

Biofuels: Implications for Agriculture and Energy

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Overview

- **Agriculture Background**
- **Status of Biofuels & Market Implications**
- **Public Policy and Biofuels**
 - **Energy Bill**
 - **Farm Bill**

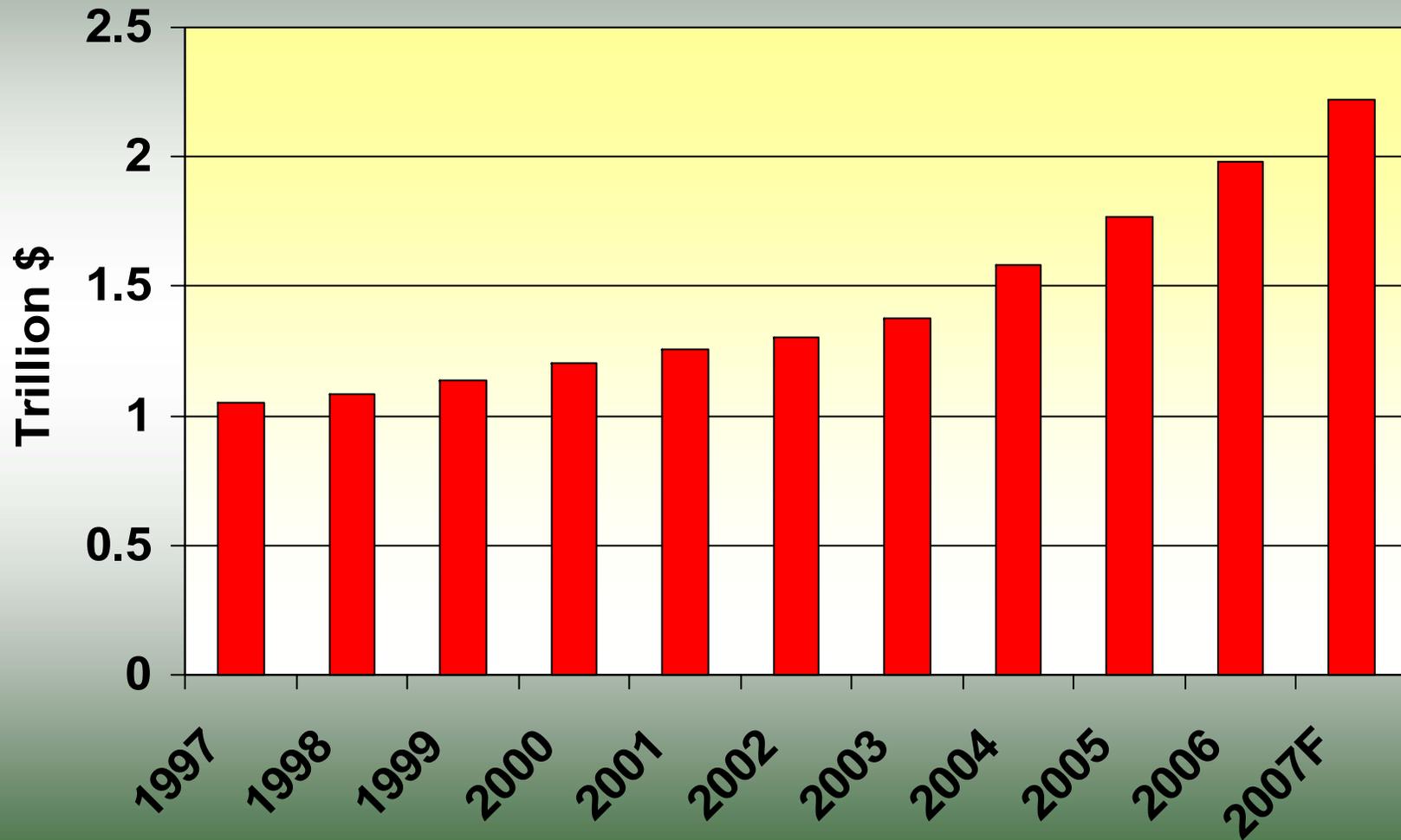
Agriculture at a Glance...

2007 was a very good year

Item	1997-2006 average	2007F
	<i>Billion \$</i>	
Farm cash receipts	211	282
Crop receipts	105	143
Corn receipts	18	33
Livestock receipts	106	140
Livestock feed costs	27	37
Net Farm Income	57	88

