

# **The New World of Biofuels: Implications for Agriculture and Energy**

**Keith Collins, Chief Economist, USDA**

***EIA Energy Outlook, Modeling, and Data  
Conference***

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# Overview

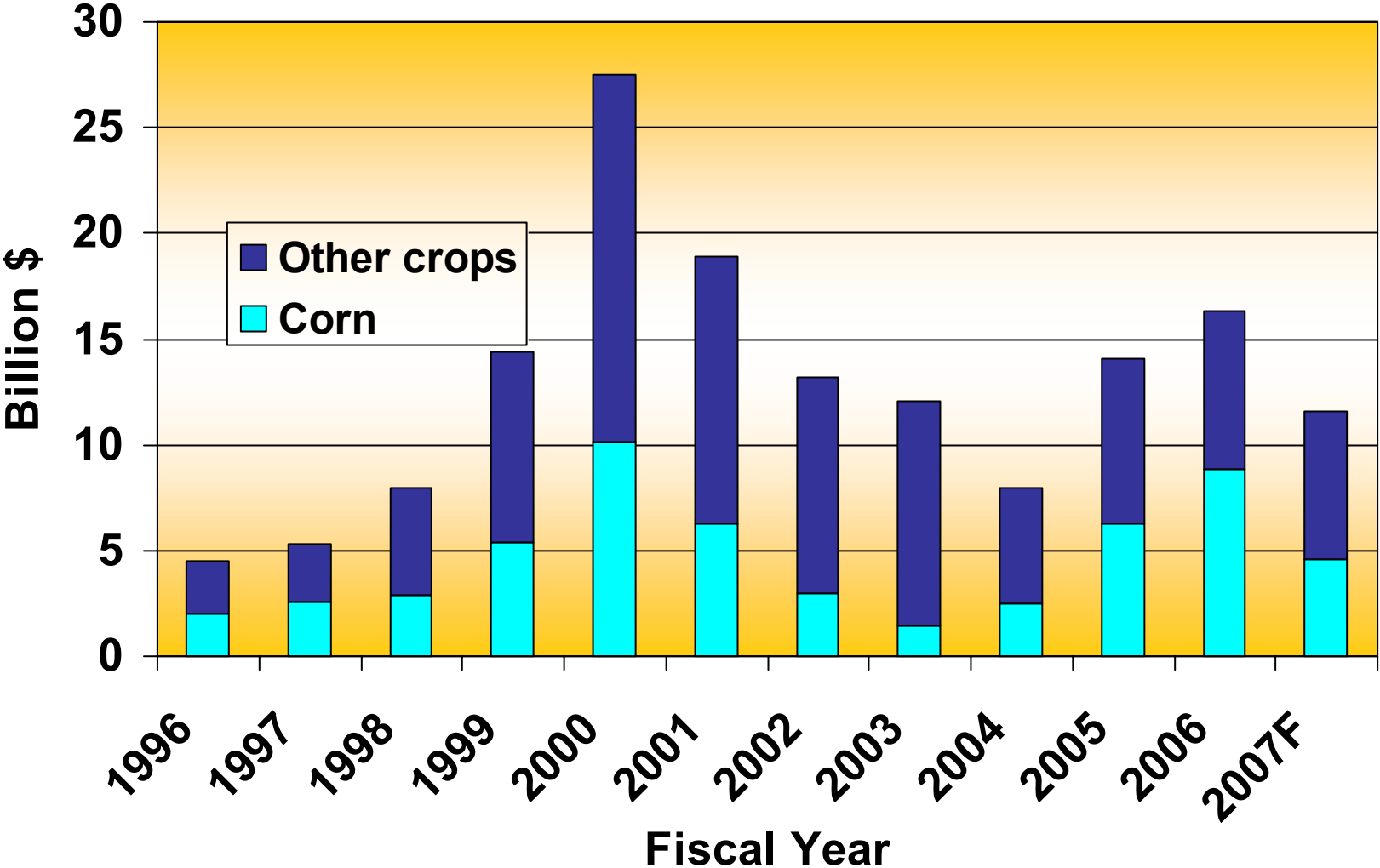
- **Ag 101**
- **Status of Biofuels & Market Implications**
- **Public Policy and Biofuels**
- **Role of Research**
- **USDA Energy Policy & 2007 Farm Bill**

# Ag at a Glance

Item	2006	2007F
	<i>Billion \$</i>	
<b>Farm cash receipts</b>	<b>243</b>	<b>259</b>
<b>Crop receipts</b>	<b>122</b>	<b>134</b>
<b>Corn receipts</b>	<b>23</b>	<b>31</b>
<b>Livestock receipts</b>	<b>121</b>	<b>125</b>
<b>Livestock feed costs</b>	<b>31</b>	<b>35</b>
<b>Value of exports (FY)</b>	<b>69</b>	<b>78</b>

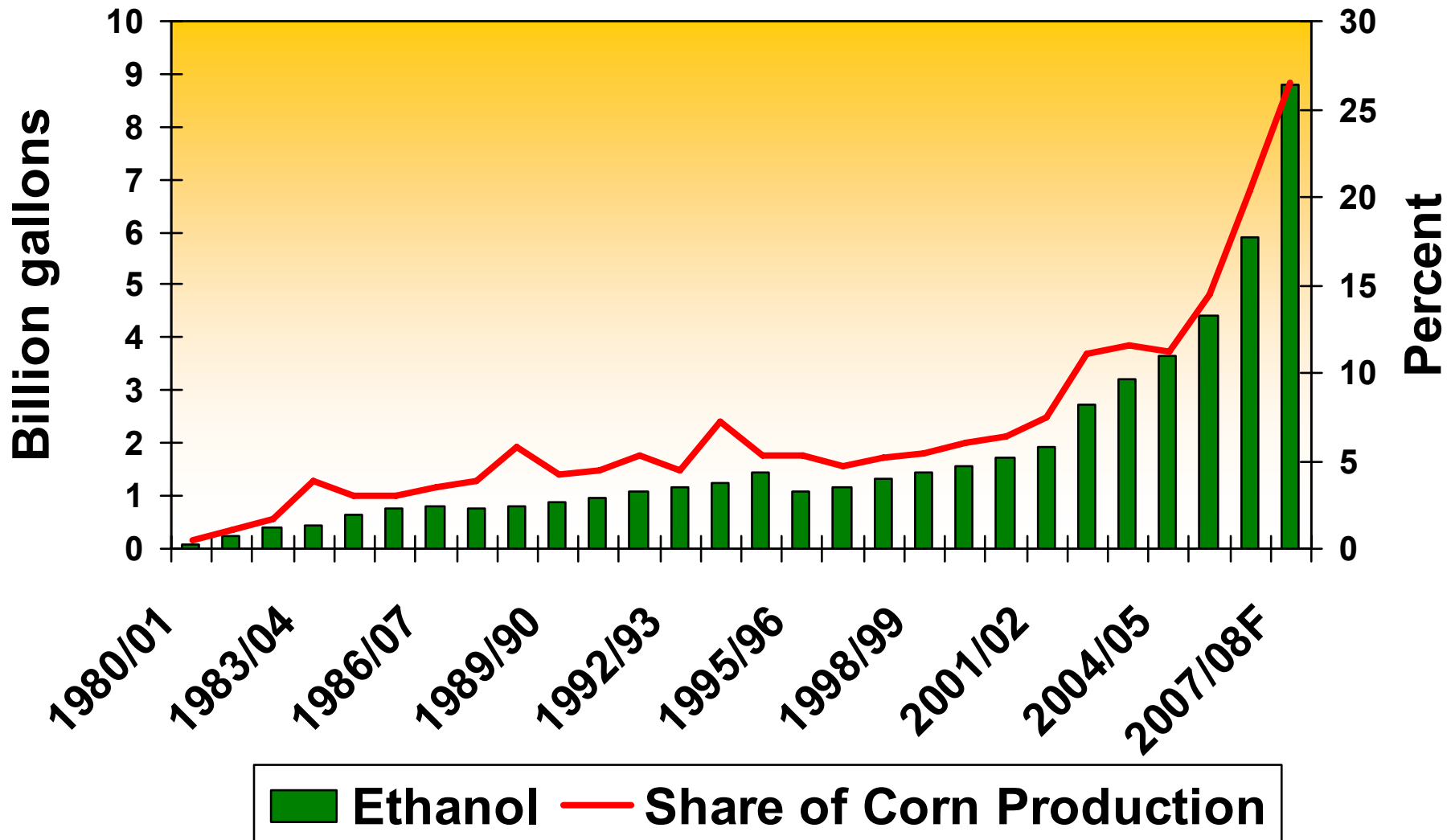
# Farm Program Payments . . .

