

# Agriculture Outlook Forum

## Biofuels: Overview & Potential for US Markets

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*March 1, 2007*

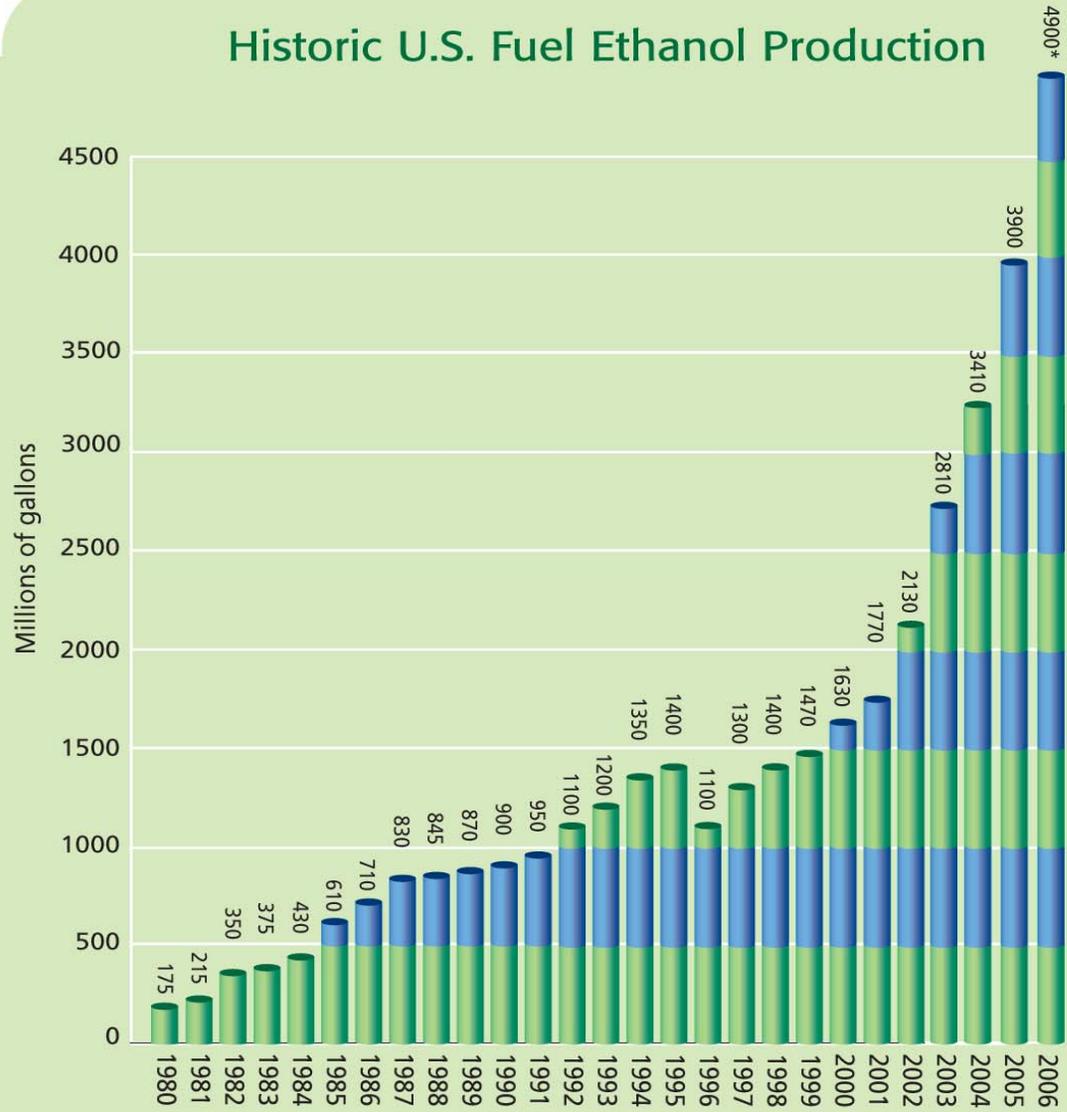


# U.S. Ethanol Industry Today

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- Annual production in 2006 of 4.9 billion gallons
- 114 plants in 19 states with 5.5 bgy capacity today (*February, 2007*)
- 78 plants under construction, combined with 8 expansions, will increase industry capacity by an additional 6 bgy (*February, 2007*)
- Dozens of additional plants in various stages of development