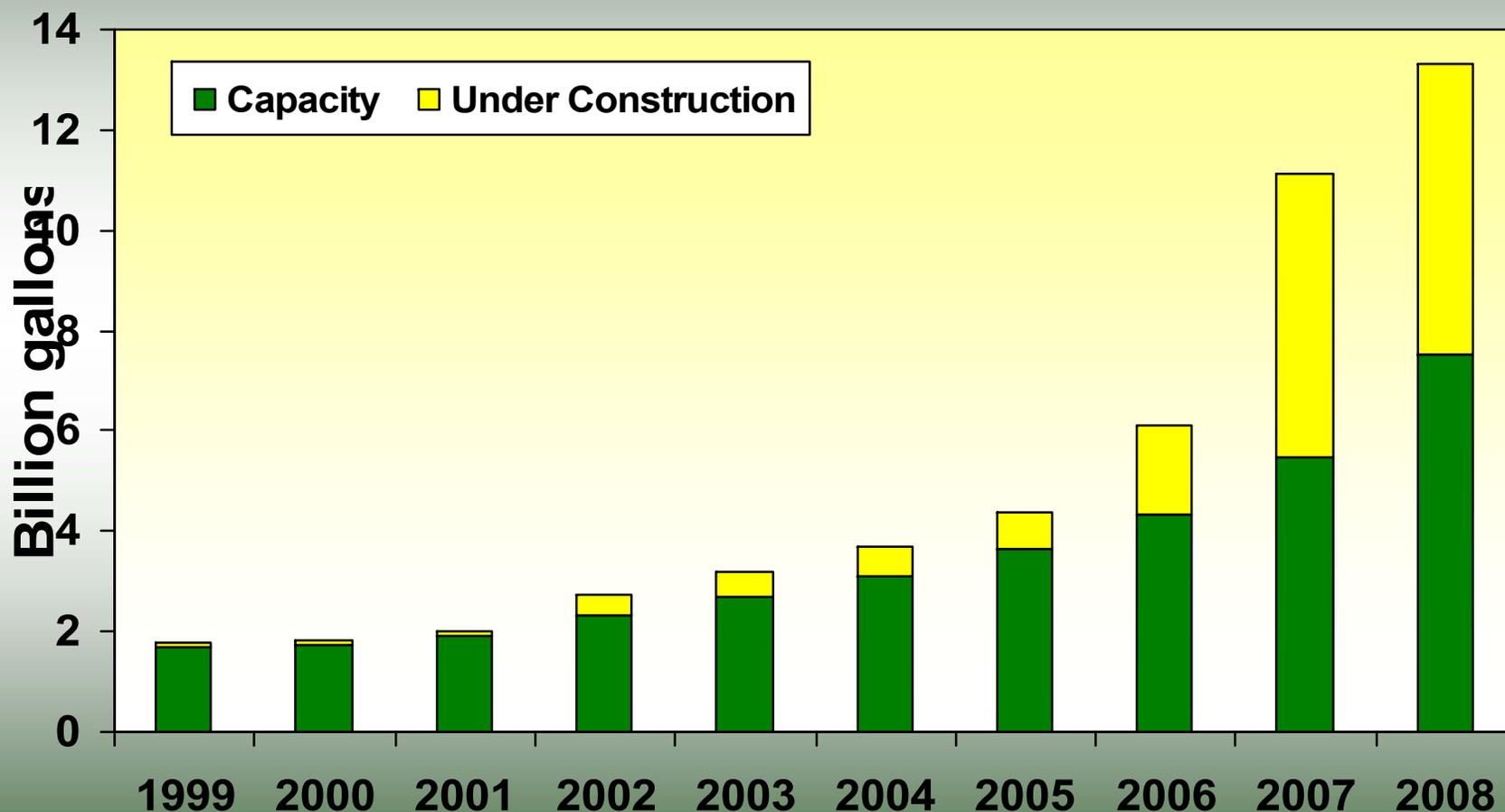
Reflected in Farm Assets . . .

expected to exceed \$2 trillion in 07



Ethanol Industry . . .

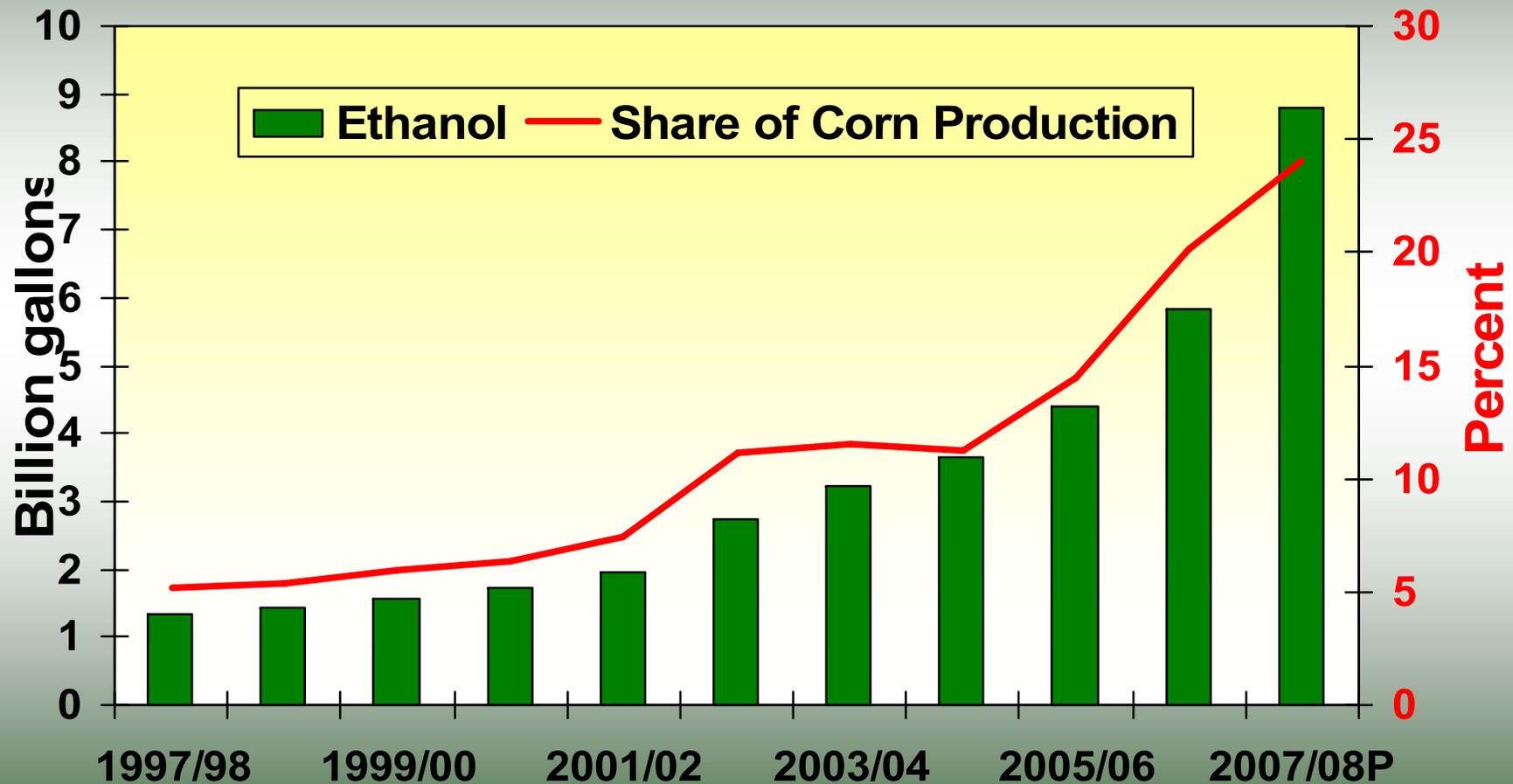
tremendous growth in capacity in the last 2 years