*corn accounts for a large share*



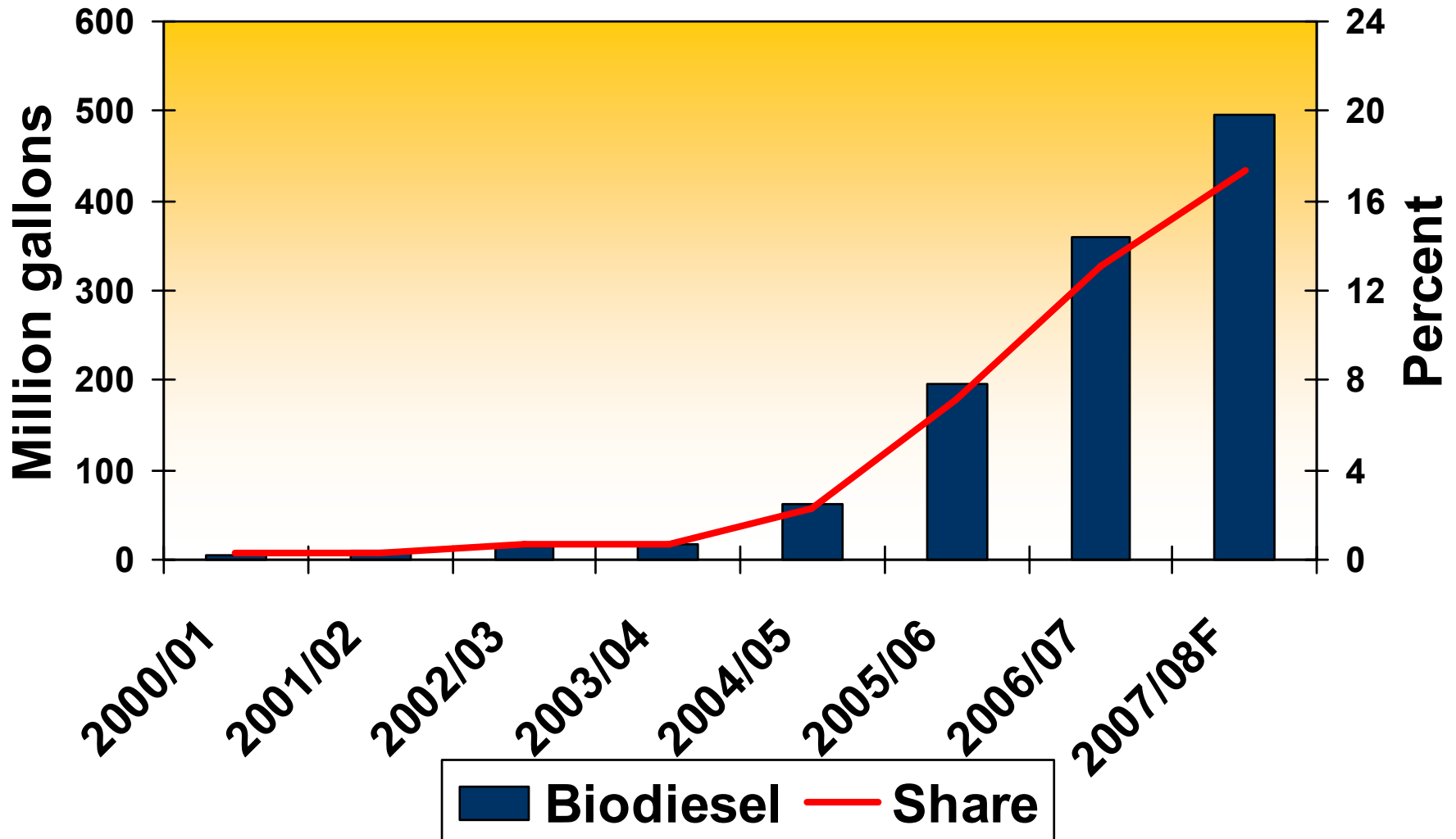
# Corn Ethanol Production . . .

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



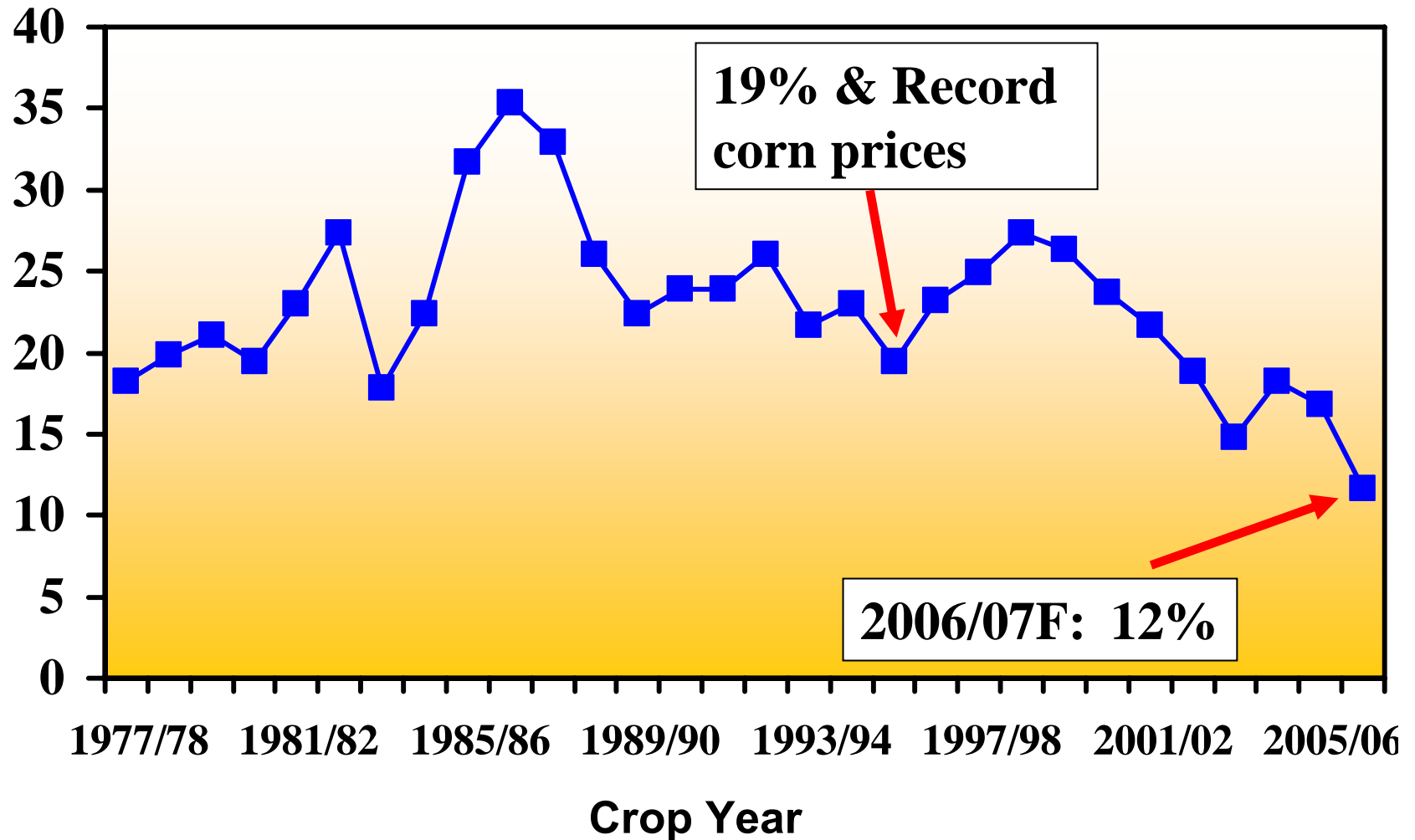
# Biodiesel Production . . .

