

U.S. Agriculture's Role in the International Biofuel Market

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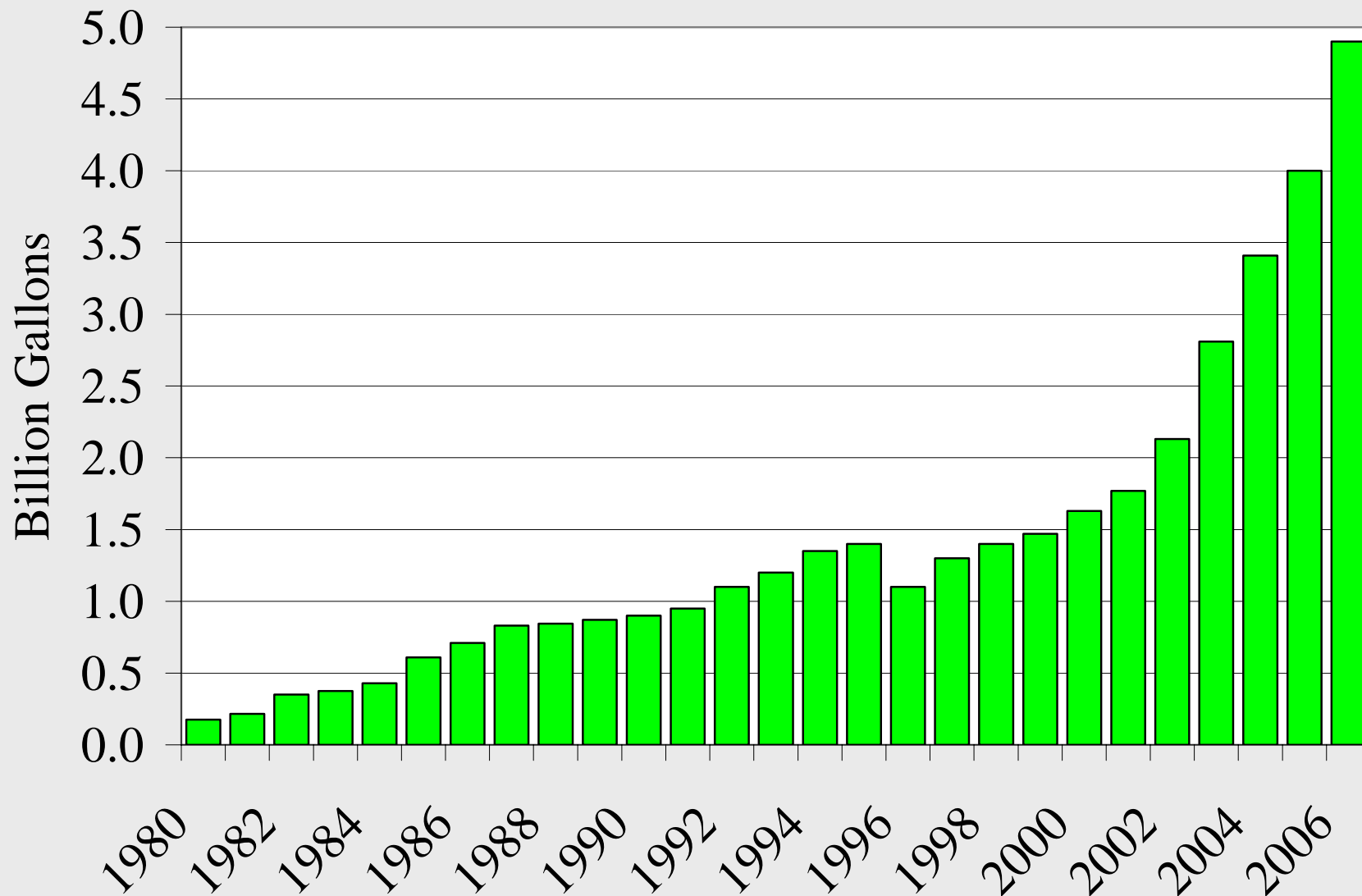
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2007 Wisconsin Fertilizer, Agrilime and Pest Management
Conference