Source: Renewable Fuels Association. January 1 of each year.

Corn Ethanol Production . . .

expect to use 24% of '07 corn crop for nearly 9 bil. gal.

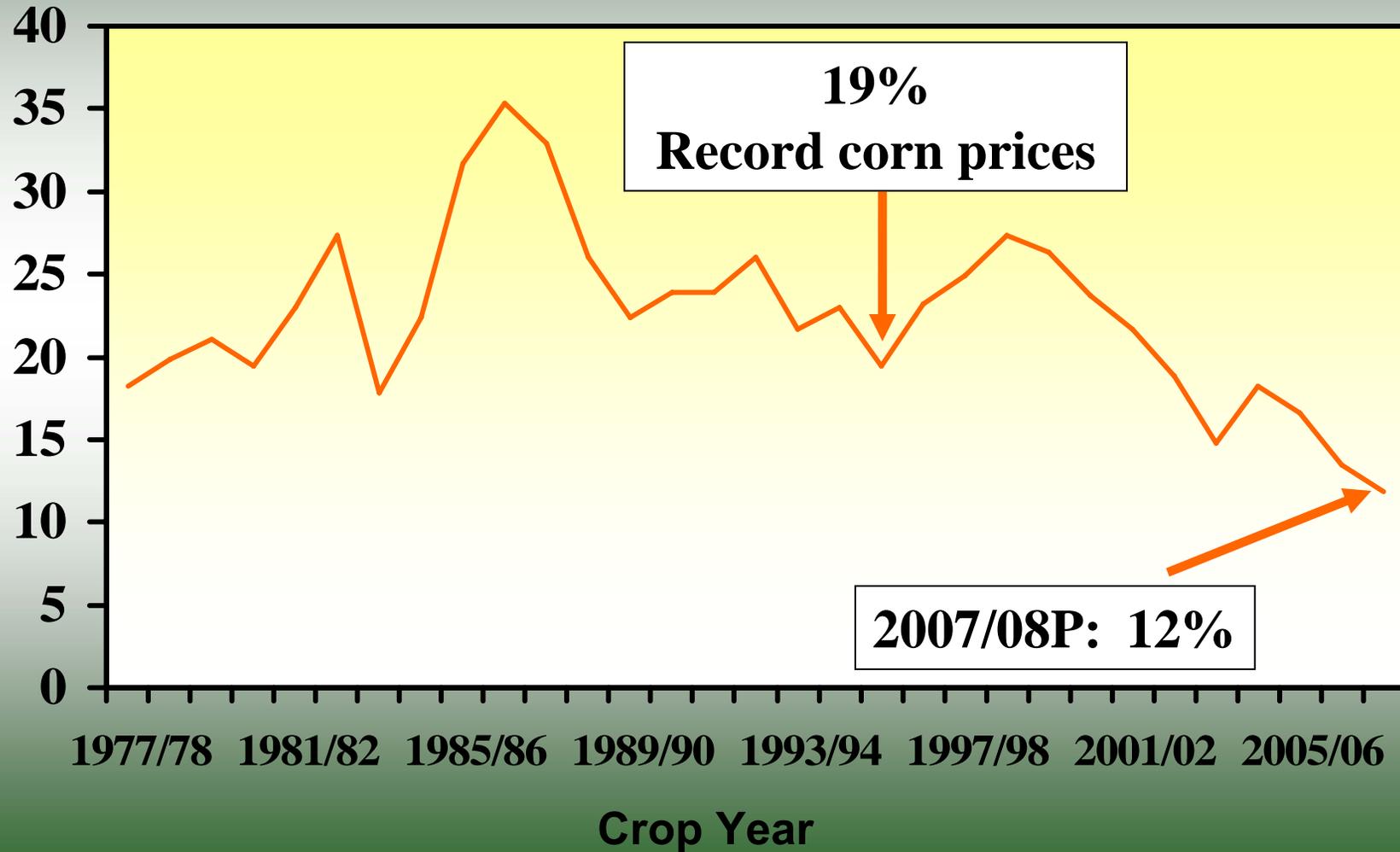


Marketing year begins September 1 for corn.

