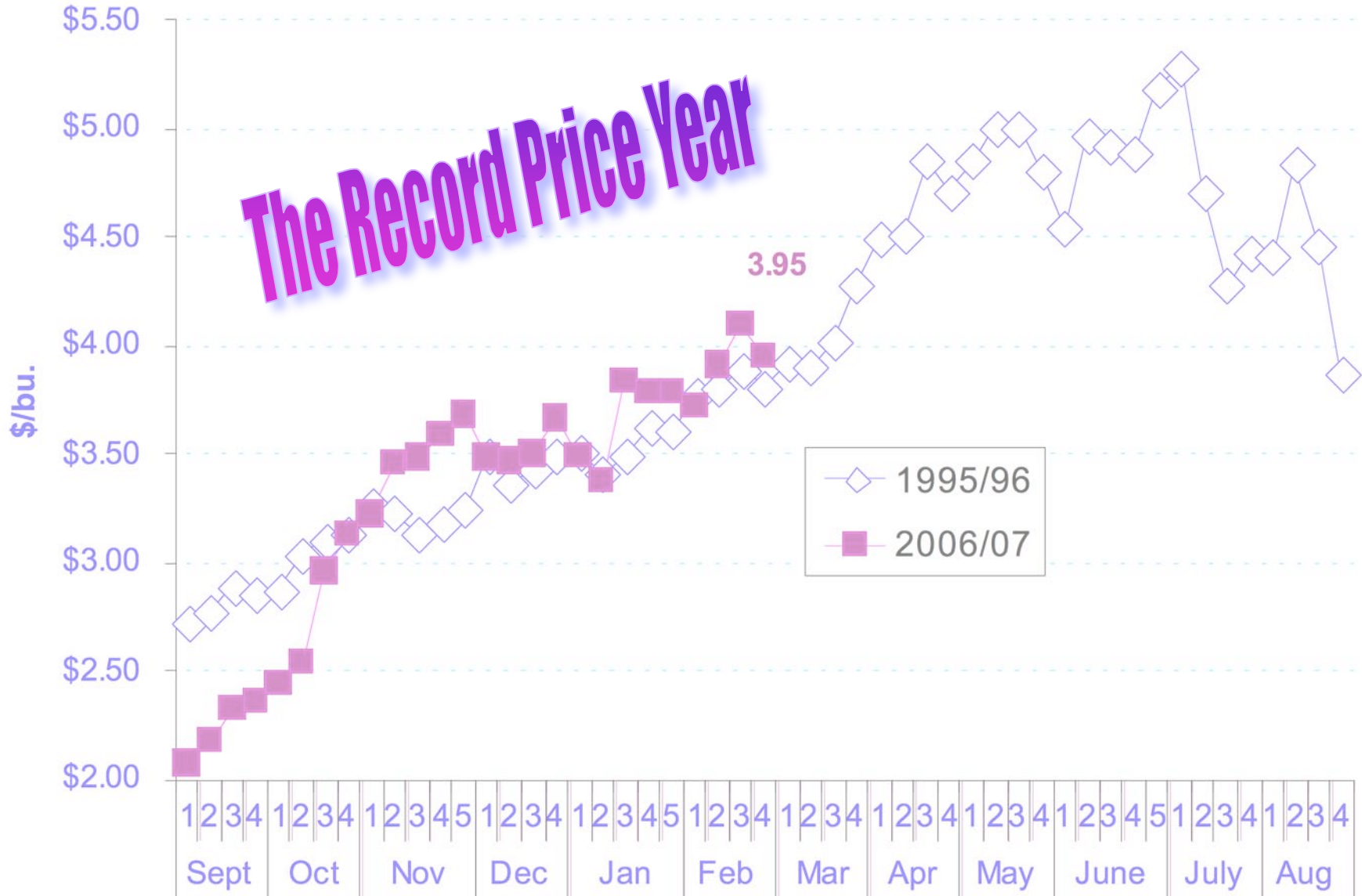
CORN NEAREST FUTURES .. monthly OHLC plot