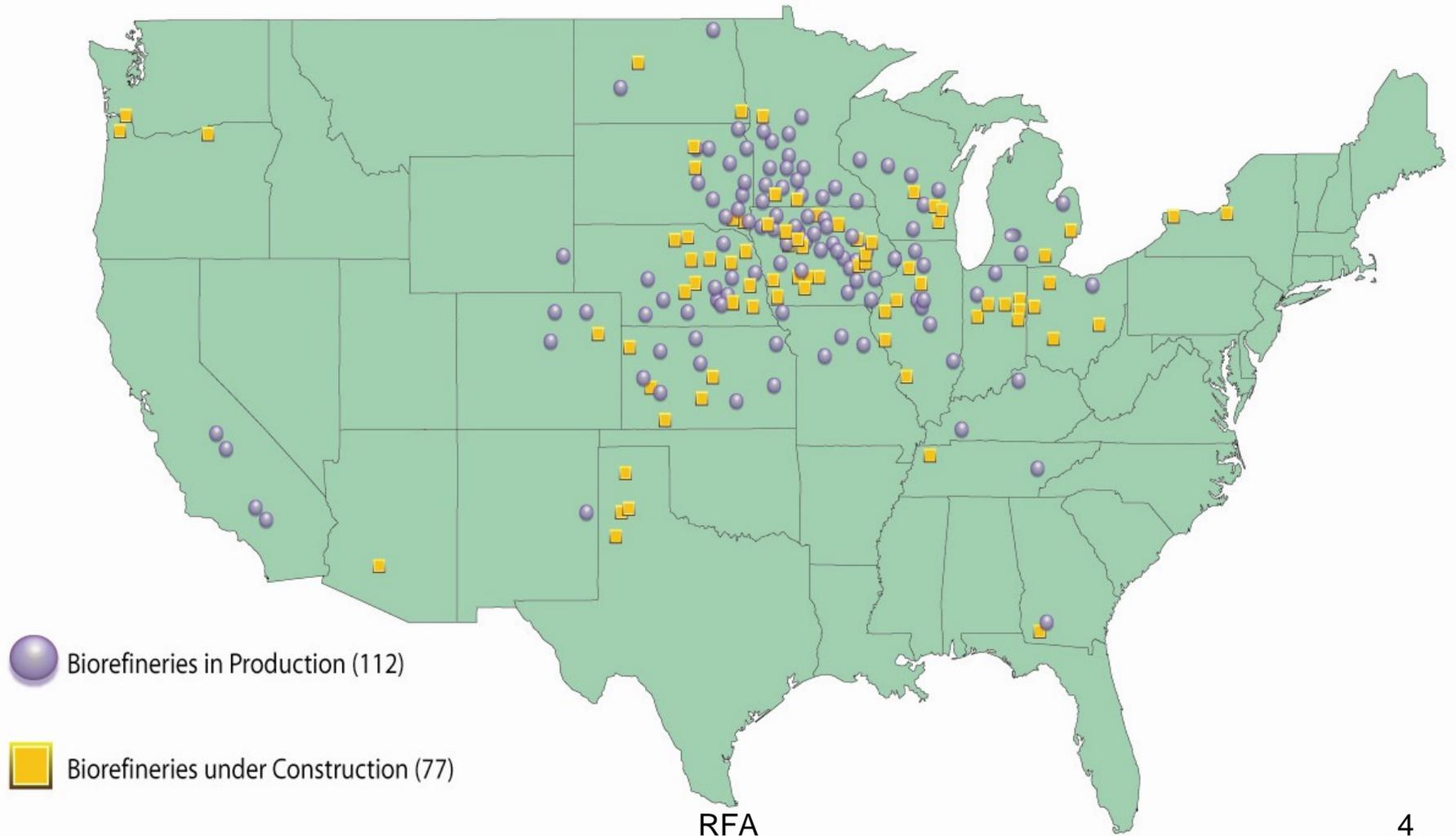
# Historic U.S. Fuel Ethanol Production



\*Estimated

Source: U.S. Energy Information Administration / Renewable Fuels Association

# U.S. Ethanol Biorefinery Locations



# RFA Projections: Breakdown by Quarters

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## 2007 (Millions of Gallons)