Global Coarse Grain Stocks . . .

getting uncomfortably tight

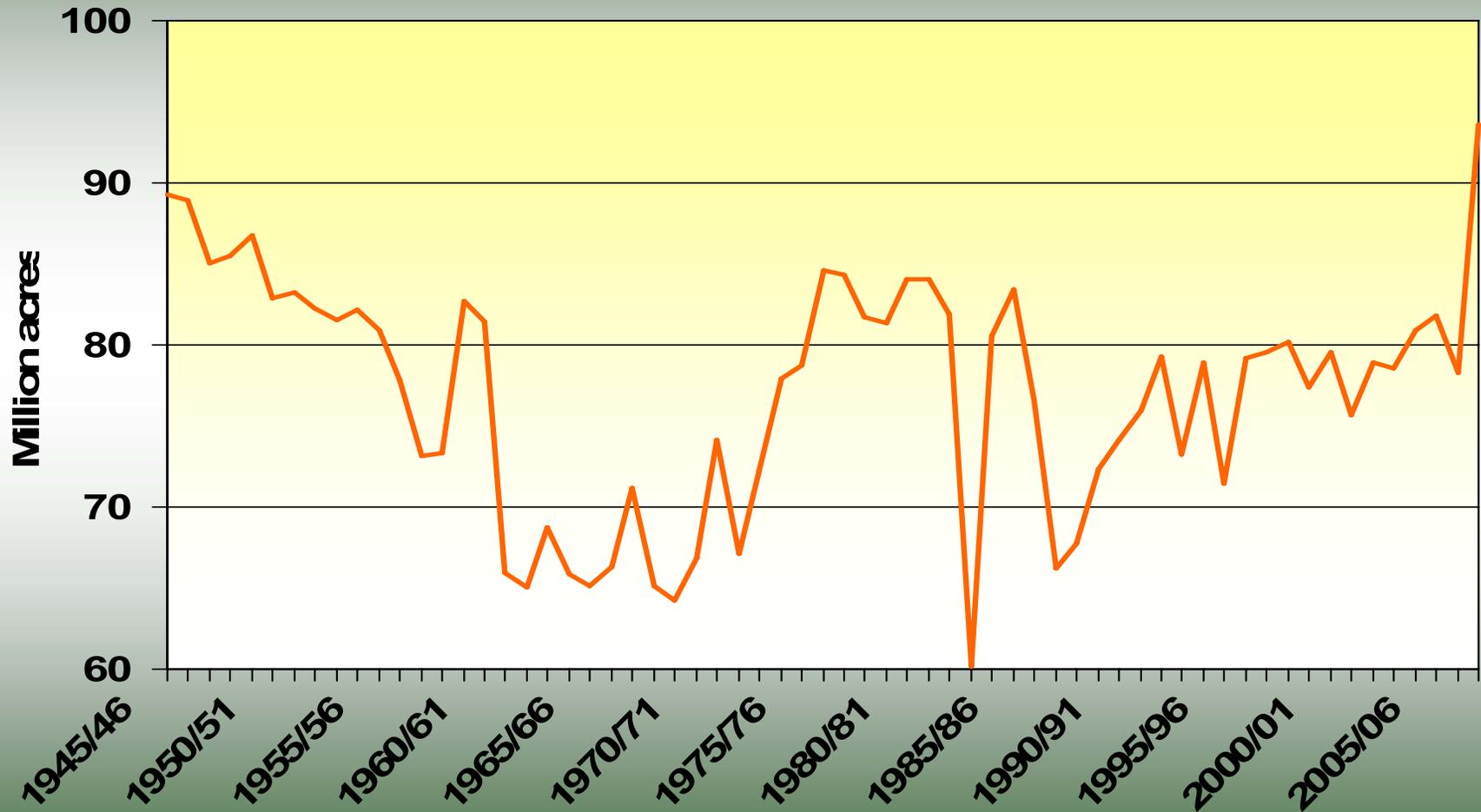
% of total use



Coarse grains are corn, sorghum, barely, oats, rye, millet, and mixed grains.

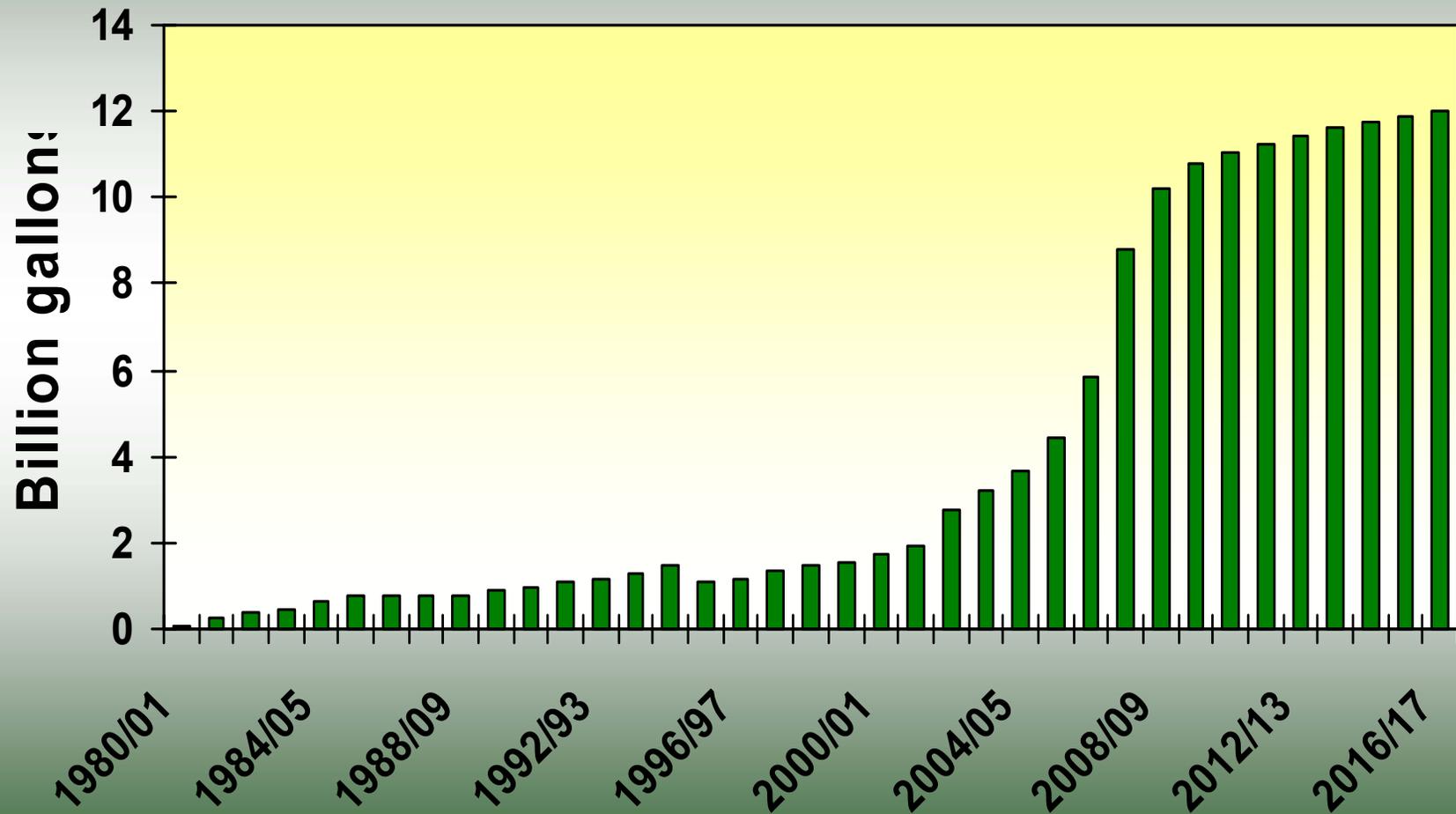
Planted Corn Acres . . .