*expect to use 17% of '07 soyoil crop for 500 mil. gal.*



# Global Coarse Grain Stocks . . . *getting uncomfortably tight*

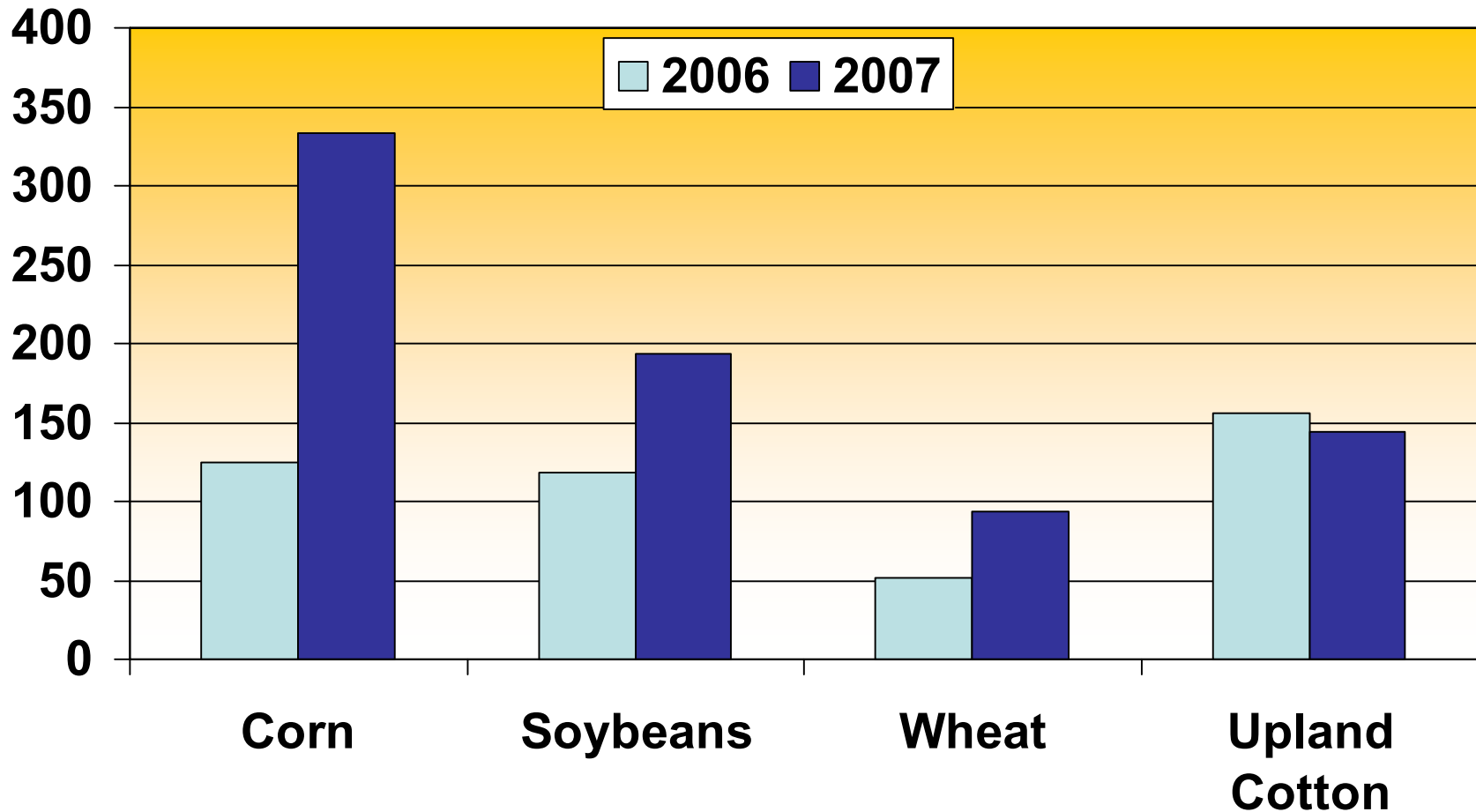
% of total use



# Expected Net Returns . . .

*favor corn*

\$ per acre

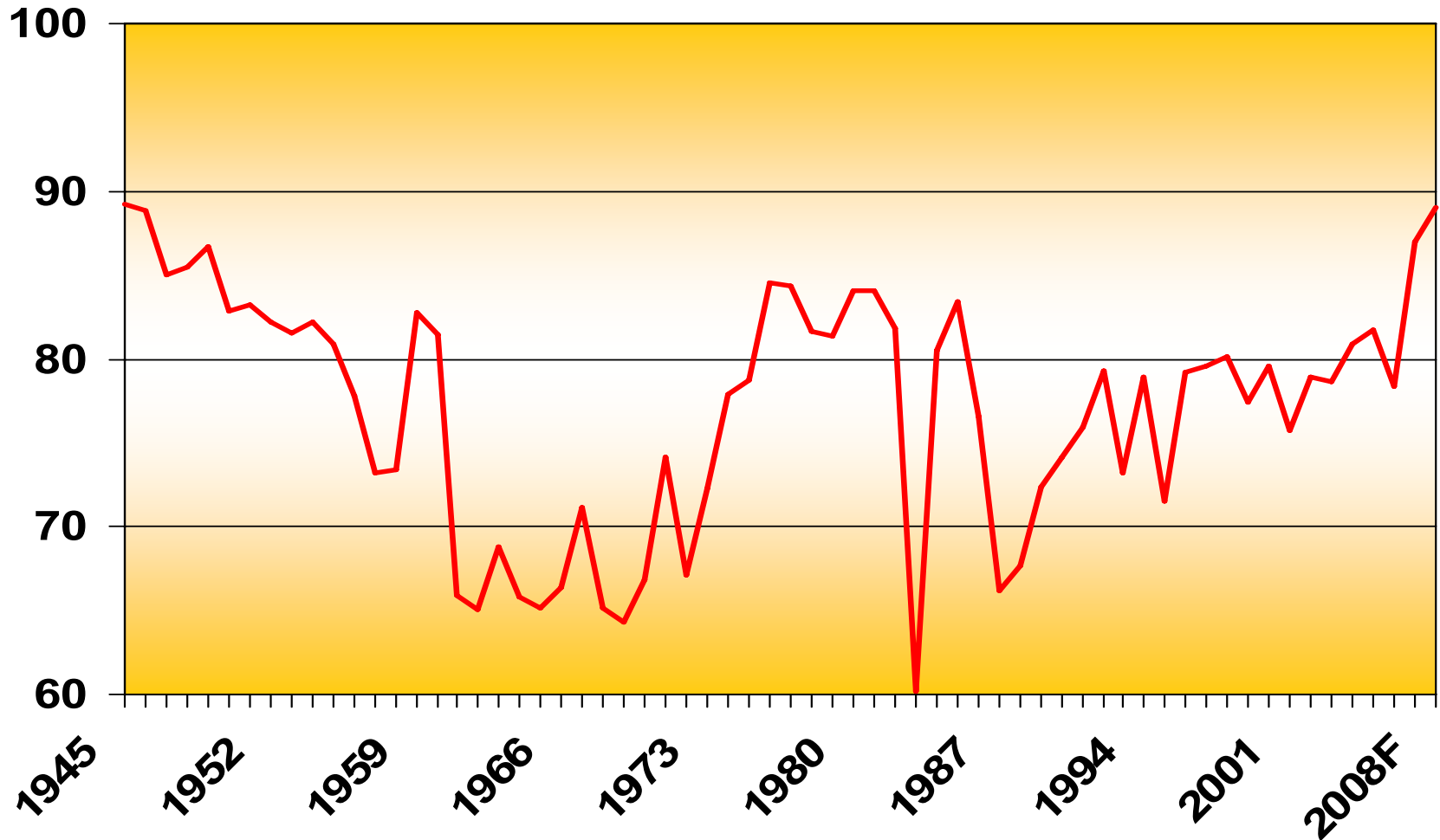




# Corn Acres Planted . . .

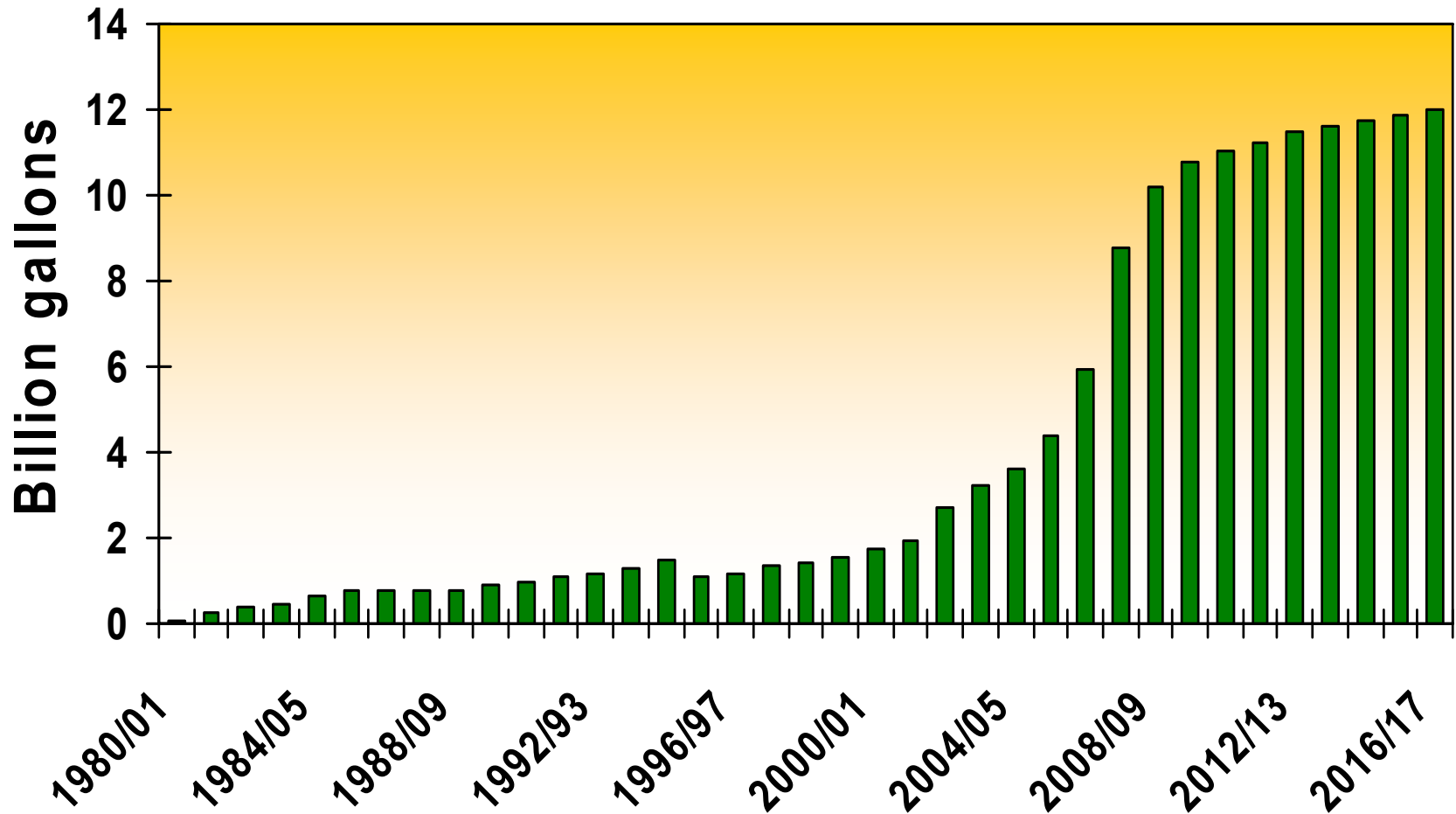
## *highest Since 1945 expected*

Million acres



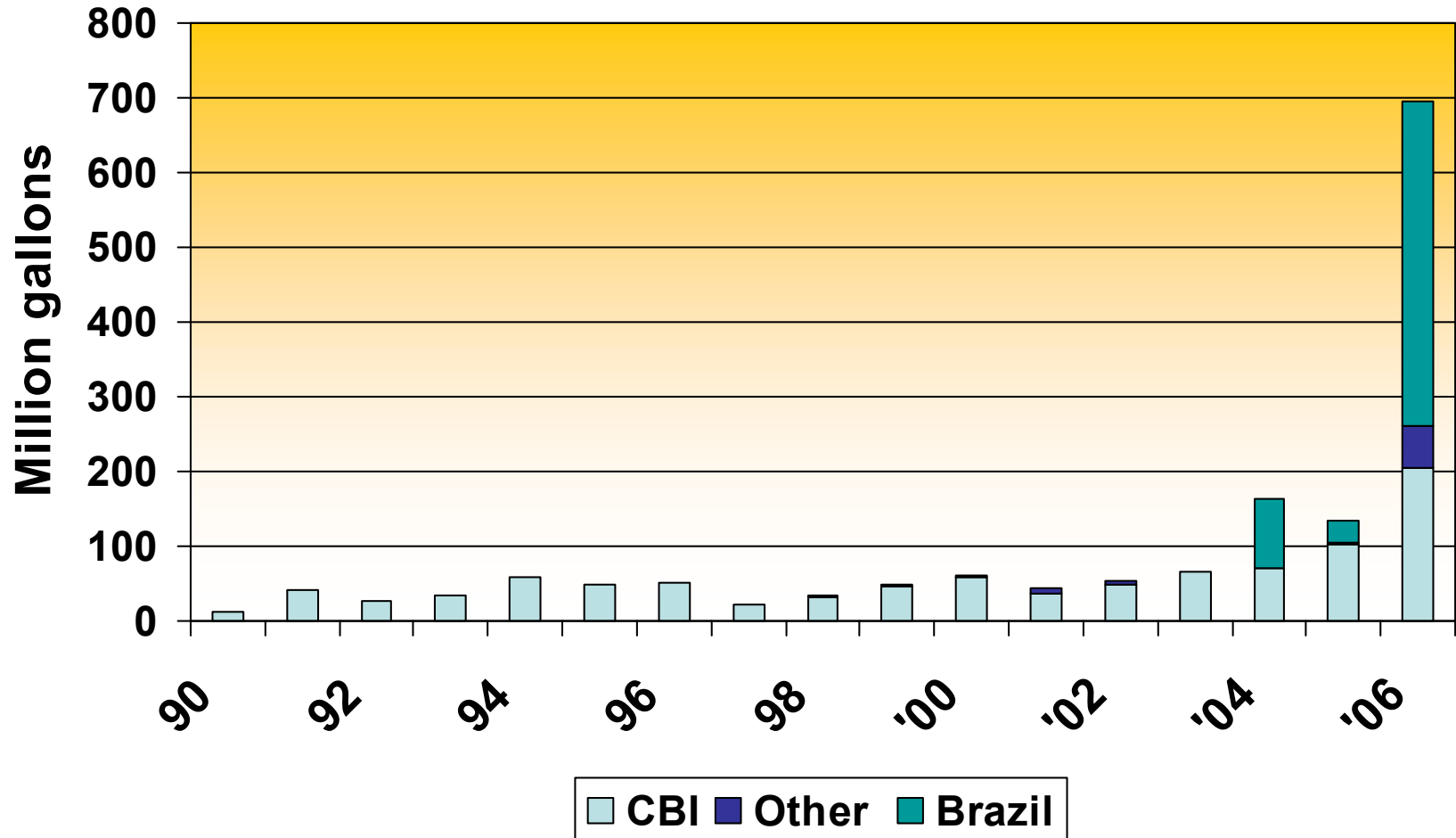
# Projected Corn Ethanol Production...

