# Energy Bill 2007:
# RFS and Fuel Efficiency Standards

## *Does It Make Sense?*

**Energy Efficiency and Biofuels — A National Policy That Makes Sense?**

ACEEE's 2nd Forum on Energy Efficiency in Agriculture
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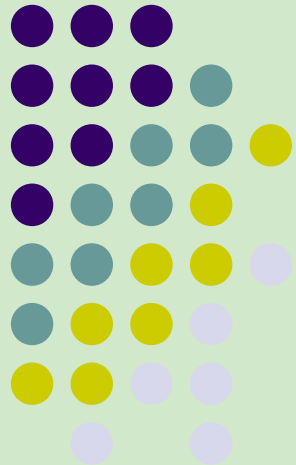


# Energy Independence and Security Act of 2007

- Mandatory Renewable Fuel Standard (RFS) – Requires fuel producers to use at least 36 billion gallons of biofuels by 2022
- National fuel economy standard –

  35 miles per gallon by MY 2020

# Expanded RFS

| Year | Biofuel mandate for motor fuel, home heating oil, and boiler fuel (billion gallons) | Portion to be from advanced biofuel (i.e., not corn starch) (billion gallons) | Cap on corn starch-derived ethanol (billion gallons) |
|---|---|---|---|
| 2006 | | | |
| 2007 | — | | — |
| 2008 | 8.5 | | 8.5 |
| 2009 | 10.5 | | 10.5 |
| 2010 | 12.0 | | 12.0 |
| 2011 | 12.6 | | 12.6 |
| 2012 | 13.2 | | 13.2 |
| 2013 | 13.8 | | 13.8 |
| 2014 | 14.4 | | 14.4 |
| 2015 | 15.0 | | 15.0 |
| 2016 | 18.0 | 3.0 | 15.0 |
| 2017 | 21.0 | 6.0 | 15.0 |
| 2018 | 24.0 | 9.0 | 15.0 |
| 2019 | 27.0 | 12.0 | 15.0 |
| 2020 | 30.0 | 15.0 | 15.0 |
| 2021 | 33.0 | 18.0 | 15.0 |
| 2022 | 36.0 | 21.0 | 15.0 |

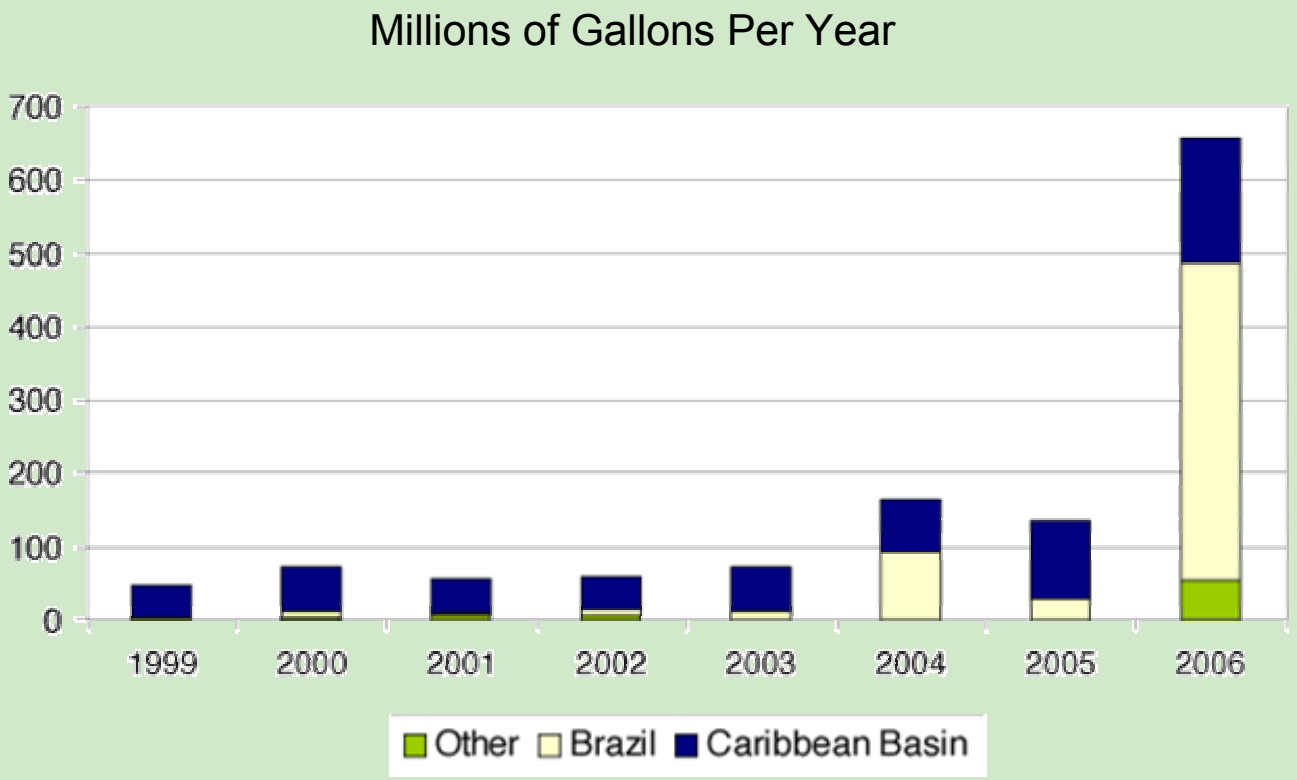
***Source:*** *CRS Report for Congress, "Selected Issues Related to an Expansion of the Renewable Fuel Standard", December 3, 2007, Yacobucci, Brent and Randy Schnepf.*