highest Since 1945 expected



Projected Corn Ethanol Production...

expect 12 bil. gal. in 2016/17– 30% of corn crop



Ethanol Economics...

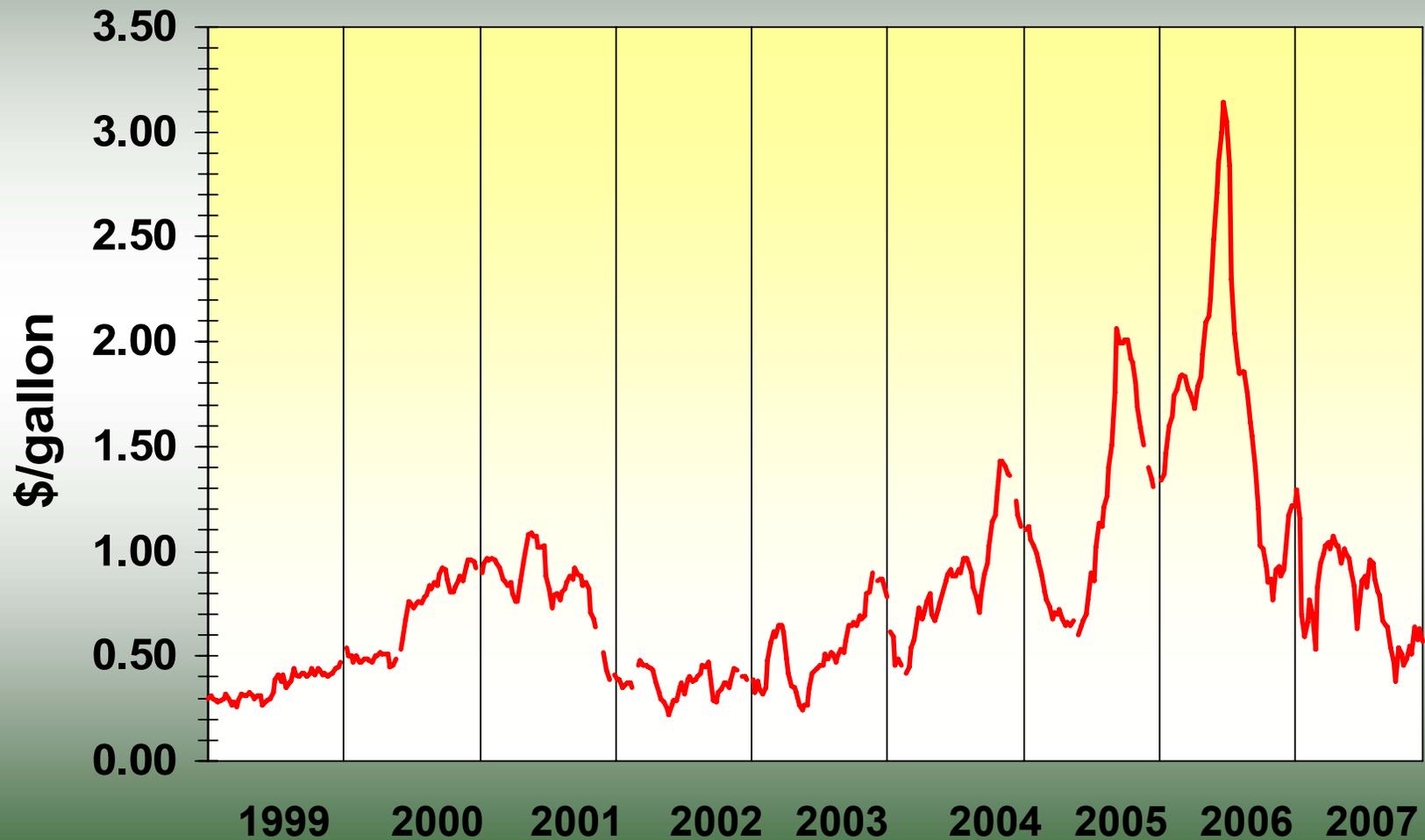
complicated market

Item	Jan. 07	Jan. 08
	\$/gallon	
Ethanol Price	\$2.21	\$2.18
- Corn Cost	- \$1.24	- \$1.61
= Ethanol-Corn Price Spread	= \$0.97	= \$0.57
+ DDG Value	+ \$0.39	+ \$0.55
= Available for Production and Capital Costs	= \$1.36	= \$1.12

Source: Prices for ethanol, corn, and DDG's are Iowa spot from USDA Livestock and Grain Market News, January 11.