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



# Ethanol Imports Augment Demand...

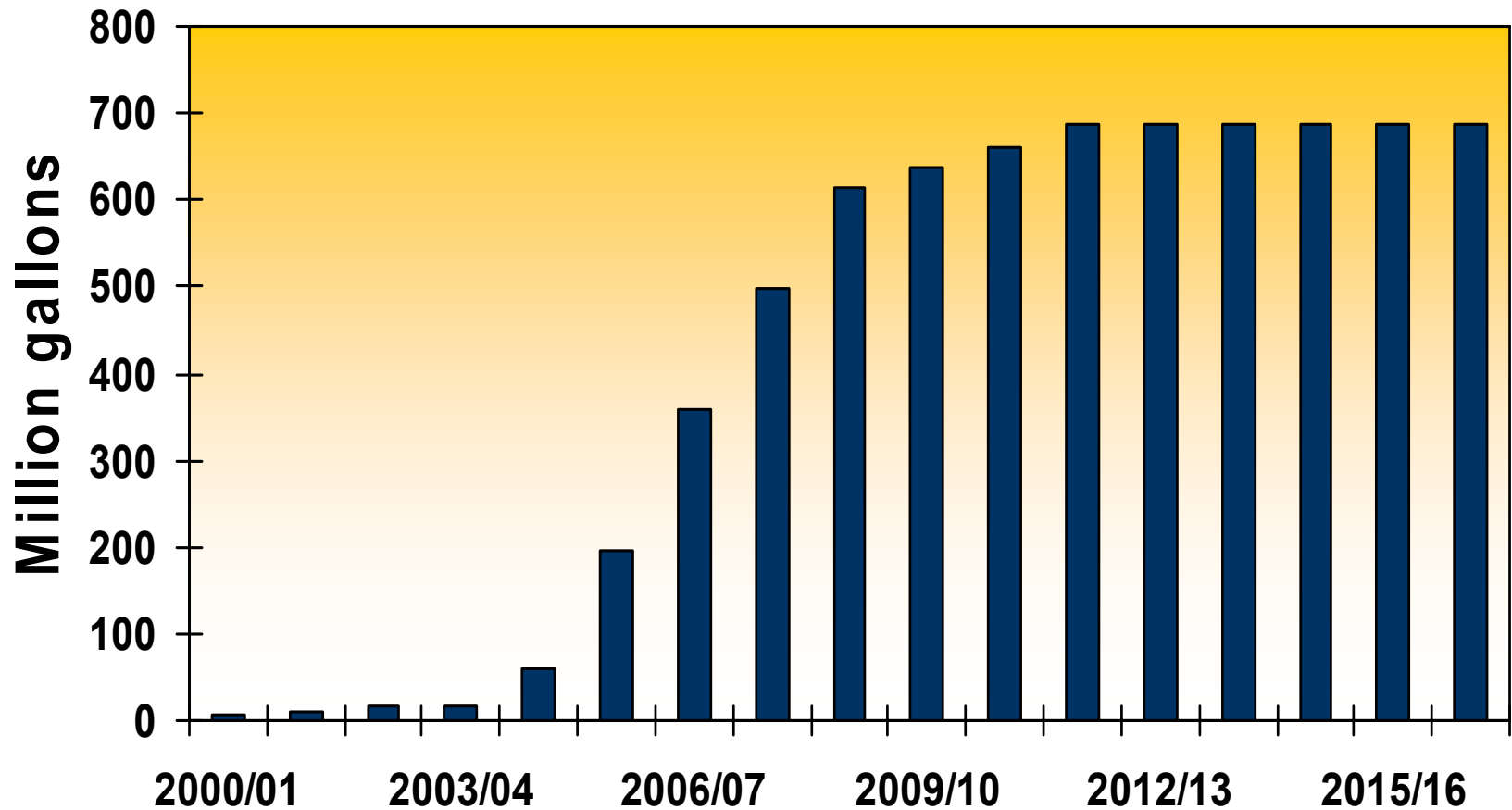
*imports soaring, led by Brazil*



Source: Census and Customs CBI TRQ data

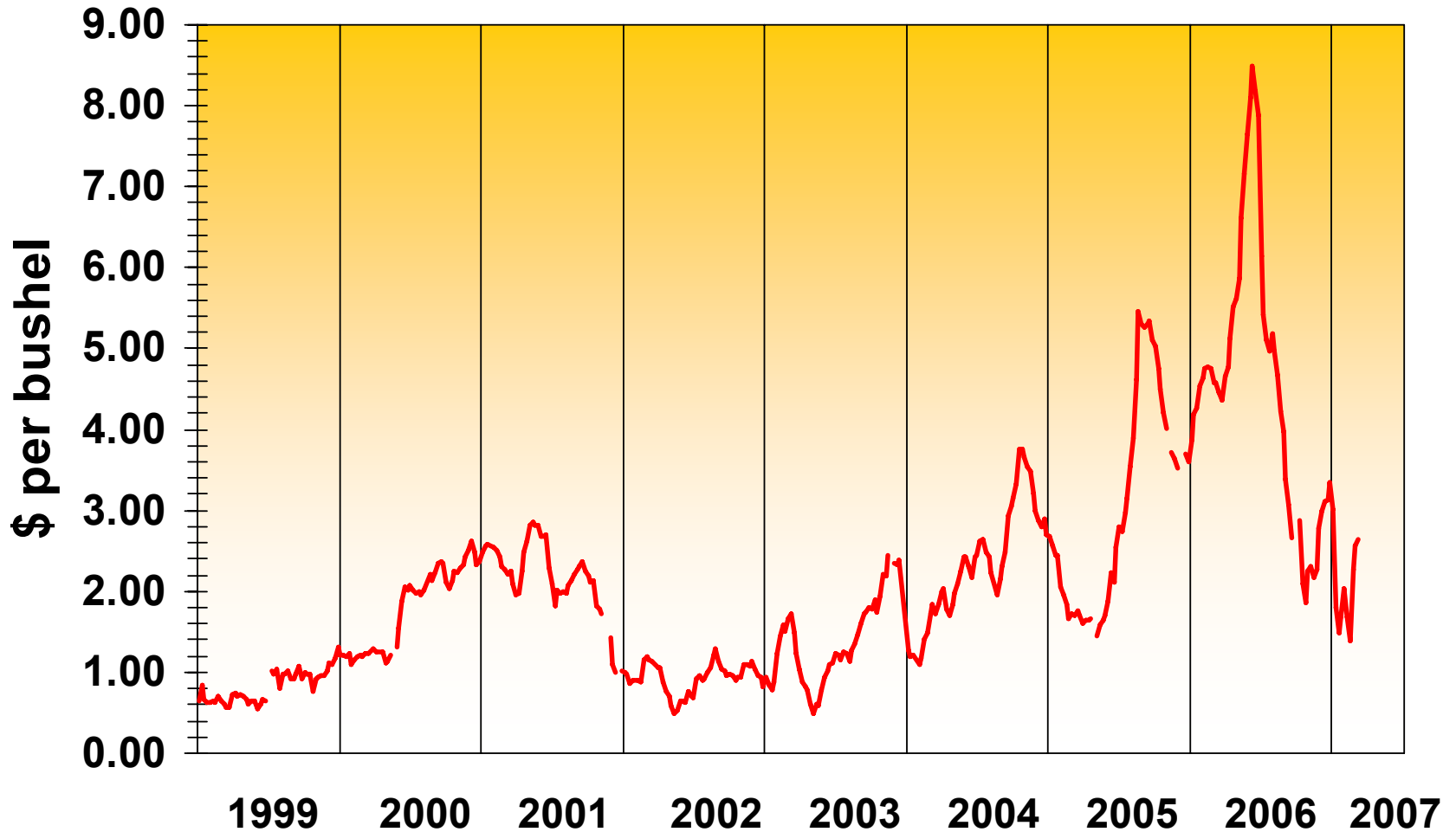
# Projected Soy Biodiesel Production...