Madison, Wisconsin

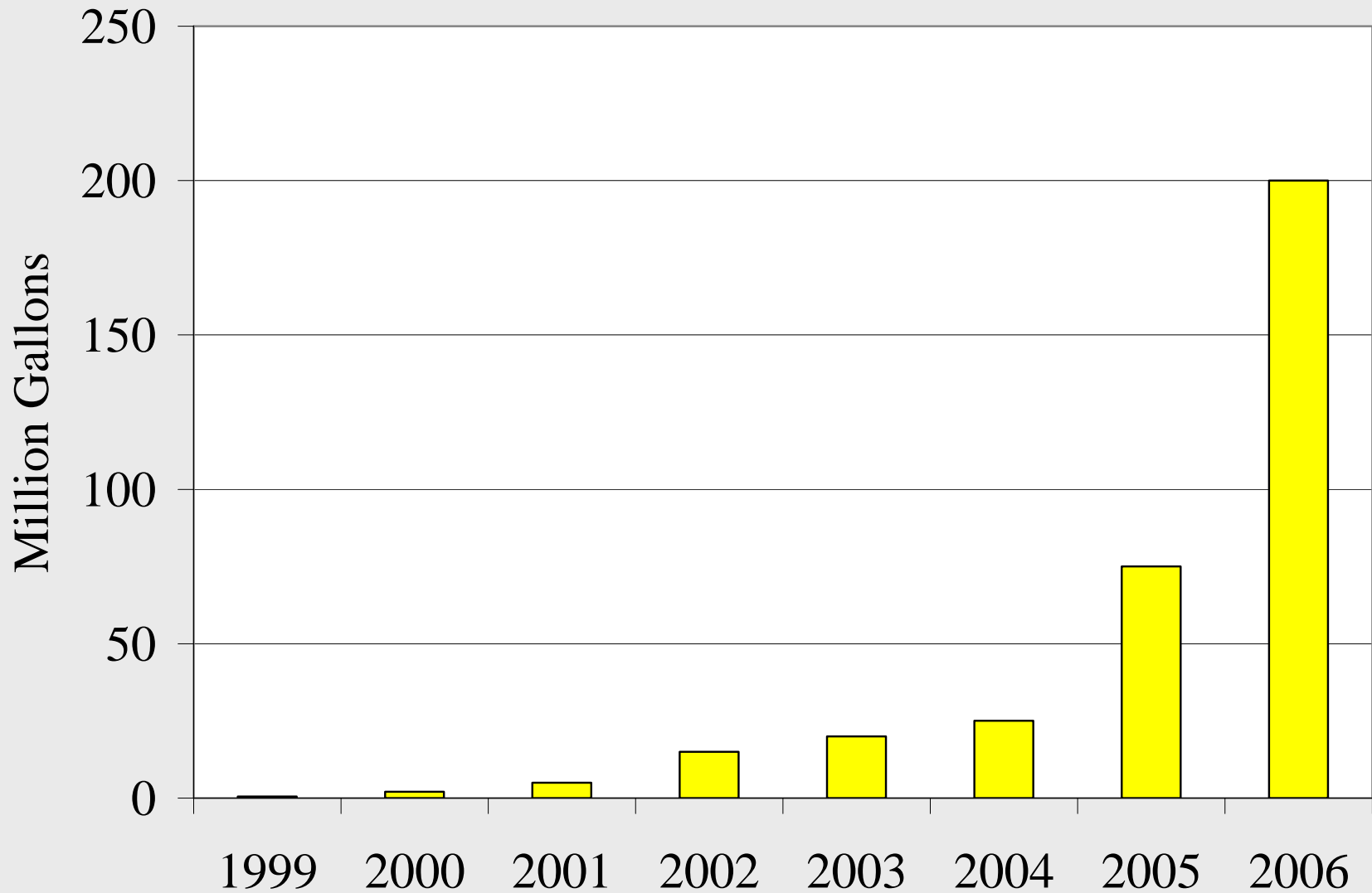
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Ethanol Explosion



