

Energy Demand Outlook for the U.S.

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U.S. Energy Information Administration

Southern BioProducts and Renewable Energy Conference

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U.S. Energy Information Administration
Independent Statistics and Analysis

EIA Overview

Mission Statement

The U.S. Energy Information Administration (EIA) collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment.



Annual Energy Outlook

- Projections/analyses of U.S. energy markets and
- CO₂ emissions
- Projections by year through 2035
- Addresses longer-term demographic, technological, economic growth, & energy resource trends
- Several forecasts based on assumptions about economic growth, oil prices, technology, etc.
- Developed using the National Energy Modeling System (NEMS) – including regional detail
- Benchmarked to latest STEO forecast



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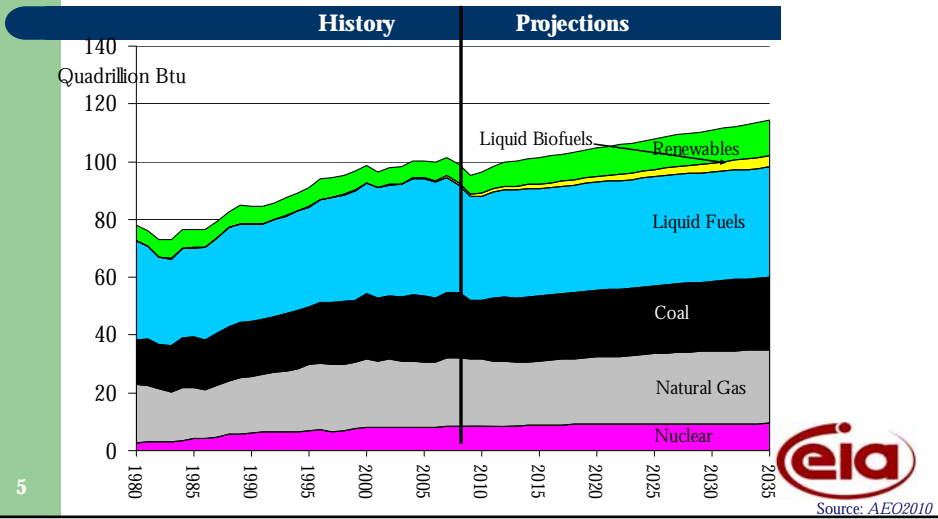
AEO 2010 Reference Case

- Generally assumes current laws and regulations
 - provisions sunset if specified
 - excludes potential future laws and regulations
 - some grey areas
 - adopts proposed regulations that are not yet final, in order to inform the likely implementation of a statute
 - adds a premium to the capital cost of CO₂-intensive technologies
 - assumes implementation of existing regulations that enable building new energy infrastructure and resource extraction
- Includes technologies that are commercial or reasonably expected to become commercial in the next decade or so
 - includes cost and efficiency improvements from learning, but not revolutionary or breakthrough technologies