Ethanol-Corn Price Spread . . .

weekly data [$P_{eth} - (P_{crn}/2.75)$]



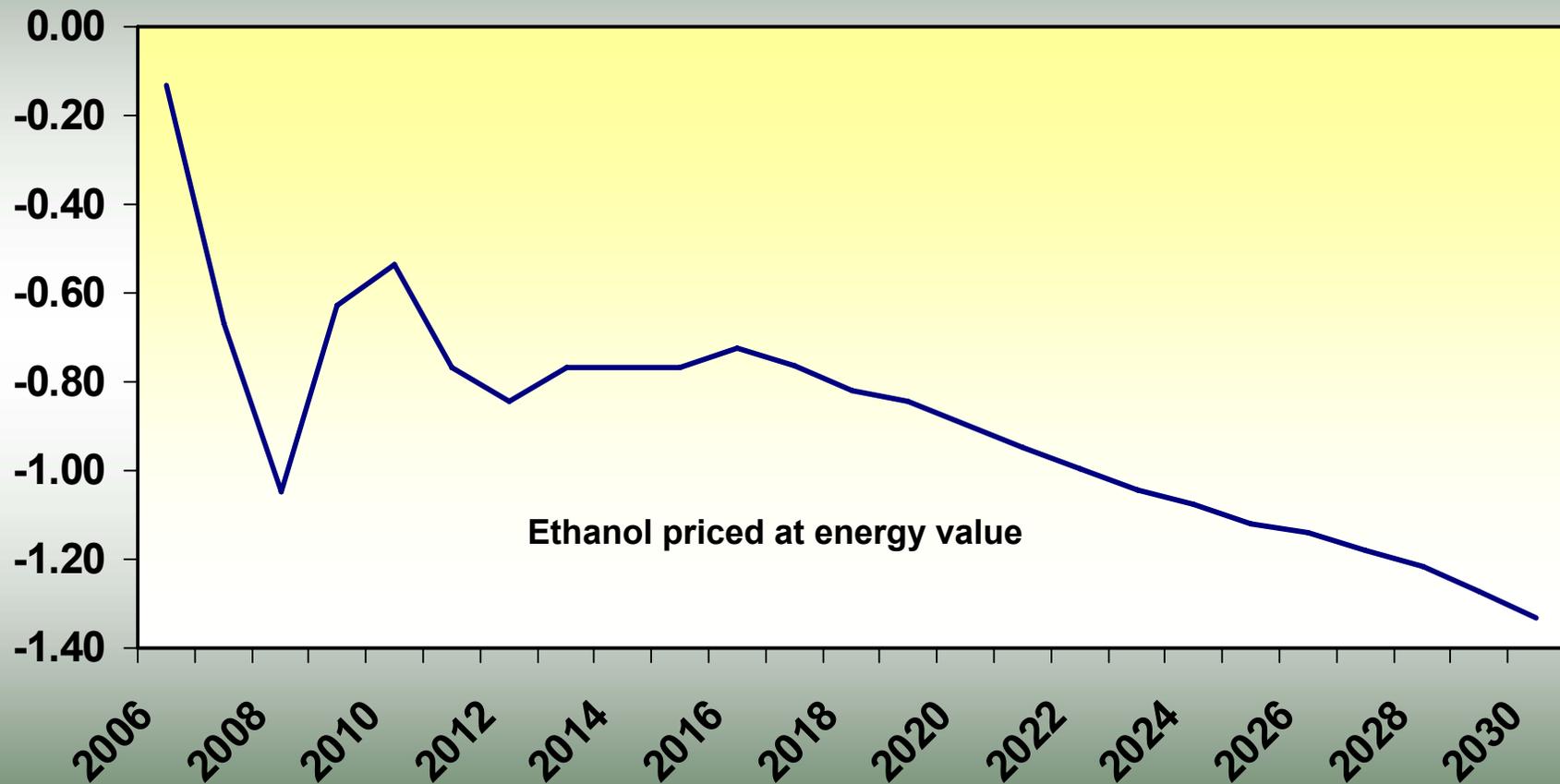
Ethanol-Gas Price Spread ...