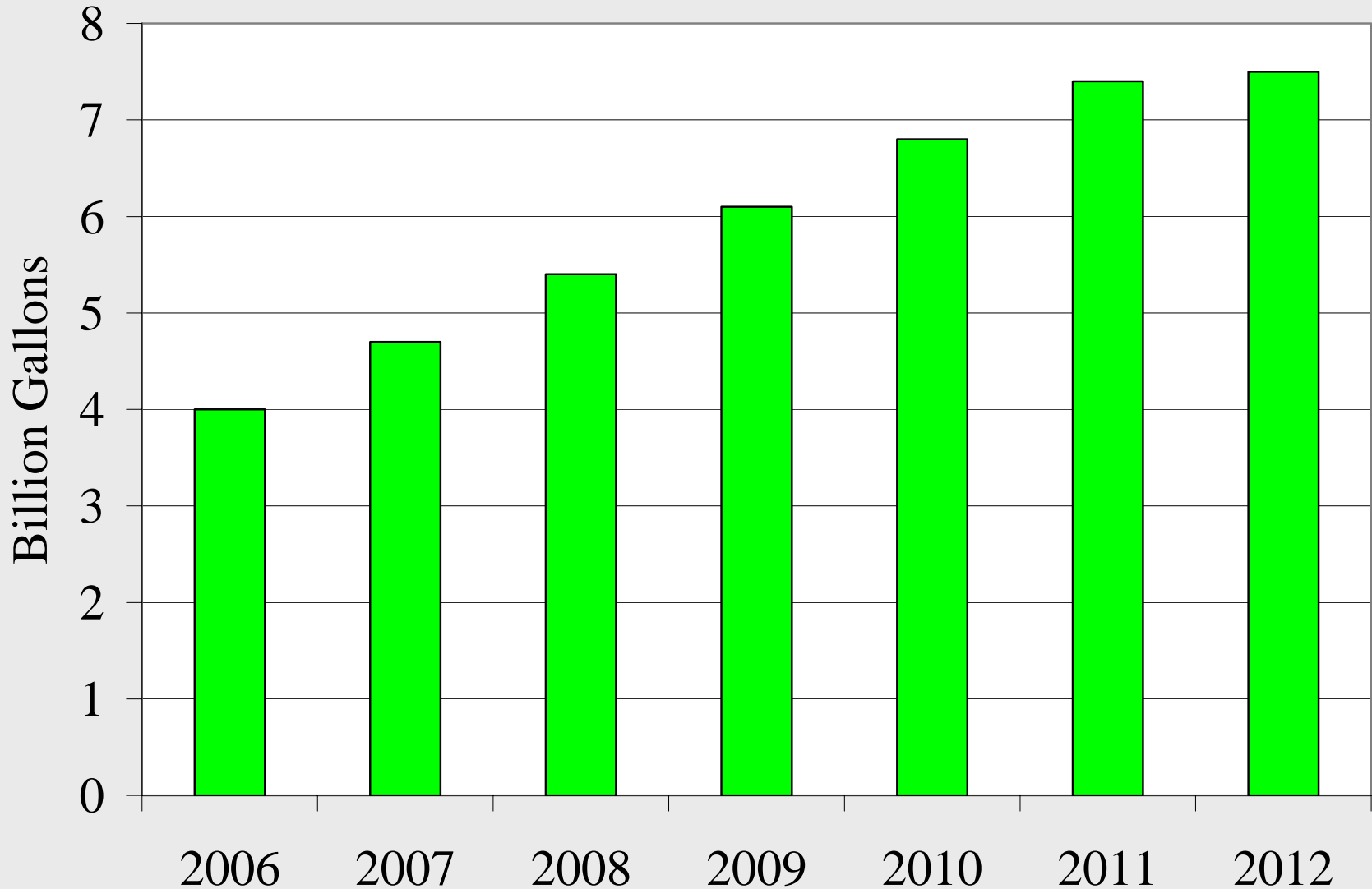
Source: Renewable Fuels Association

Biodiesel Growth



Source: National Biodiesel Board

Renewable Fuels Standard



Source: Renewable Fuels Association

Ethanol Industry Snapshots

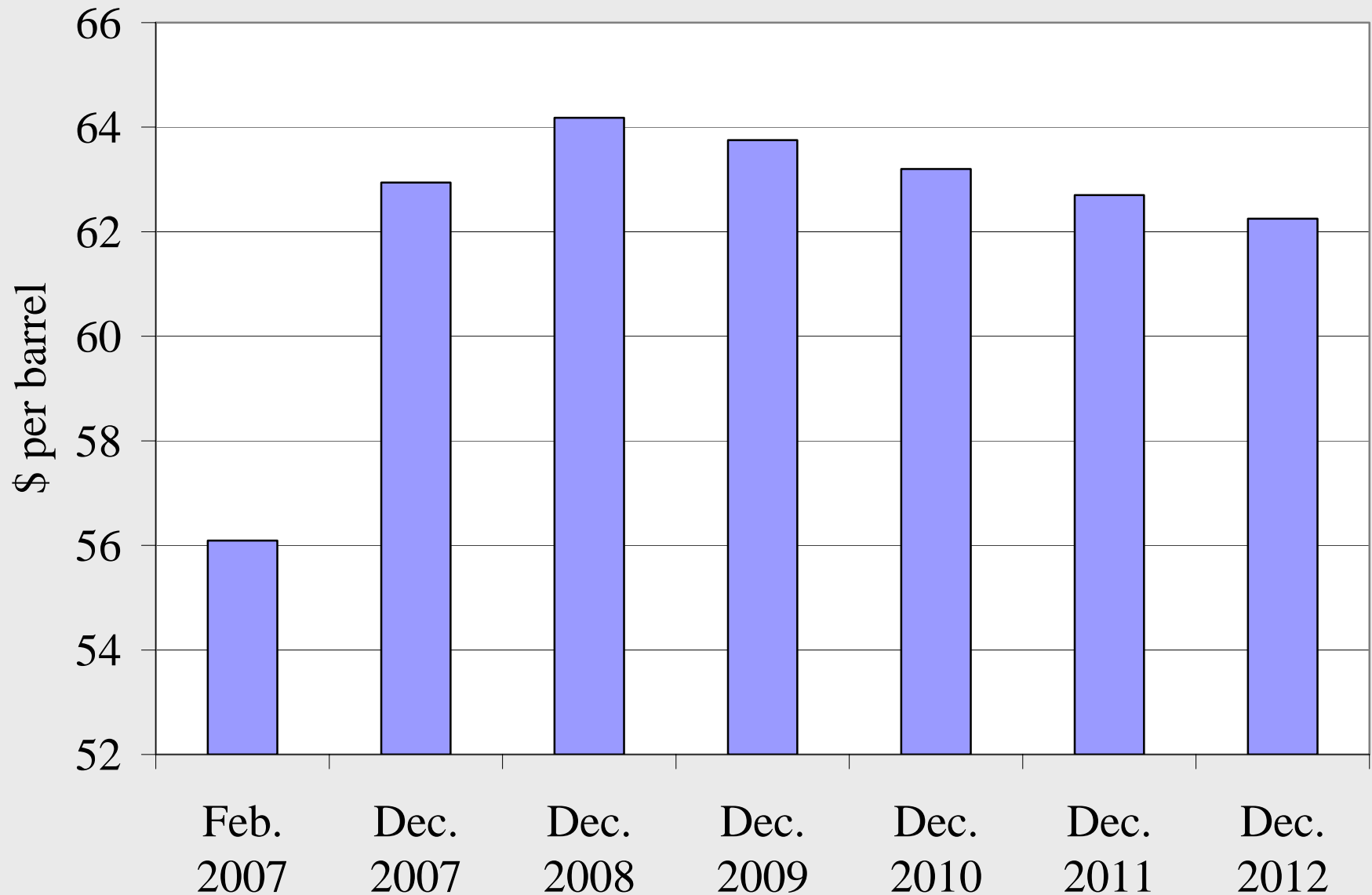
	Ethanol Plants	Capacity (mgy)
Jan. 2000	54	1,749
Jan. 2001	56	1,921
Jan. 2002	61	2,347
Jan. 2003	68	2,707
Jan. 2004	72	3,101
Jan. 2005	81	3,644
Jan. 2006	95	4,336
Jan. 2007	110	5,386