As of 03/01/07

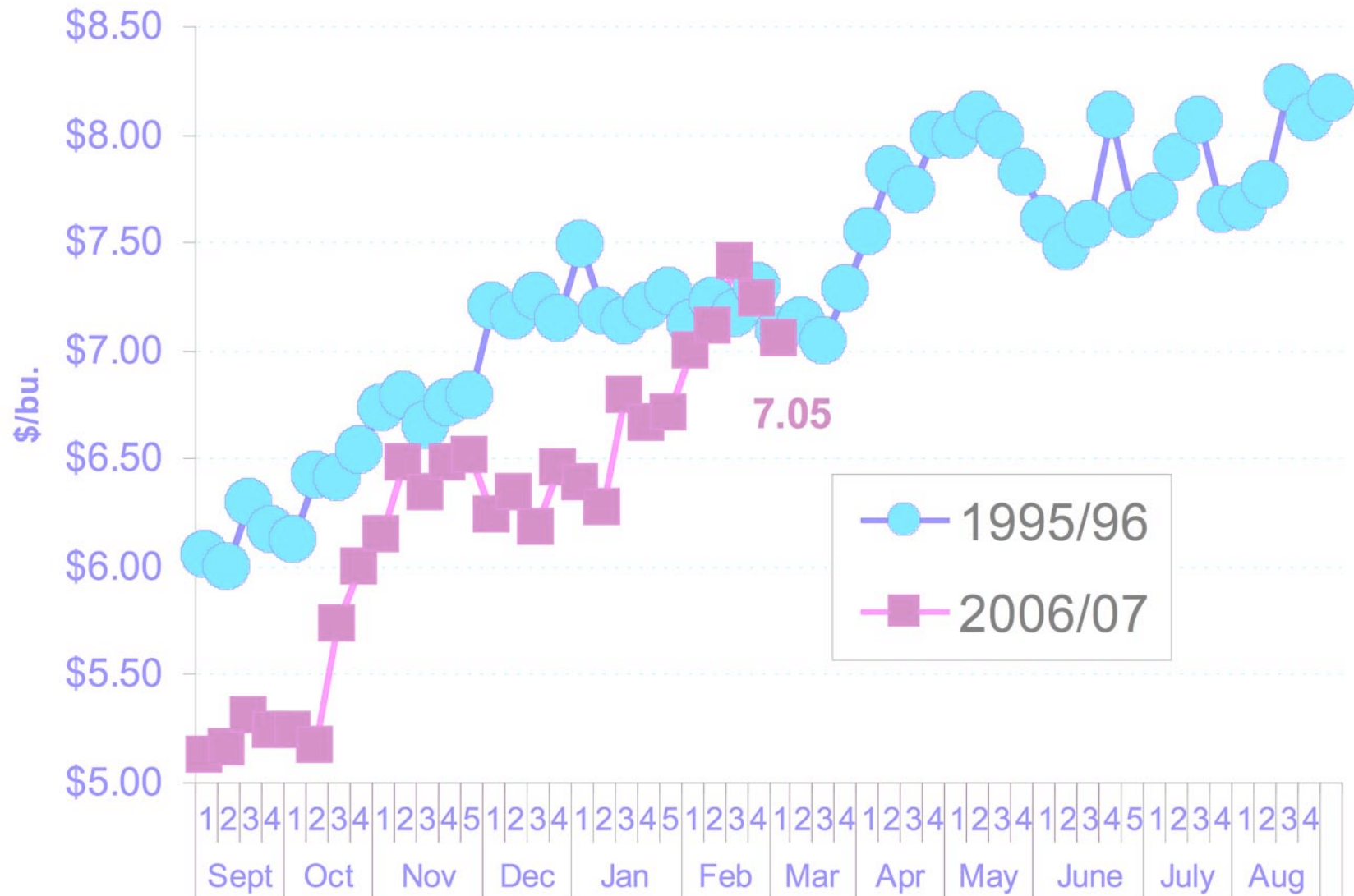
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# Central Indiana Cash Corn Prices 1995/96