*expect 700 mil. gal. in 2016/17 – 23% of soyoil production*



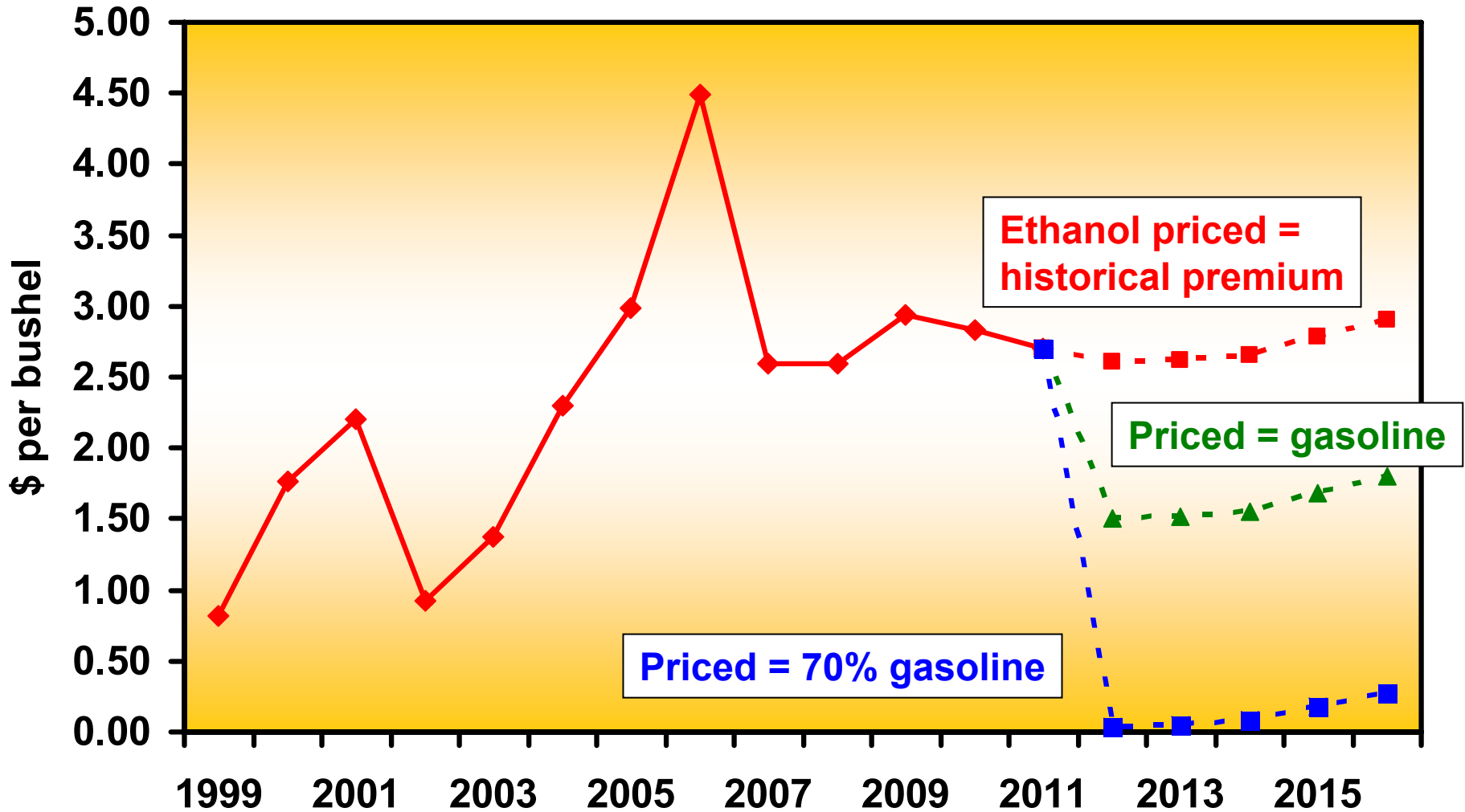
# Ethanol-Corn Price Spread . . .

*weekly data (2.75xPeth-Pcrn)*



# Ethanol-Corn Price Spread . . .

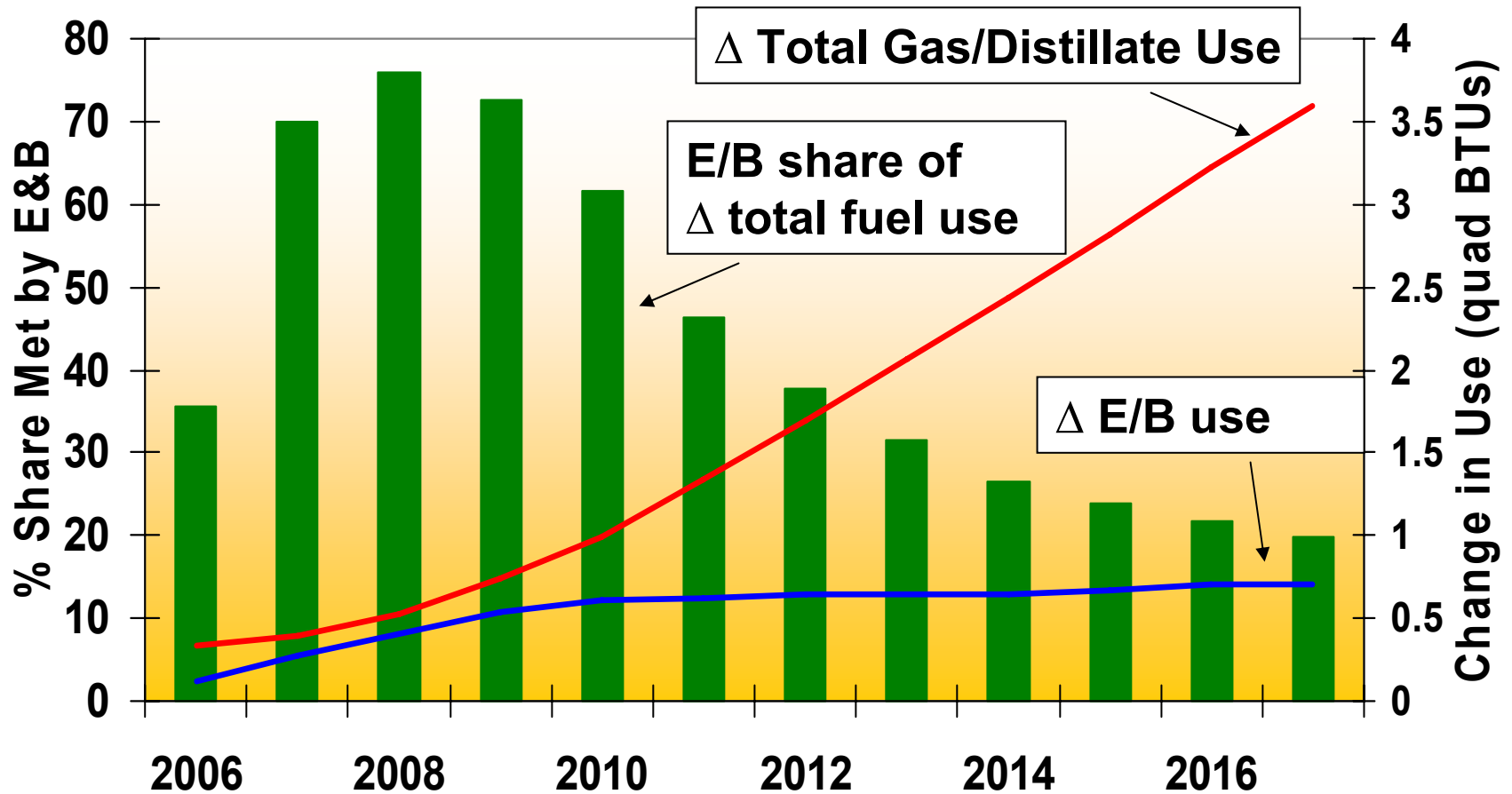
*annual data with alternative  $P_{eth}$  scenarios*