Source: Renewable Fuels Association

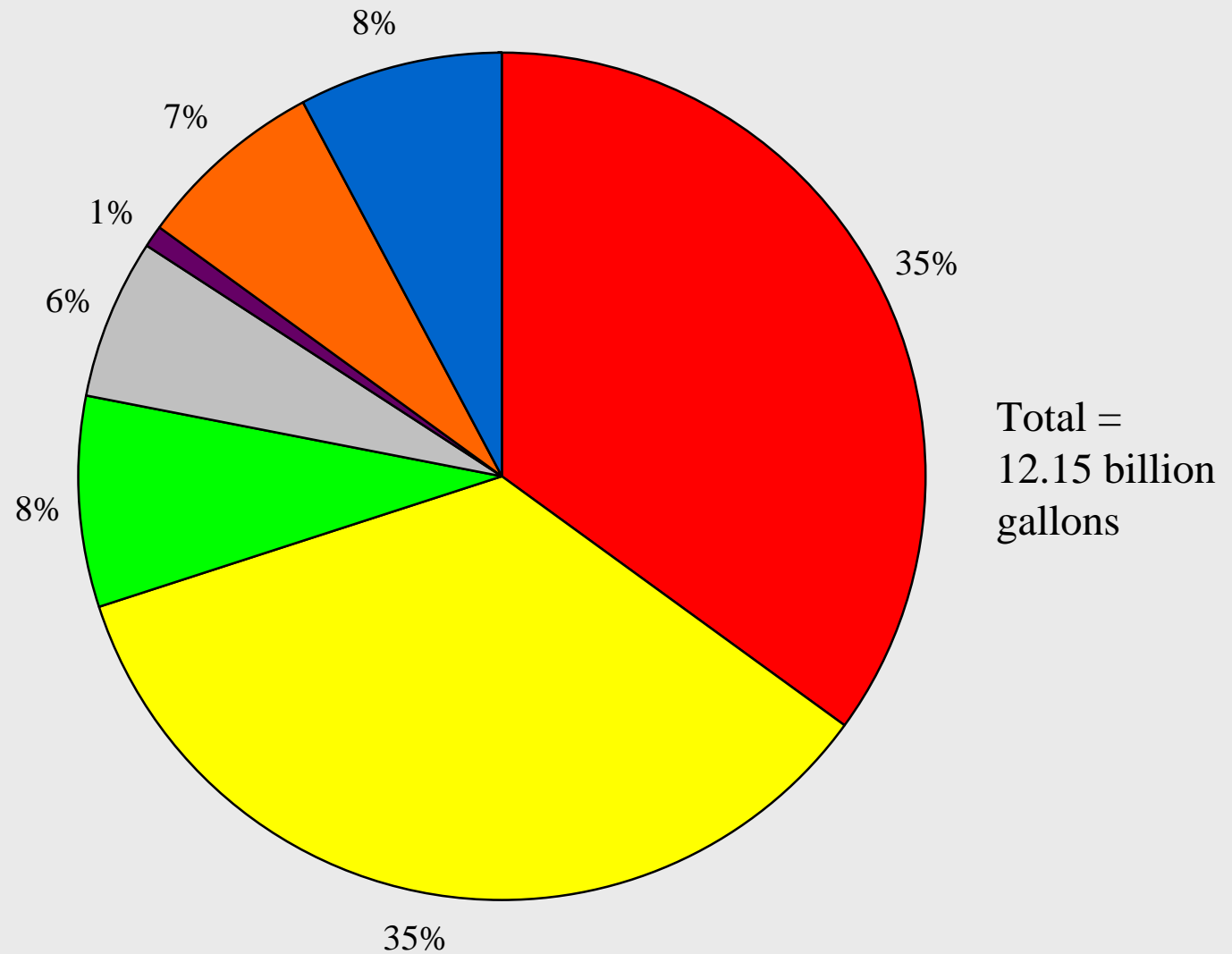
Where Are We Headed?

- Based on construction announcements for ethanol plants, by the end of 2008, ethanol production capacity could exceed 12 billion gallons
- Announced biodiesel capacity exceeds 2 billion gallons