# Ethanol Consumption


- In 2006 the U.S. consumed 5 billion gallons of biofuels, mostly corn ethanol
- Ethanol represented some 4% of annual gasoline demand
- 656 million gallons imported from Brazil and other Caribbean countries, even with a 54c per gallon import tariff
  - equivalent to 13% of the ethanol consumed in the U.S.

# Caribbean Basin Initiative

## Annual Ethanol Imports to the U.S.




**Source:** U.S. International Trade Commission (USITC), *Interactive Tariff and Trade DataWeb*, at [http://dataweb.usitc.gov], accessed March 9, 2006, and USITC, *U.S. Imports of Fuel Ethanol, by Source 1996-2006*, updated April 10, 2007.

# U.S. Production of Biofuels from Various Feedstocks

| Fue | Feedstock | U.S. Production in 2006 |
|---|---|---|
| Ethanol | Corn | 4.9 billion gallons |
| | Sorghum | less than 100 million gallons |
| | Corn Sugar | No production<br>(656 million gallons imported from Brazil and Caribbean countries) |
| | Cellulose | No production<br>(one demonstration plant in Canada) |
| Biodiesel | Soybean Oil | approximately 200 million gallons |
| | Other Vegetable Oil | less than 10 million gallons |
| | Recycleed Grease | less than 10 million gallons |
| | Cellulose | No production |
| Methanol | Cellulose | No production |
| Butano | Cellulose, other Biomass | No production |

**Source:** *Renewable Fuels Association; National biodiesel Board; CRS analysis.*

# Corn Ethanol Supply Issues

- Corn accounts for 98% of the feedstocks used in the U.S. for ethanol production
- Industry has grown very rapidly, from 1.8 billion gallons in 2001 to 4.9 billion in 2006
- In 2007, an estimated 86 million acres of corn were harvested, the largest crop since the 1940's
- Record corn production in 2007: 13.2 billion bushels
- USDA estimates that 3.2 billion bushels of corn (or 24% of the 2007 corn crop) will be used to produce ethanol during the September 2007 to August 2008 corn marketing year

# Potential of Biofuels to Displace Gasoline US

- Oak Ridge National Lab ***Billion Ton*** report estimates that, by 2030, 1.3 billion tons of biomass could be available for energy production, enough to replace roughly 70 billion gallons of gasoline per year (about 4.5 million barrels per day).
- If entire 2007 U.S. corn crop was used to produce ethanol, resulting 35 billion gallons ethanol would displace about 16% of gasoline use

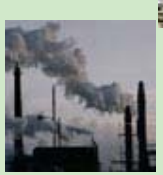
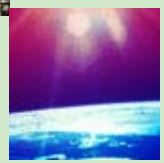
# Uncertainty Regarding Commercial Development of Cellulosic Ethanol

- 5 to 10 years away
- Production costs continue to be prohibitive
- Alternatives filling in the void:
  - Domestic sorghum-starch ethanol
  - Domestic of sugar-beet ethanol
  - Increase of imports of Brazil sugar-cane and other imports