# Challenges Facing Ethanol

- **Corn trend acreage & yields**
- **Global weather**
- **Demand growth for blends/E85**
- **Ethanol distribution system**
- **Tax credit, tariff, RFS/AFS issues**
- **Livestock feed costs & adjustments**
- **DDG quality**
- **Meat and consumer food prices**
- **Environmental issues: nitrogen, water quantity & quality, CRP**

# Change in Fuel Use Since 2005 Met by Ethanol/Biodiesel



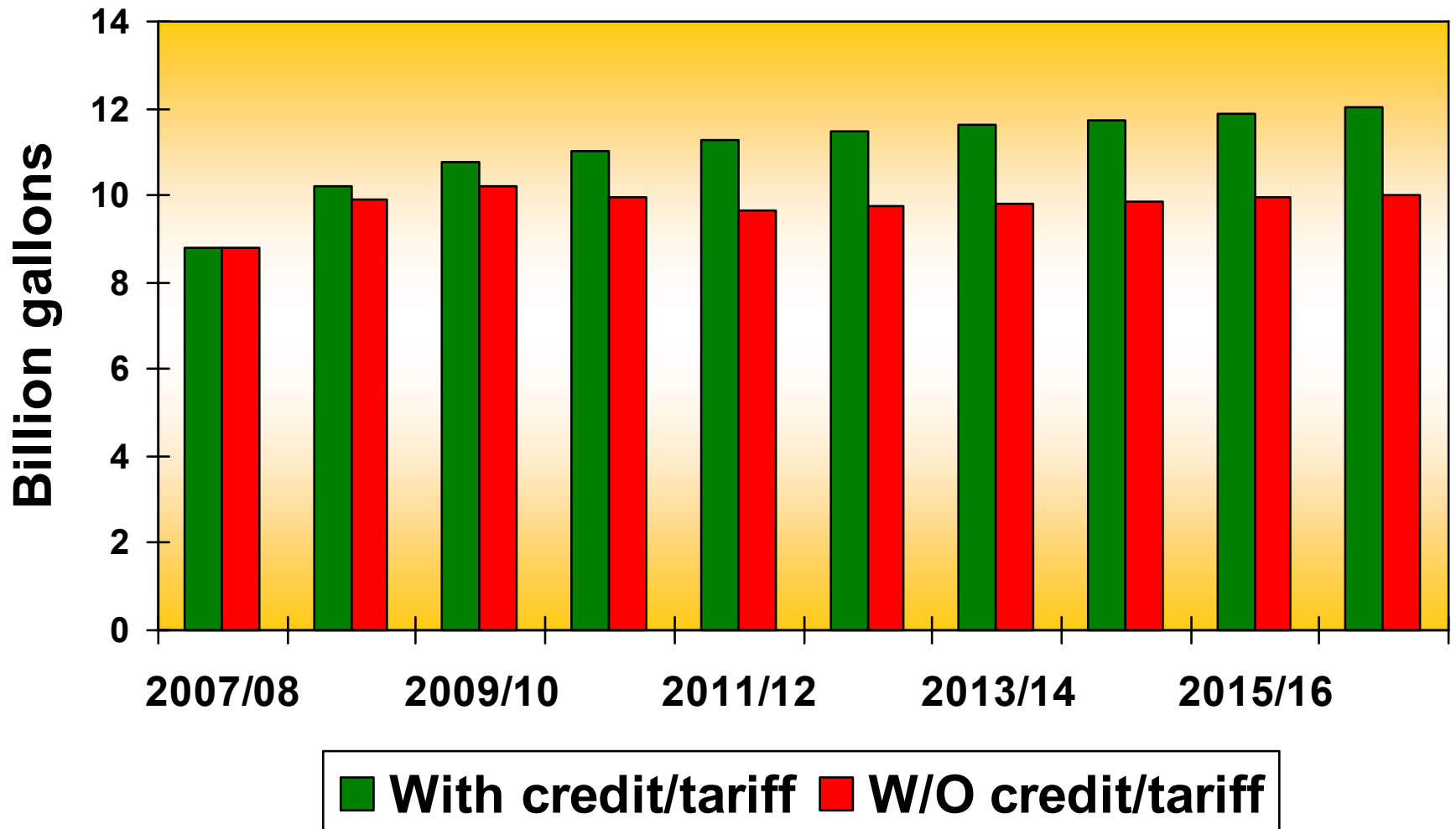
Source: 2007 EIA Annual Energy Outlook



# Options to Maintain Biofuel Growth

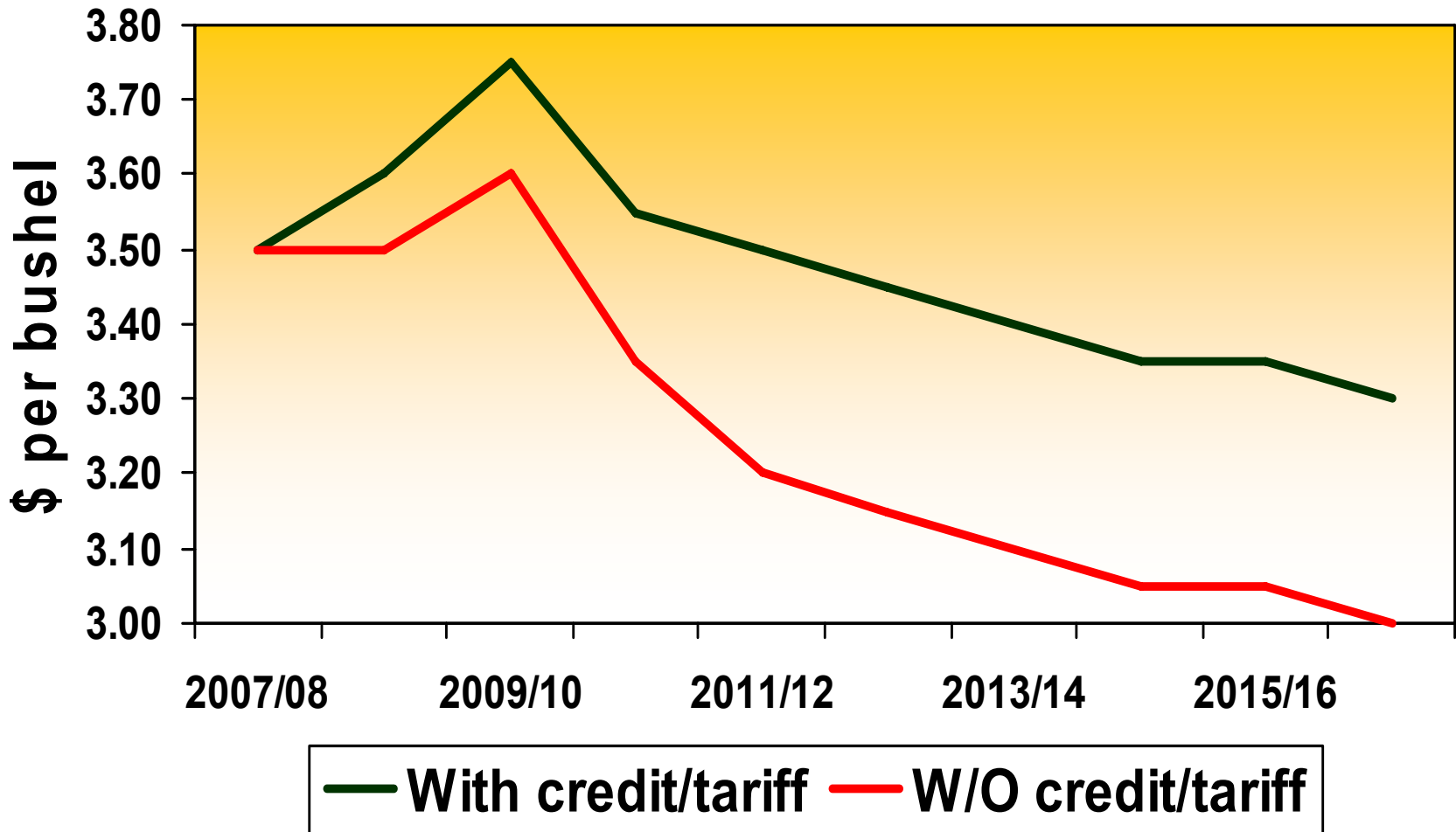
- **Do nothing**
- **Minimum prices (price controls)**
- **Maintain or amend subsidies/tax preferences**
- **Increase renewable fuel standards**