Oil Futures As Of 1/8/2007

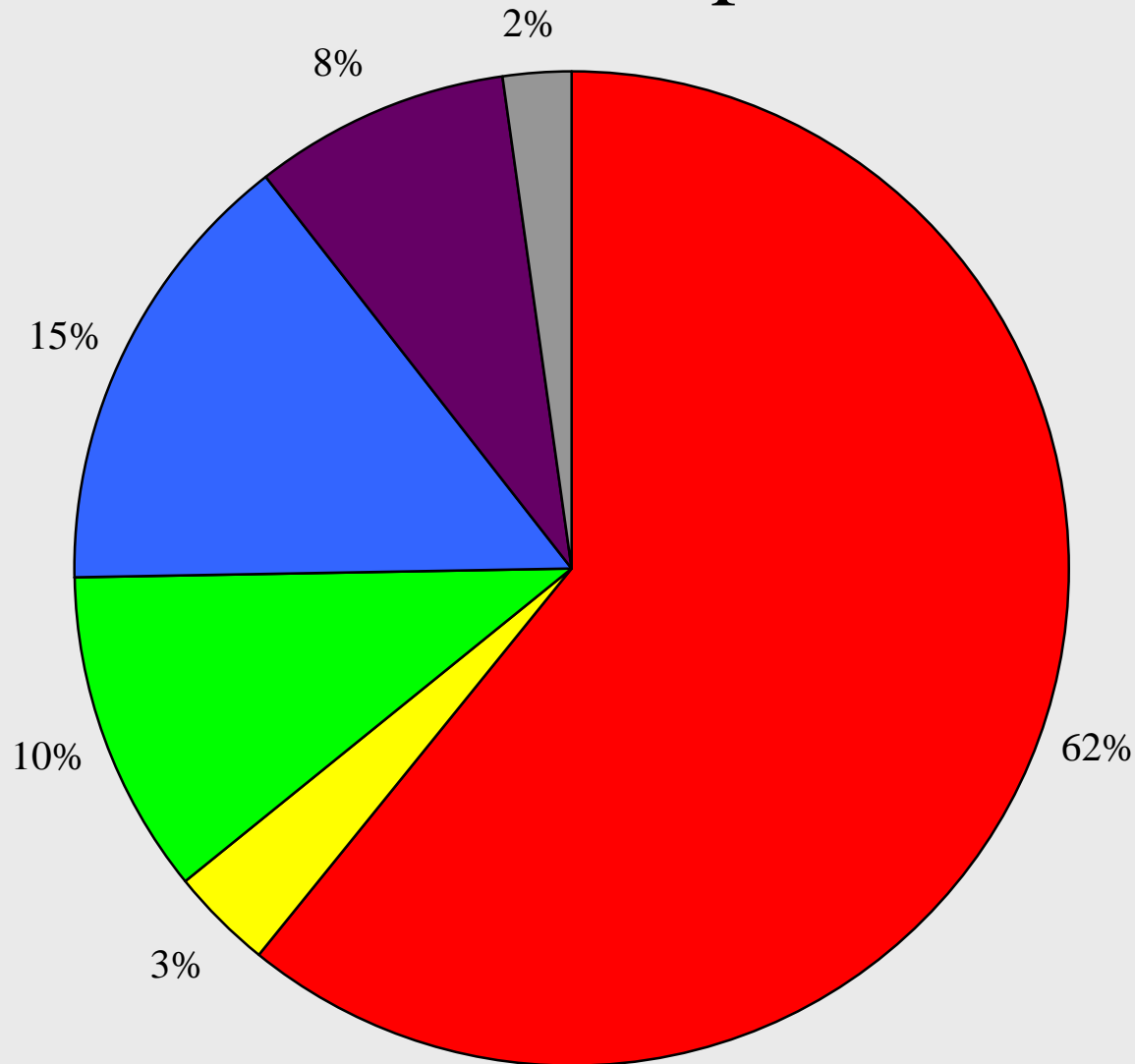


World Ethanol Production, 2005



■ U.S. ■ Brazil ■ China ■ Europe ■ Africa ■ Asia ■ Rest of World

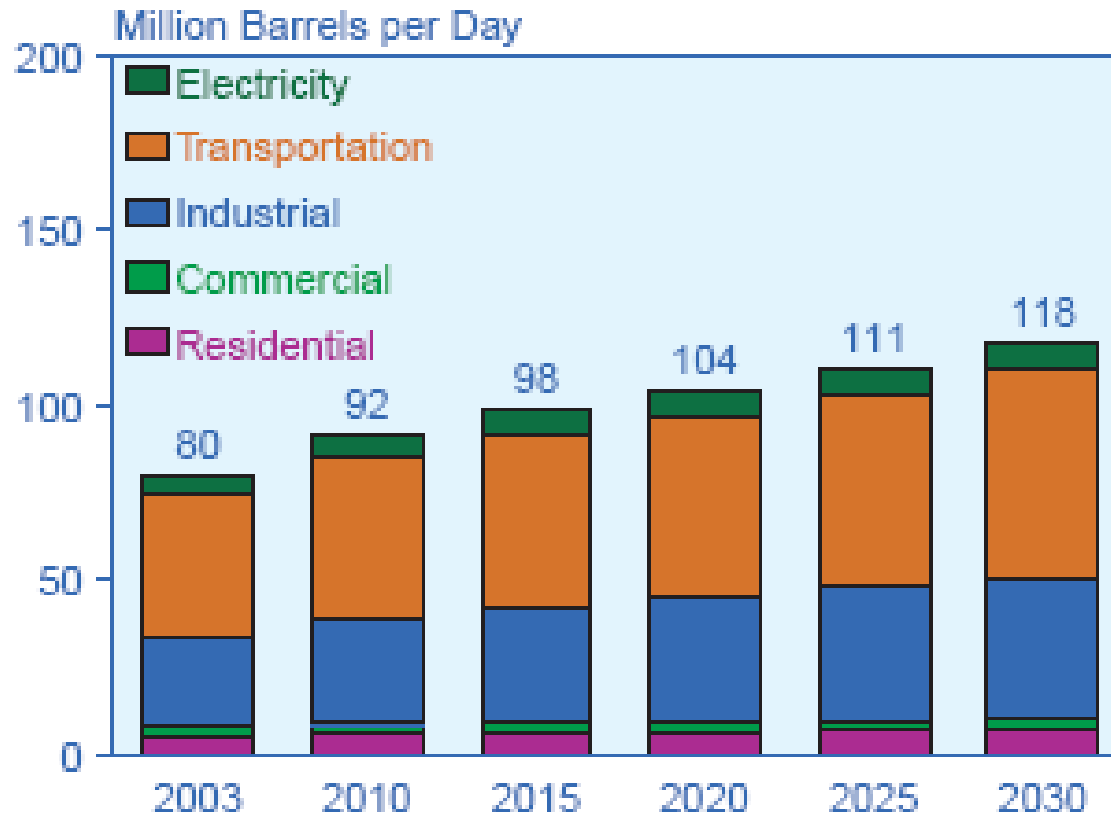
World Ethanol Imports, 2006



■ U.S. ■ EU ■ India ■ Japan ■ South Korea ■ Rest of World

Projected World Oil Consumption

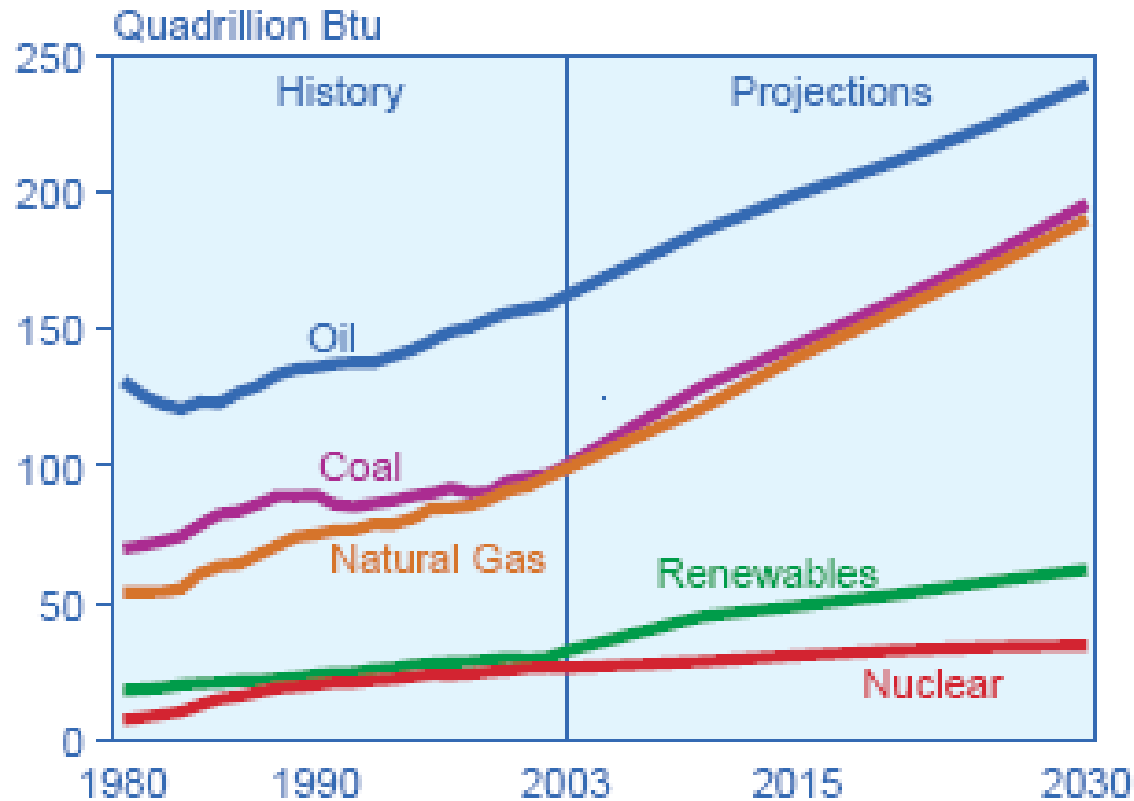
Figure 26. World Oil Consumption by Sector, 2003-2030



Sources: 2003: Derived from Energy Information Administration (EIA), *International Energy Annual 2003* (May-July 2005), web site www.eia.doe.gov/iea/. Projections: EIA, *System for the Analysis of Global Energy Markets* (2006).

Projected World Energy Sources

Figure 3. World Marketed Energy Use by Energy Type, 1980-2030



Sources: History: Energy Information Administration (EIA), *International Energy Annual 2003* (May-July 2005), web site www.eia.doe.gov/iea/. Projections: EIA, *System for the Analysis of Global Energy Markets* (2006).