weekly data Peth - Pgas



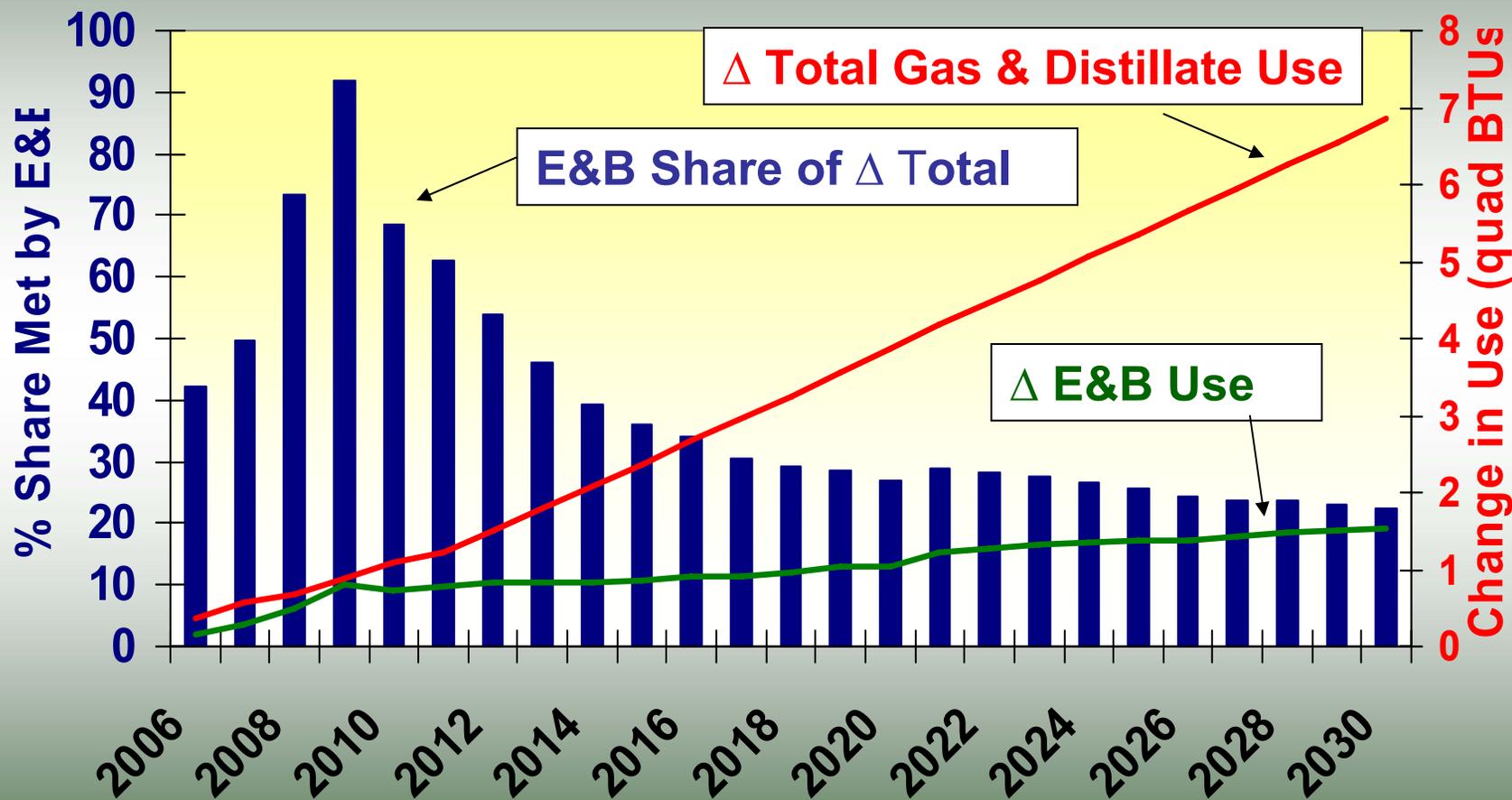
Ethanol-Gas Price Spread ...

where next? EIA Forecast



Source: 2008 EIA Annual Energy Outlook

Change in Fuel Use Since 2005 Met by Ethanol & Biodiesel



Source: 2008 EIA Annual Energy Outlook

Options to Maintain Biofuel Growth

- **Do Nothing**
- **Minimum Prices (price controls)**
- **Maintain or Amend Subsidies/Tax Preferences**
- **Increase Renewable Fuel Standards**
 - **“20 in 10”**
 - **Energy Bill**

Presidents' "20 in 10" Proposal

- **Reduce U.S. Gasoline Use by 20% in the Next 10 Years**
- **Path:**
 - **Modify CAFÉ**
 - **Require 35 billion gallons of renewable and alternative fuels by 2017**
- **\$1.00 per Gallon Safety Valve**
- **Role of Ethanol and Biodiesel – Market Driven**