# Projected Corn Ethanol Production. . . *w/o tax credit and import tariff (USDA analysis)*



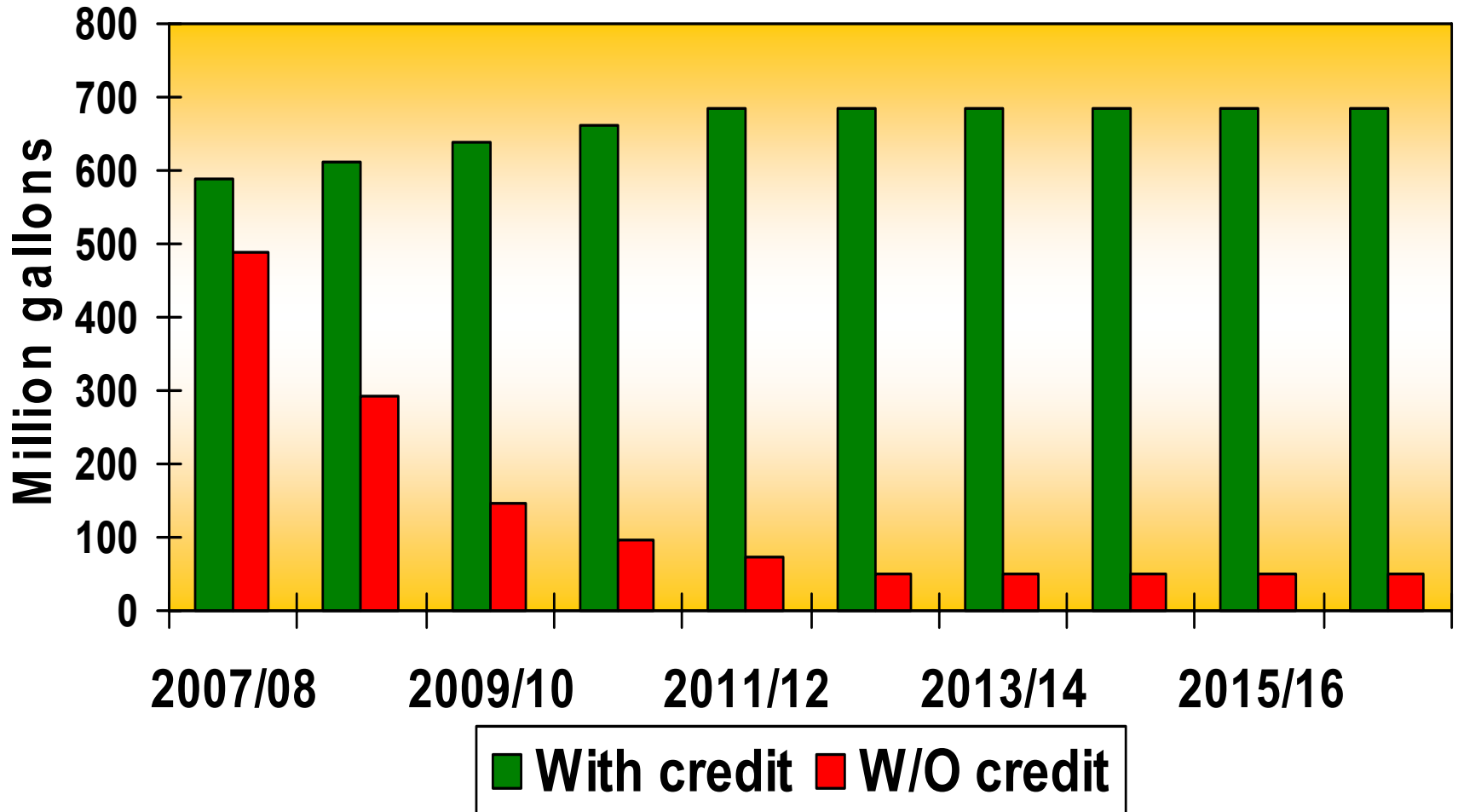
# Projected Corn Prices...

*w/o tax credit and import tariff (USDA analysis)*



# Projected Soy Biodiesel Production...

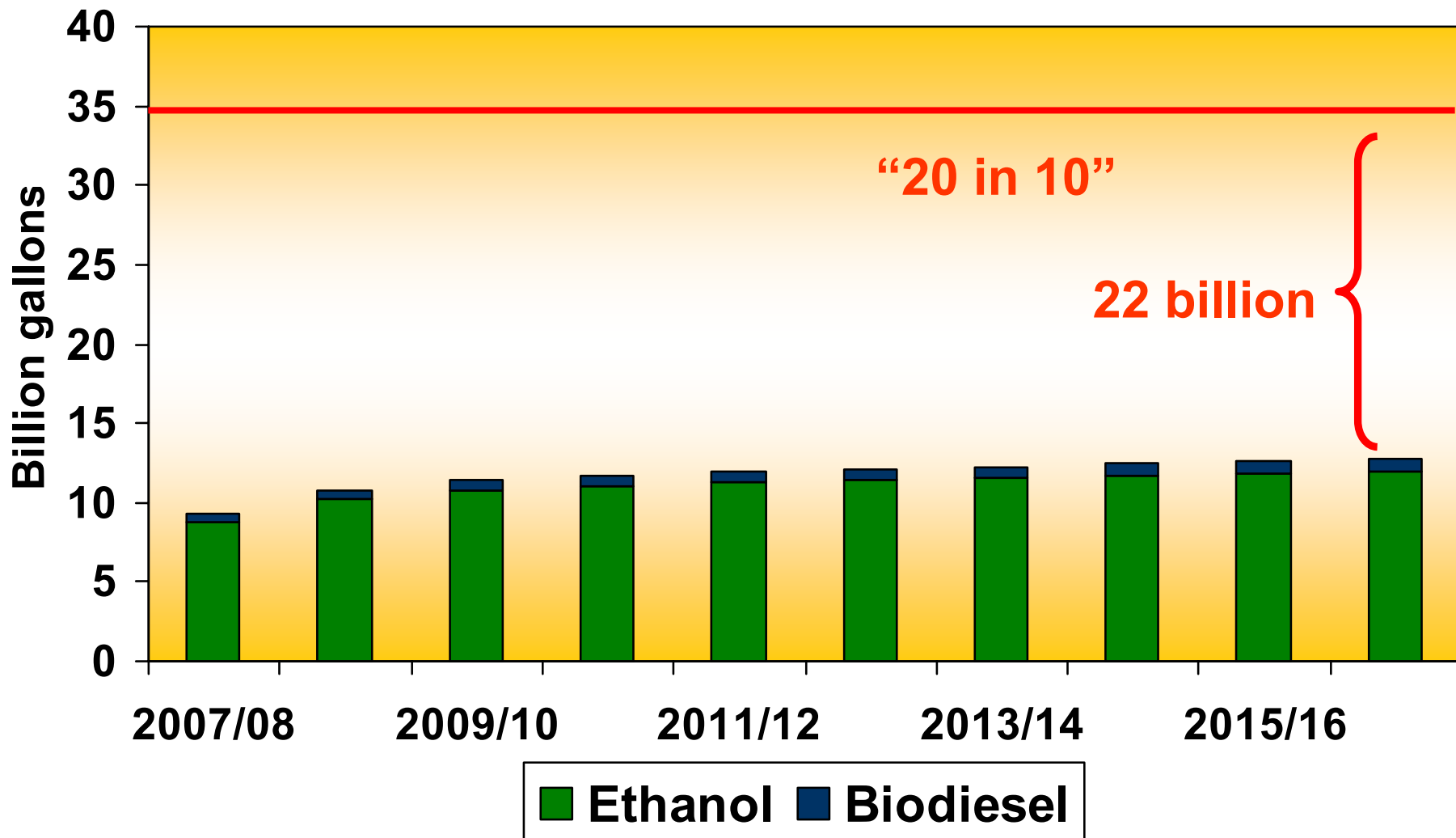
*w/o tax credit (USDA analysis)*



# President's "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**
- **Easy to achieve?**
- **Role of Ethanol and Biodiesel ?**