Biofuel Feedstocks

- Corn – U.S., China
- Sugarcane – Brazil, Central and South America, Southeast Asia, India
- Soybean Oil – U.S., Brazil
- Rapeseed and Sunflower Oil – Europe
- Palm Oil – Malaysia and Indonesia

Biofuel Programs

- U.S. – Renewable Fuels Standard
- Brazil – Ethanol blend requirement, preferential tax policies
- Argentina – Require use E-5 blend over the next 5 years
- India – 5% ethanol in all gasoline
- EU – 5.75% biofuel (energy content) target by 2010

Biofuel Programs

- Columbia – Mandated use of E-10 in big cities
- Venezuela – Phasing in a national E-10 blending mandate
- Japan – Long term goal of replacing 20% of oil needs with biofuels or gas-to-liquid fuels
- Canada – 45% of gasoline to be E-10 by 2010
- Thailand – Mandating nationwide E-10 in 2007

Biofuel Programs

- China – Mandates E-10 blends in five provinces
- Philippines – Will mandate E-5 and 2% biodiesel in 2007

Trade Barriers

- U.S. tariff of 2.5% plus 54 cents per gallon
- Brazil and Argentina – 20% tariff
- European Union – 87 cents per gallon tariff
- Canada – 19 cents per gallon tariff
- Thailand – 30% tariff
- India – 186% tariff

U.S. Energy Department Projections

- U.S. liquid fuel demand will grow by 1% a year through 2030
- U.S. ethanol production will average a 5.2% growth rate
- But U.S. ethanol imports will average a 8.4% growth rate
- The U.S. will remain a net importer of ethanol

U.S. Energy Department Projections

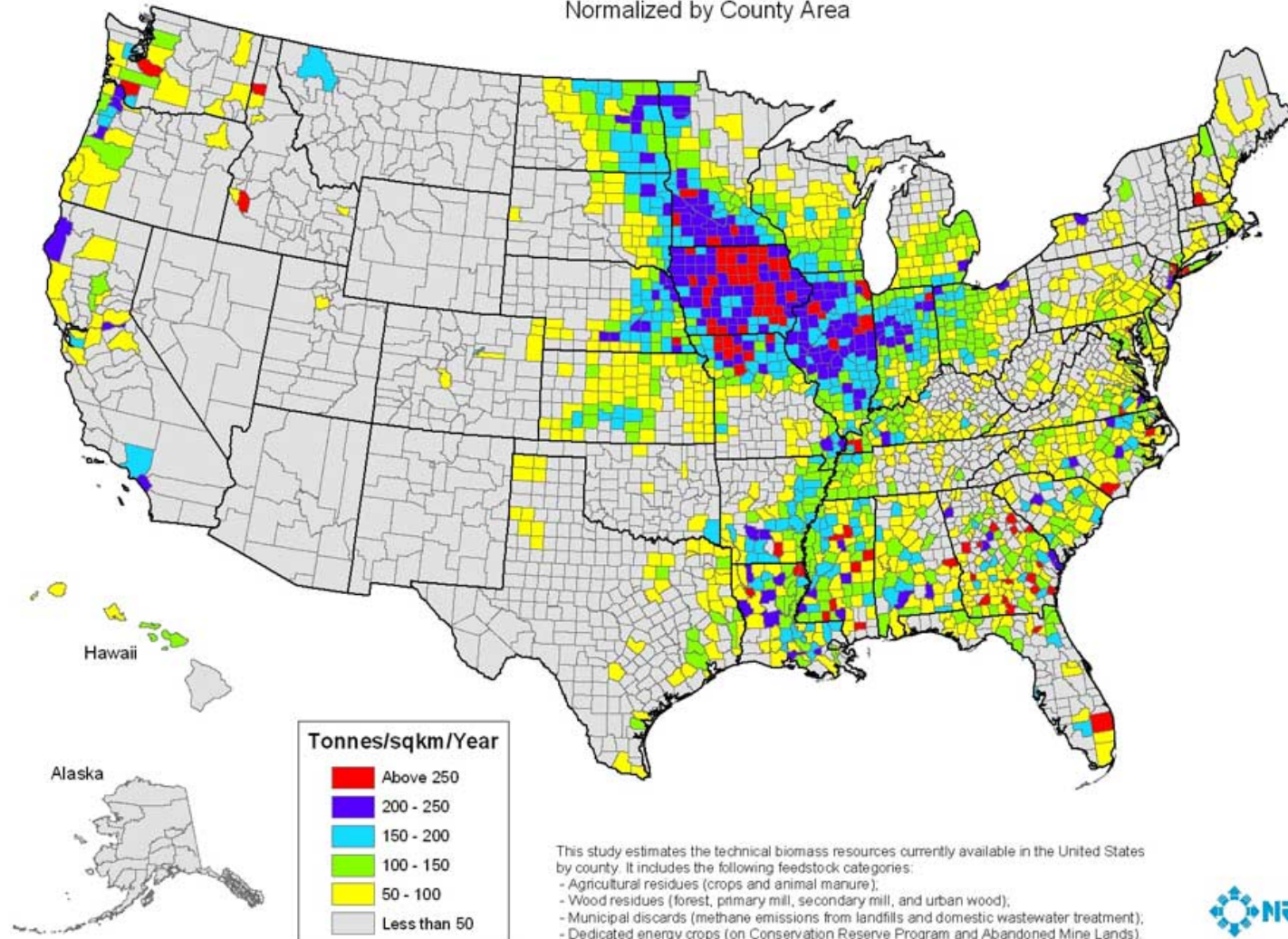
- World petroleum demand will grow by 1.3% per year
- China's petroleum needs increase 3.2% per year
- India's oil requirements go up 2.3% per year

Given Energy Demand Projections...

- The U.S., China, India, the EU, Japan, and South Korea are all expected to be importers of ethanol over the next decade
- Brazil will be the major exporter of ethanol
 - Already exports roughly 25% of production, over 1 billion gallons

U.S. Biomass

Biomass Resources Available in the United States
Normalized by County Area



Cellulosic Ethanol ...