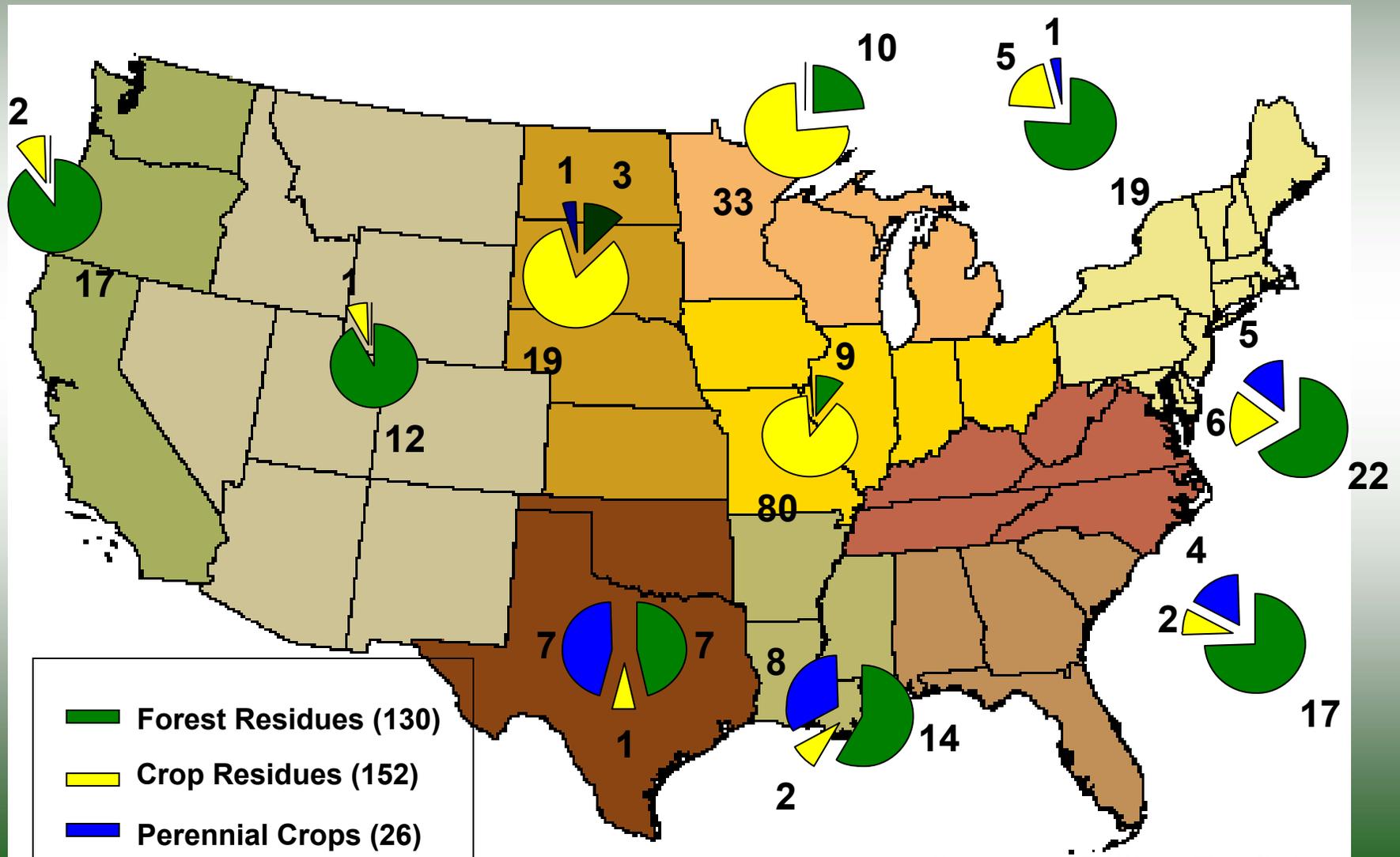
Energy Bill

- **Extends Renewable Fuel Standard**
- **Path:**
 - 36 billion gallons of renewable fuels by 2022
- **No Explicit Safety Valve – Waivers Allowed**
- **Role of Ethanol and Biodiesel**
 - **Renewable Fuels** 36 billion gallons
 - **Advanced Biofuels** 21 billion gallons
 - (not ethanol from corn starch)
 - **Cellulosic Biofuels** 16 billion gallons
 - (60% reduction in baseline emissions)
 - **Biomass Based Biodiesel** 1 (2012)
 - **Other (ethanol from sugar, biobutanol)**

Biomass Potential by 2017

(excluding corn based ethanol)

(310 million tons of biomass = 28 billion gallons of ethanol)



Source: "Billion-Ton" Study

Cost Competitiveness of Cellulosic Ethanol

	Corn Jan. 11 2008	Cellulosic Today <i>DOE est.</i>	Cellulosic 2012 <i>DOE target</i>
Net Feedstock*	\$1.06 2.75g/bu	\$0.92 65g/dt	\$0.52 90g/dt
Enzymes	\$0.04	\$0.32	\$0.10
Processing **	\$0.62	\$0.93	\$0.50
Plant Balance	\$0.20	\$0.34	\$0.22
Total	\$1.92	\$2.51	\$1.33

•*(includes harvest, preprocessing, transportation, grower payment)

•**(includes prehydrolysis, saccharification/fermentation)

•Cellulosic Costs are from DOE. Biomass Multi-Year Program Plan. November 2007.

Challenges Facing Ethanol

- **Global Weather**
- **Demand growth for blends/E85**
- **Ethanol distribution system**
- **Tax credit and tariff**
- **Environmental issues: nitrogen, water quantity & quality, CRP**
- **Meat and consumer food prices**

Challenges Facing Corn-Based Ethanol

- **Corn trend acreage & yields**
- **Livestock feed costs & adjustments**
- **DDG quality**
- **New RFS fuel categories**

Challenges Facing Cellulosic-Based Ethanol

- **Biomass yields/Feedstock Production Costs**
 - University of Nebraska: \$44/ton
 - Iowa State: \$60/ton
- **Transportation**
- **Plant Infrastructure**
 - 1 billion gallons = 40 - 25 million gpy plants
 - 10 billion gallons = 400 – 25 million gpy plants
 - 16 billion gallons = 640 – 25 million gpy plants
- **Market Development**

Senate Farm Bill

- **Biomass Crop Transition**
 - Transition Assistance - \$130 mil.
 - CHST of Renewable Biomass - \$30 mil.
 - Forest Biomass Planning
- **Biorefining and Repowering**
 - Grants/Cost Shares -\$300 mil.
 - Loan Guarantees
- **Bioenergy Program for Advance Biofuels**
 - Incentives to purchase renewable feedstocks -\$245 mil.

Senate Farm Bill

- **Renewable Energy for America Program**
 - **Promote Energy Efficiency -\$230 mil.**
- **Biomass R&D**
 - **\$75 mil.**
- **Sun Grant Program**
 - **Regional Centers -\$25 mil.**
- **Regional Biomass Crop Experiments**
 - **\$40 mil.**

Conclusions

- ***Tight agricultural markets raising risks***
- ***Corn ethanol:***
 - Approaching limits
 - Making minor inroads in crude oil market
 - Can do a little more with better yields
- ***Cellulosic technology:***
 - Great prospects
 - Large potential biomass feedstock base (technical)
 - Must focus on economic potential
 - Need to improve yields to reduce feedstock costs
 - Public policy goal to get over initial adjustment costs