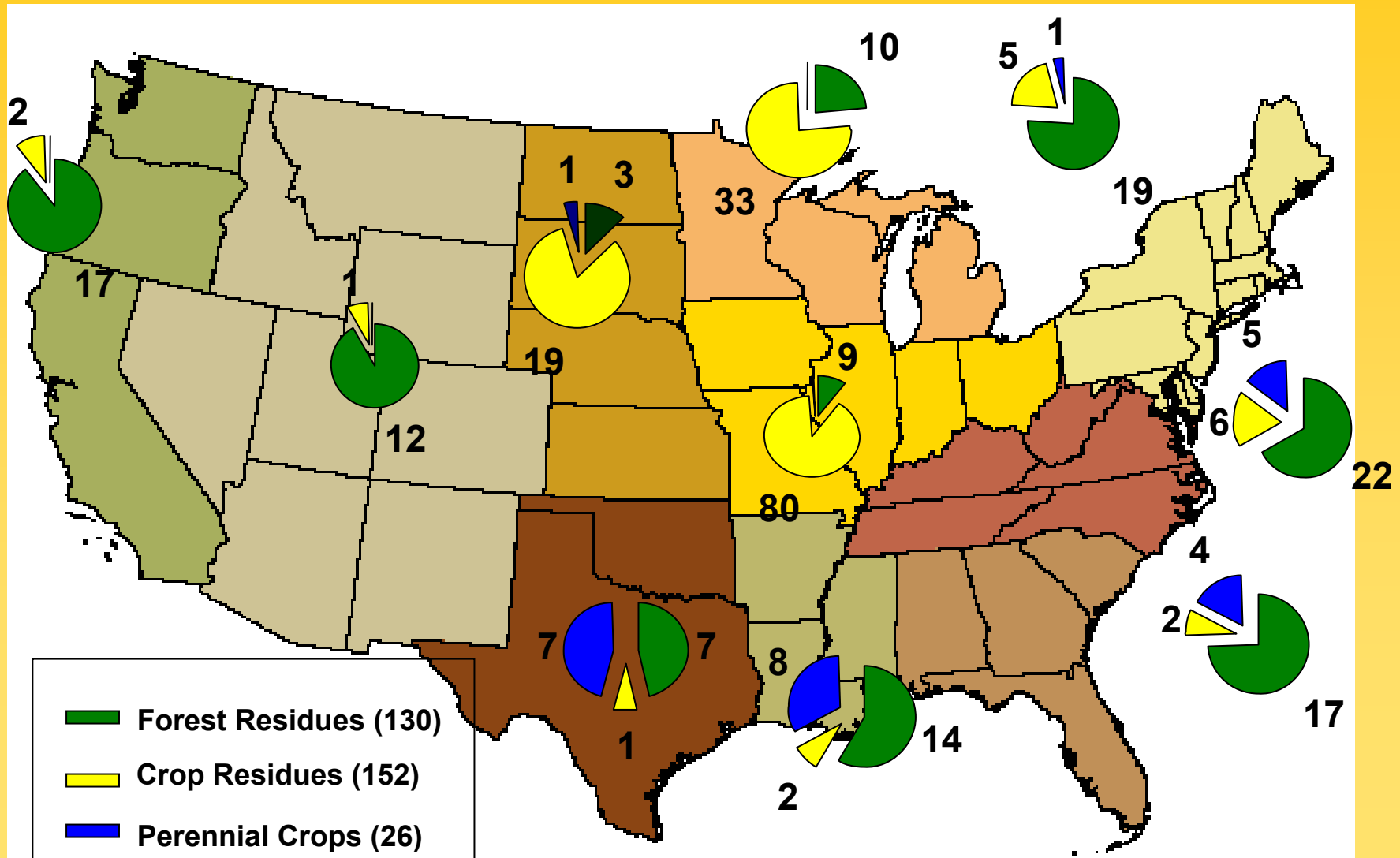
# USDA Baseline Biofuel Production



# 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

	<b>Corn Based</b>	<b>Cellulosic Today?-- <i>Illustrative</i></b>	<b>Cellulosic 2010-12— <i>DOE target</i></b>
<b>Feedstock</b>	<b>\$1.17</b> <b>@\$3.22/bu</b> <b>2.75g/bu</b>	<b>\$1.00</b> <b>@\$60/dt</b> <b>60g/dt</b>	<b>\$0.33</b> <b>@\$30/dt</b> <b>90g/dt</b>
<b>By-Product</b>	<b>-\$0.38</b>	<b>-\$0.10</b>	<b>-\$0.09</b>
<b>Enzymes</b>	<b>\$0.04</b>	<b>\$0.40</b>	<b>\$0.10</b>
<b>Other Costs**</b>	<b>\$0.62</b>	<b>\$0.80</b>	<b>\$0.22</b>
<b>Capital Cost</b>	<b>\$0.20</b>	<b>\$0.55</b>	<b>\$0.54</b>
<b>Total</b>	<b>\$1.65</b>	<b>\$2.65</b>	<b>\$1.10</b>

**\*\* (includes preprocessing, fermentation, labor)**



# Role for Research

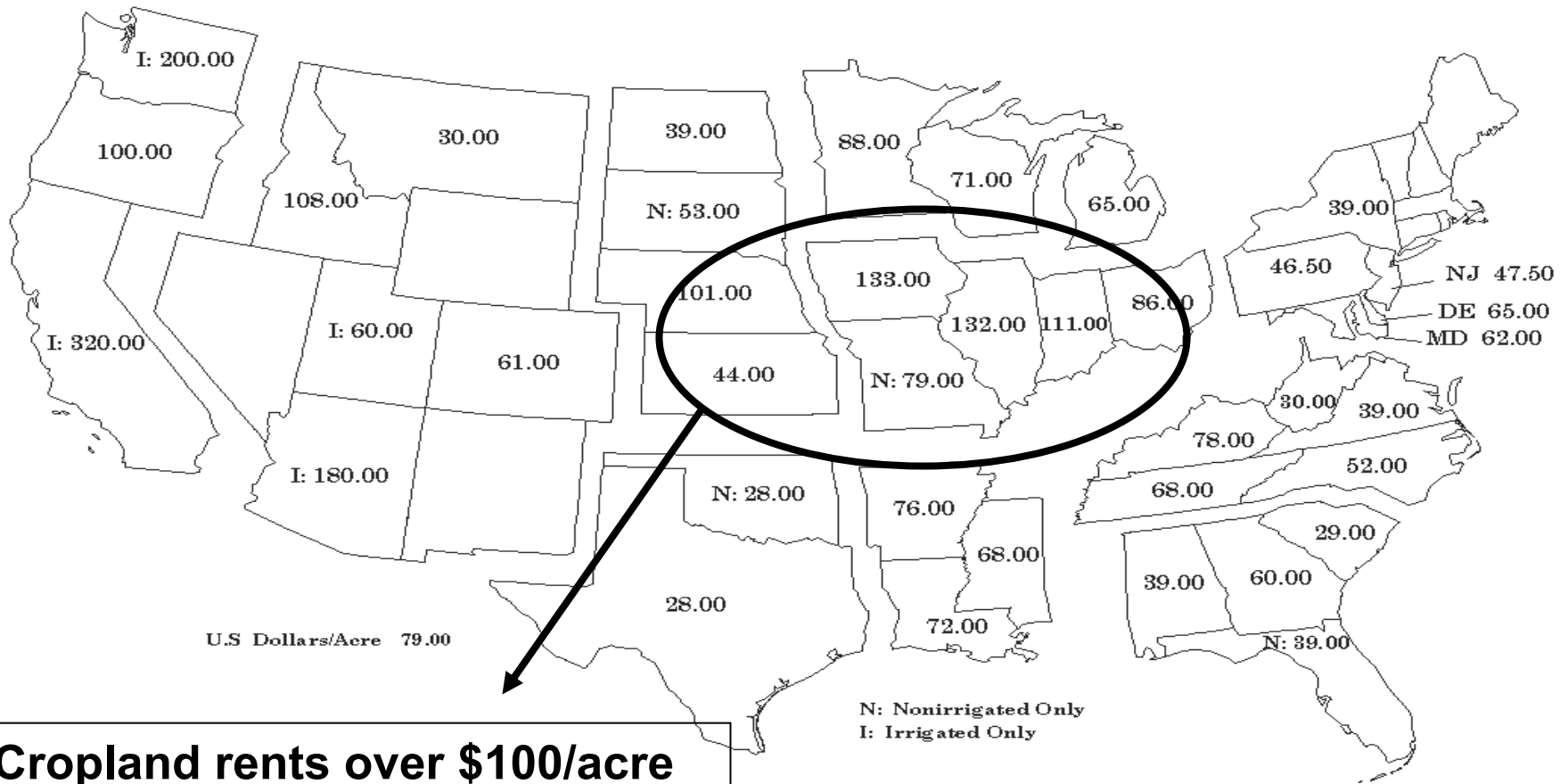
- **Reduce Production Costs**
  - **Land Costs**
    - Cropland
    - Grassland/Pasture
  - **Establishment and Reseeding**
  - **Baling and Staging**
- **Transportation Costs**

# Cropland Rents . . .

*hard for dedicated crops to compete for land*

2006 Cropland Rented for Cash by State

Dollars per Acre



**Cropland rents over \$100/acre  
need over 3 dt/acre just to  
cover land costs**

# Production Costs . . .

*(actual economic data are limited)*

- **University of Nebraska/ARS**
  - Switchgrass, 173 acres, 5 years, 10 farmers
  - Average yield = 3.4 tons/acre
  - Land cost = \$17/ton
  - Production cost = \$27/ton
  - Total cost = \$44/ton*
  
- **Iowa State University**
  - Switchgrass from Pasture
  - Average yield = 4 tons/acre
  - Land cost = \$13/ton
  - Establishment + reseeding cost = \$7/ton
  - Production cost = \$40/ton
  - Total cost = \$60/ton*

# 2007 Farm Bill Proposal

- **\$500 million-- Ag Bioenergy and Biobased Products Research Initiative**
- **\$150 million--Biomass Research and Development Act**
- **\$100 million--Cellulosic Bioenergy Program**
- **\$150 million--Forest Wood-to-Energy Program**
- **Biomass Reserve Program (BRP)**

# 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