- Ethanol derived from any lignocellulosic or hemicellulosic matter that is available on a renewable basis
- Sources: trees, wood and crop residues, grasses, fibers, energy crops, and other non-petroleum wastes
- Federal legislative support via the Biomass Research and Development Act of 2000, extended by the 2002 Farm Bill and the Energy Policy Act of 2005

U.S. Production Incentives

- Goal: 1 billion gallons of cellulosic biofuel per year and biofuel price-competitiveness by 2015
- Per gallon production incentive set by the Sec. of Energy until
 - 2008 or
 - 100 million gallons per year of cellulosic biofuel
- Then a reverse auction sets the incentive until
 - 2015 or
 - 1 billion gallons per year of cellulosic biofuel

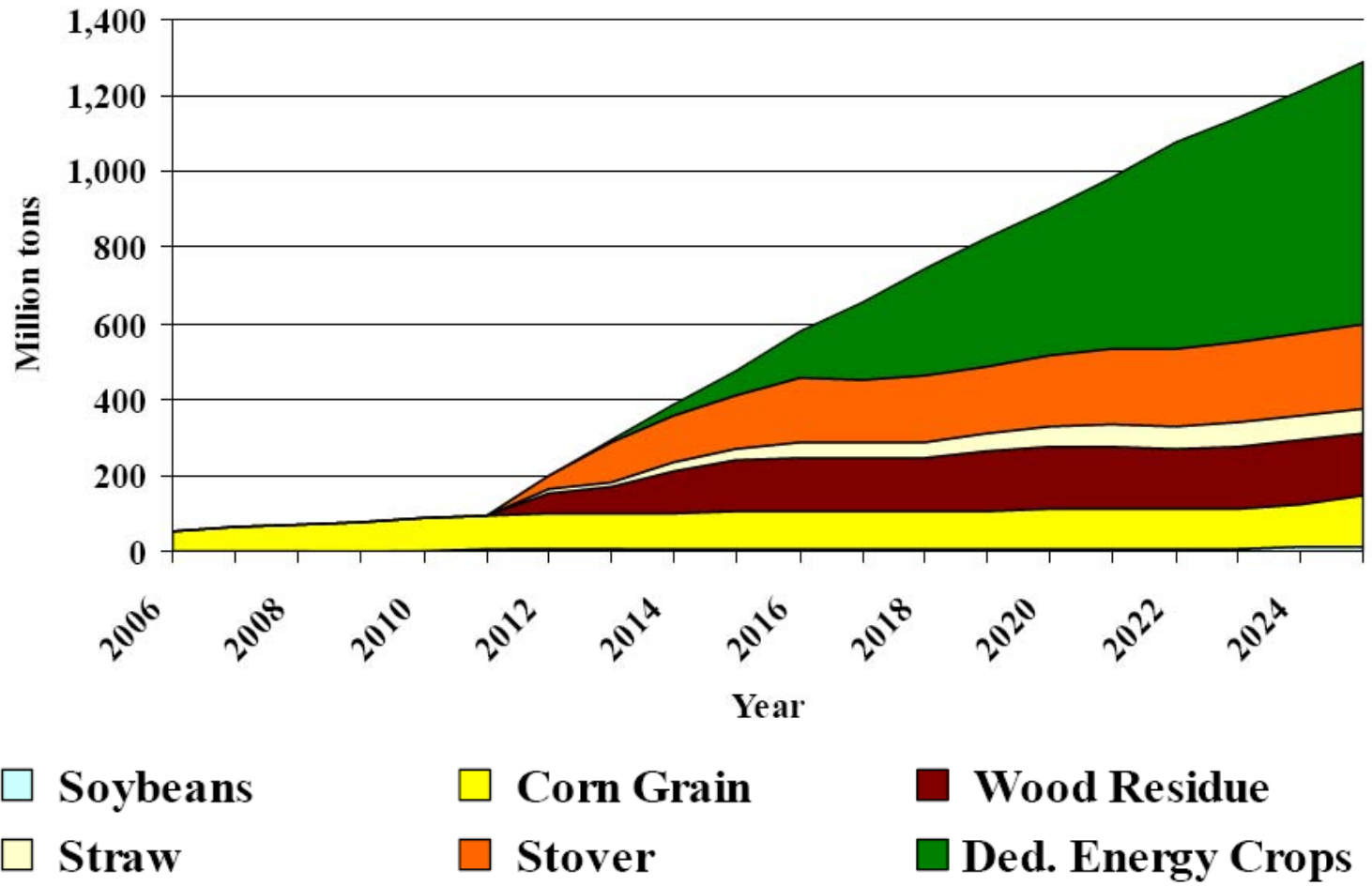
Production Incentives (cont.)

- Bidders submit desired incentive and estimated production
- Incentive paid on actual production
- Funding for auction set at \$250 million

Other Features of the Energy Act

- Preprocessing and harvesting grants for cellulosic biomass
- Minimum target of 250 million gallons of renewable fuel from cellulosic biomass by 2013
- Production credit: 1 gallon of cellulosic biomass ethanol = 2.5 gallons of renewable fuel (until 2013)
- Additional loan guarantees and grants

Potential Outlook for U.S. Biomass



Source: U. of Tennessee, "25% Renewable Energy for the U.S. by 2025", Report, November 2006