1Q:	906
2Q:	137
3Q:	822
4Q:	1220
Total:	3085

## 2008 (Millions of Gallons)

1Q	1057
2Q:	595
3Q:	510
4Q:	101
Total:	2263

## 2009 (Millions of Gallons)

1Q:	105
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# RFS vs. RFA Projections

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<u>Year</u>	<u>RFS</u>	<u>RFA Projections</u>
2006	4.0	5.3
2007	4.7	8.4
2008	5.4	10.6
2009	6.1	11.4
2010	6.8	
2011	7.4	
2012	7.5	

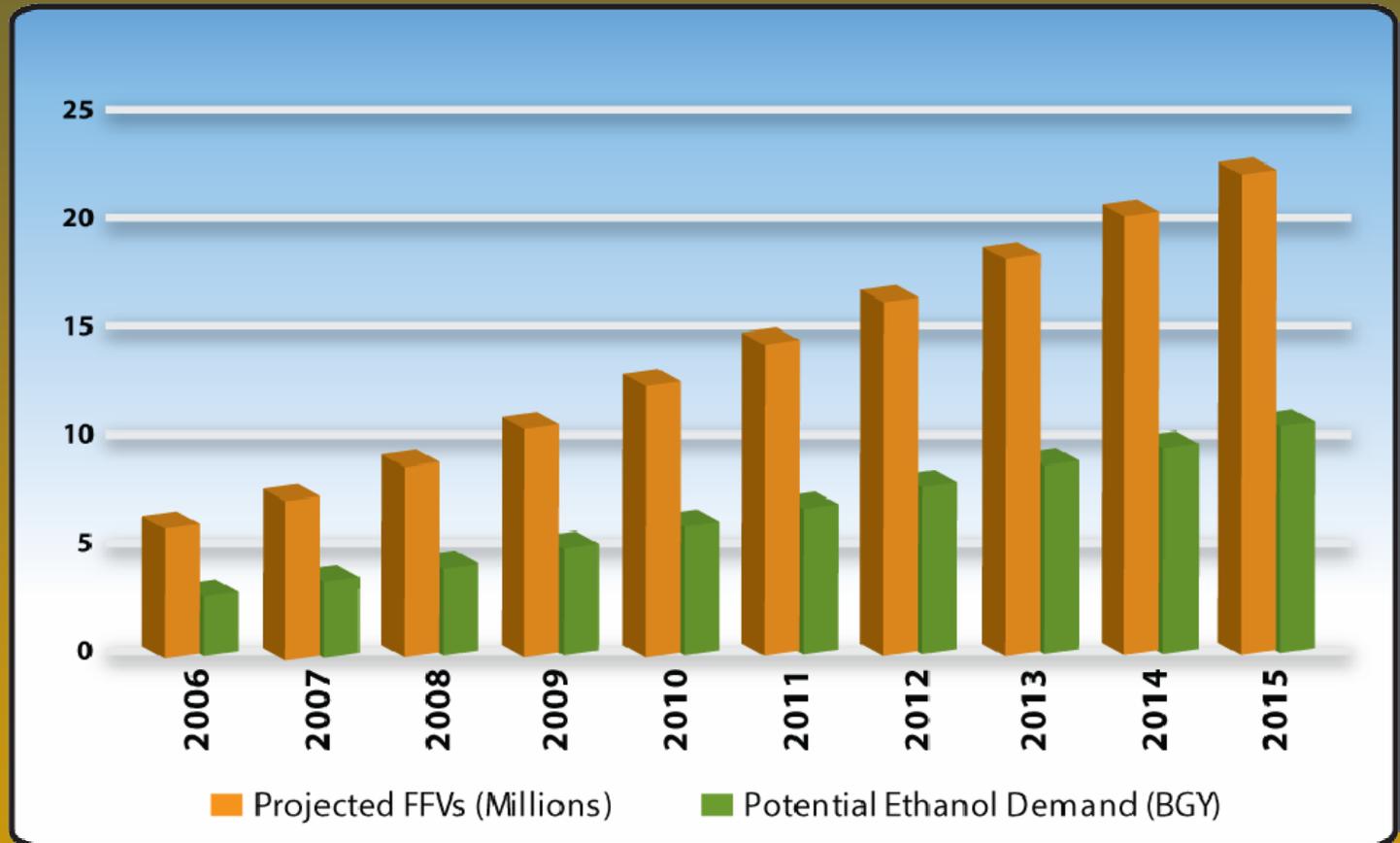
# Is there an Ethanol Blend Wall?