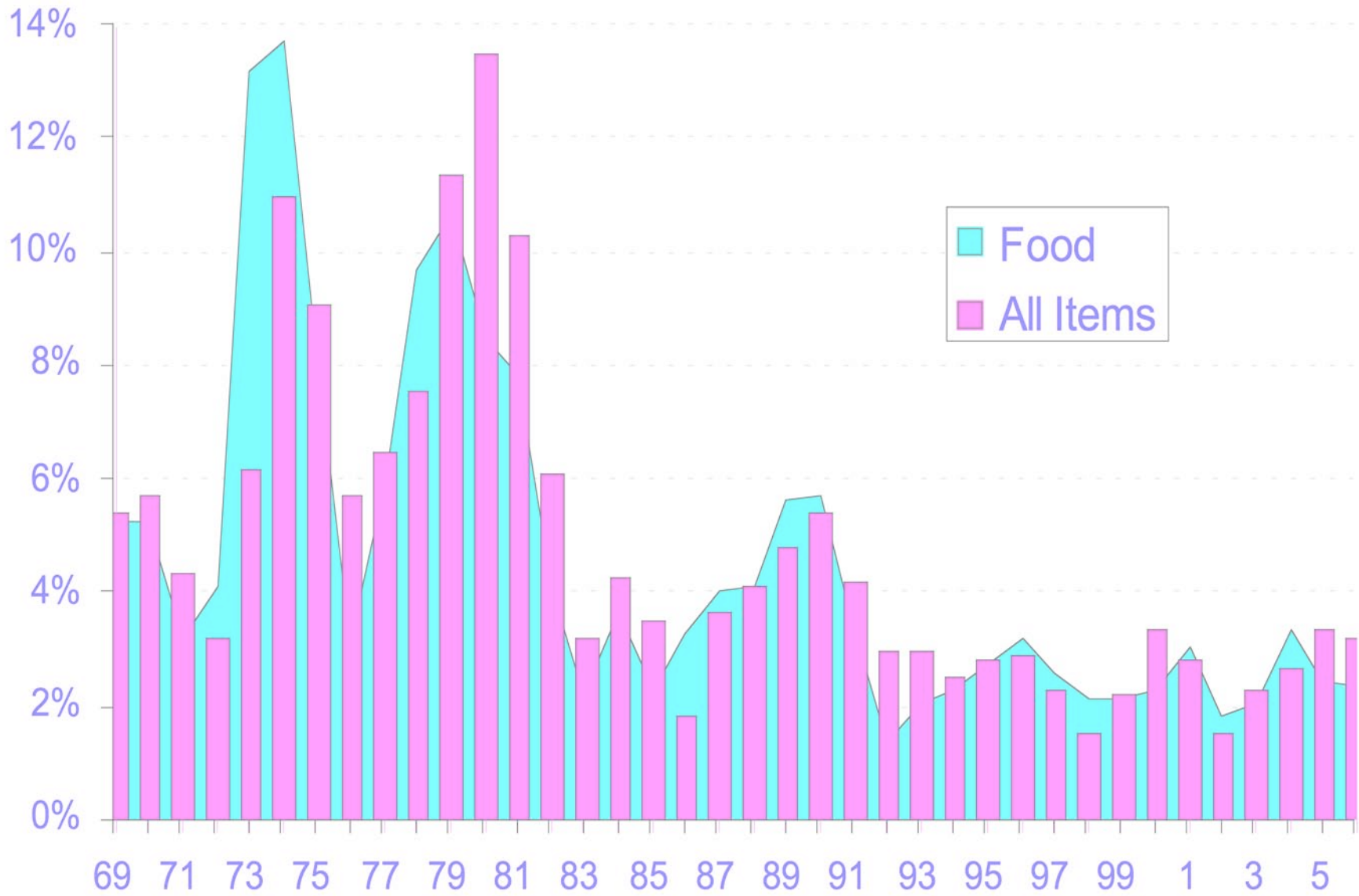




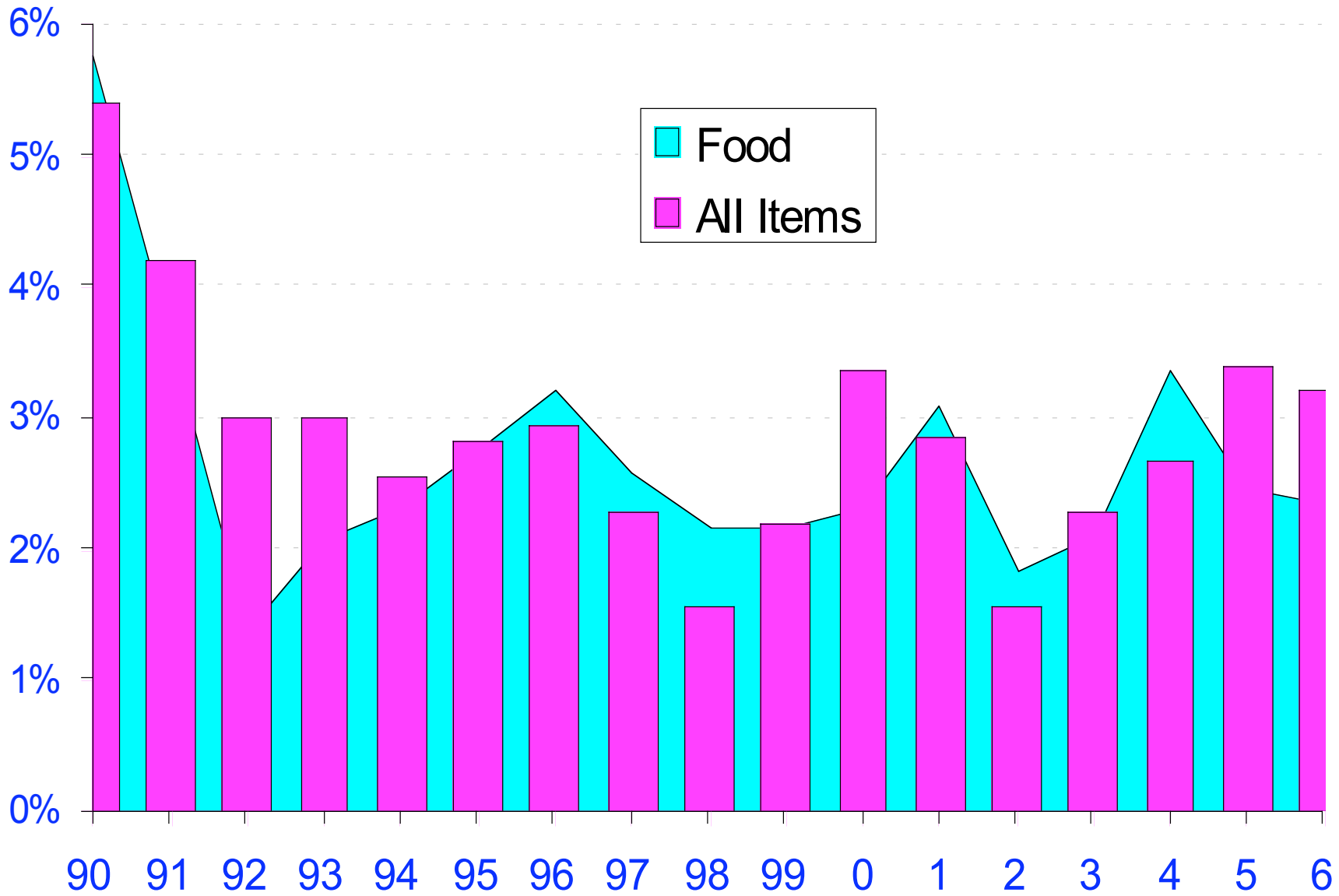
## Central Indiana Cash Bean Prices 1995/96



## Annualized Inflation Rates:



# Annualized Inflation Rates



# 2007 Estimated Crop Budget:

Indiana: March 12, 2007

Prices	Corn	Soybeans	Wheat
Harvest Futures	\$4.0300	\$8.0400	
Expected Basis	-0.20		-0.70
Expected Cash Price	\$3.83	\$7.74	\$4.13
Approximate Loan		\$5.12	\$2.50

**Consider tearing up wheat and seeding to corn-----\$35 to \$90 better anticipated return**

Estimated Yields and Returns/Acre Above Variable Costs

	<b>Corn</b>		<b>Soybeans</b>		<b>Wheat</b>	
Land Quality	<u>bu./acre</u>	<u>\$/acre</u>	<u>bu./acre</u>	<u>\$/acre</u>	<u>bu./acre</u>	<u>\$/acre</u>
<b>Low</b>	120.0	\$249	37.7	\$179	60.0	<b>\$145</b>
<b>Average</b>	153.0	\$347	48.0	<b>\$252</b>	70.0	\$170
<b>High</b>	183.0	\$431	57.5	<b>\$318</b>	74.0	\$168

Budget: Purdue ID 166

**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!