# Greenhouse Gas Emissions Reductions

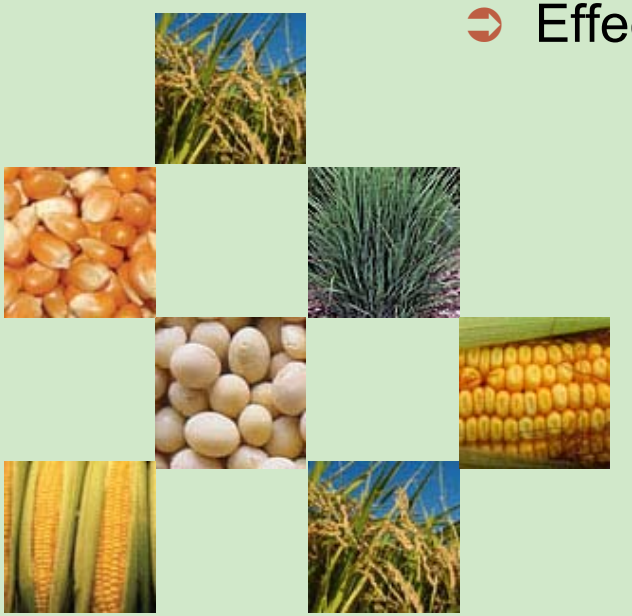
- Wide range of fuel-cycle estimates for GHG emissions reductions for corn ethanol
- Most studies on the 10%-20% range
- Fuel-cycle analysis vs life-cycle analysis – Land use changes
- New studies indicate very low GHG emissions reduction potential – 3% for corn and 50% for cellulosic
- New studies suggest almost all biofuels used today cause more GHG emissions than conventional fuels



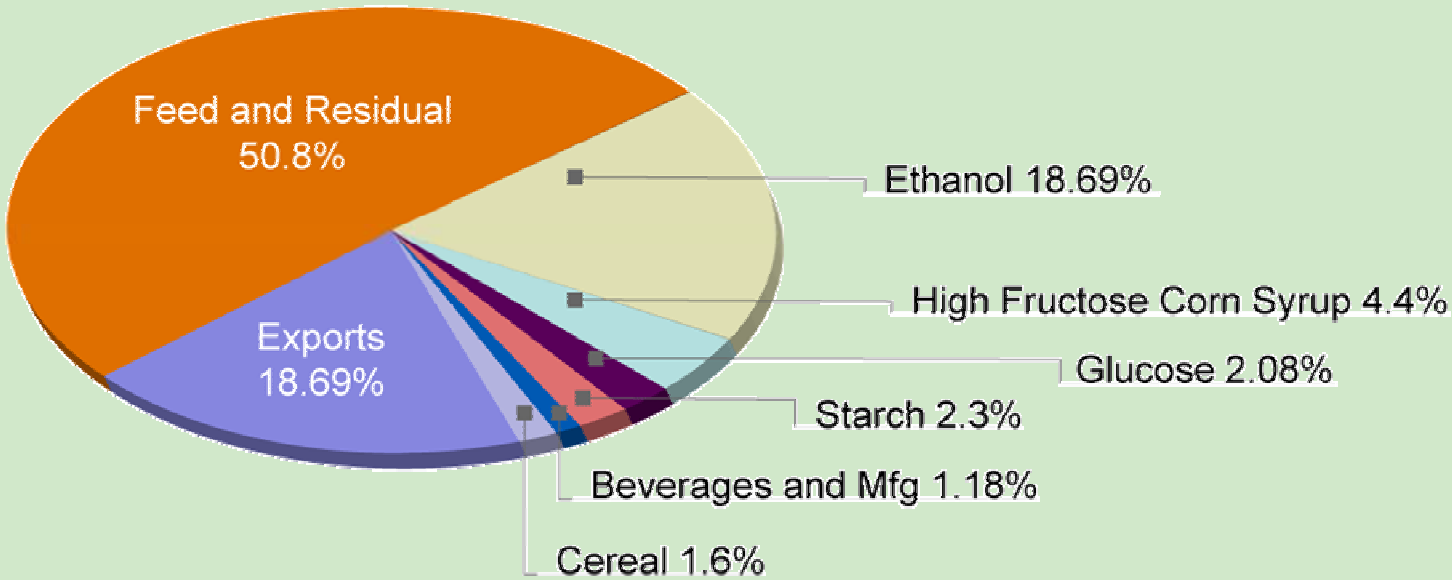
# Agricultural Impacts

- Pressure to expand corn production – CRP land and marginal lands
- Pressure to alter corn-soybean rotation
- Direct or indirect displacement of other crops
- Effects on the feed markets



# U.S. Corn Use

Market Year 2006/2007



# Impacts on Exports

- U.S. is the world's leading exporter of corn – over 65% of world corn trade
- In the past decade U.S. has exported about 20% of its corn production
- Increased use of corn for ethanol will decrease share of exports – in 2010 ethanol share of corn production to increase to 36% while exports decline to 13%

# Protection Mechanisms Built Into the Law

- EPA authority to temporarily wave part of the biofuels mandated
- Renewable fuels produced from new refineries required to reduce by at least 20% the life cycle GHG emissions
- Several studies are required on the impacts of RFS expansion

# National fuel economy standard of 35 miles per gallon by MY 2020

- Automakers required to boost fleetwide gas mileage to 35 mpg by MY 2020
- This applies to passenger automobiles and light trucks
- Credit system
- Trading mechanism between car makers
- FFV credits are maintained
- Nega-gallons