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- Ethanol is blended in 46% of the nation's fuel today
- Near Term Market Opportunities
  - California 10% blends
  - SE U.S.
  - Higher RFS?
- U.S. gasoline demand ~ 140 billion gpy
- When ethanol nears 14 bgy, new markets will be needed
- Longer Term Market Opportunities
  - Higher level blends?
  - E-85

# U.S. FFVs Could Exceed 22 Million by 2015

## Creating potential E-85 Demand in Excess of 11 BGY



- (1) Currently 6.0 million flex fuel vehicles (FFVs); assumed growth of 1.4 million in 2007, 1.6 million in 2008, 1.8 million in 2009 and by 2.0 million per year after 2010 (2010 and beyond data according to public statements made by Ford, General Motors and Chrysler)
- (2) Calculated assuming 600 gallons of E85 used each year per FFV. (Source: EIA projects 500 gallons of gasoline per year per vehicle assumes 20% mileage loss compared to conventional)

# Ethanol's Economic Footprint

- Increased gross output by \$41 billion
- Supported the creation of 160,000 new jobs, including 20,00 in the manufacturing sector
- Put an additional \$6.7 billion in the pockets of American consumers
- Added \$2.7 billion in new federal tax revenue and \$2.3 billion for state and local governments



# Technology Moving Industry Forward

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- Cutting edge technologies are reducing energy consumption, improving refinery efficiency, developing new co-products, using new feedstocks
  - Corn fractionation
    - ❖ Increases starch availability for ethanol production
    - ❖ Increases protein content of DDGS, improved flowability
  - Cold starch hydrolysis
    - ❖ Decreases energy use and production costs
  - Corn oil extraction
    - ❖ A dedicated crude oil source for biodiesel production
    - ❖ Higher protein feed content, improved flowability
  - Biomass Gasification
    - ❖ Energy source for both steam and power generation
    - ❖ Increases overall efficiency of energy generation while reducing emissions

# The Future is Now for Cellulose Ethanol

## ■ **Abengoa BioEnergy**

- 11.4 million gallon plant in Kansas using stover, wheat straw, milo stubble, switchgrass, and other feedstocks.

## ■ **Alico, Inc.**

- A 13 million gallon plant in LaBelle, FL using gasification technology to process yard, wood, and vegetative wastes and eventually energy cane.

## ■ **Bluefire Ethanol**

- A 19 million gallon plant located in southern California sited on a landfill to process sorted green waste and wood waste with acid.

## ■ **Broin Companies**

- A 125 mgy biorefinery planned in Emmetsburg, Iowa to process, corn, corn fiber and corn stover. 25% of the feedstock will be cellulose.

## ■ **logen Biorefinery Partners**

- 18 mgy ethanol facility in southeastern Idaho using enzymatic conversion technology to process wheat straw.

## ■ **Range Fuels**

- 40 million gallon plant in Georgia using thermal conversion technology to process wood waste and wood-based energy crops.

# Contact Information

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Renewable Fuels Association