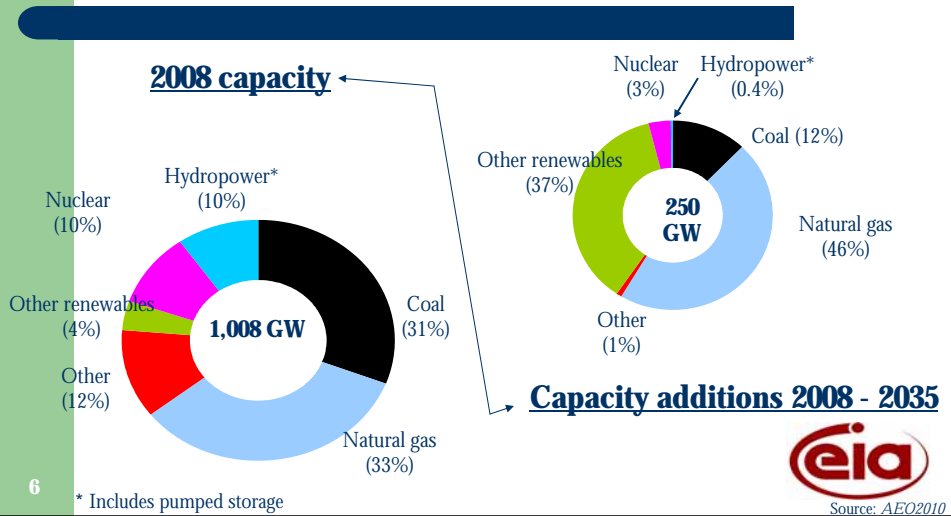


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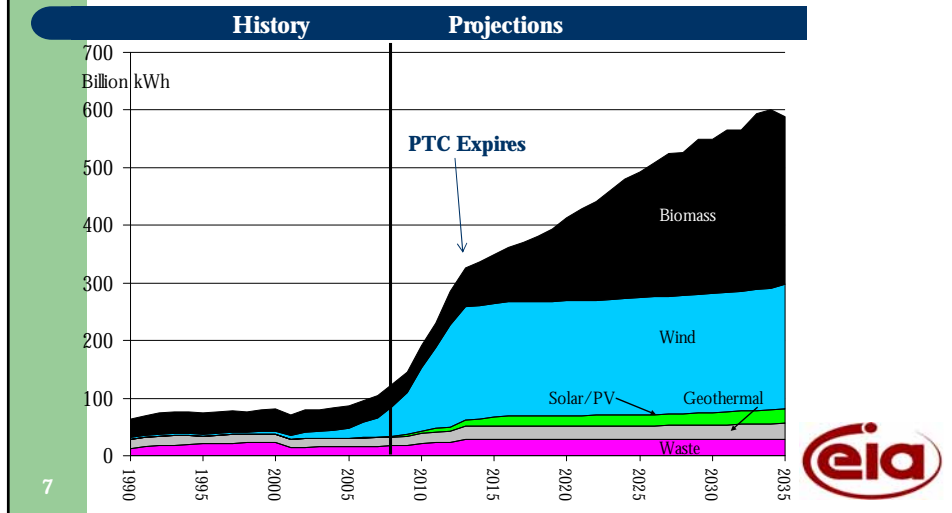
AEO2010 Energy Usage



Capacity additions dominated by Natural Gas and Renewables



Non-hydro renewables account for 41% of electricity generation growth



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Federal Renewable Energy Incentives

- **Production Tax Credit** – extended until the end of 2012 for wind, and 2013 for incremental hydro, geothermal, MSW, biomass, wave and tidal energy.
 - 2.1-cent per kWh for wind, solar, closed-loop biomass, geothermal
 - 1.05-cent per kWh for open-loop biomass, incremental hydropower, small irrigation systems, landfill gas and municipal solid waste
- **Investment Tax Credit** – 30% of capital costs, payable to project owner when capital is placed into service. Intended to promote development of capital intensive technologies such as solar energy systems, dedicated biomass, geothermal and wind.
- **Grant** – up to 30% of the project's value for a wind, biomass, geothermal or solar project. Other eligible technologies can receive up to 10% of the projects value. Intended to encourage development of renewable energy despite recession which has left many projects unprofitable and therefore not paying taxes.

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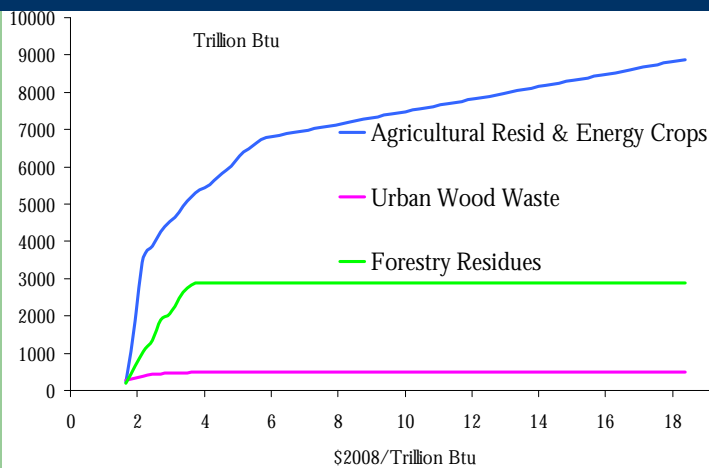
U.S. Biomass Resource Base

- About one-half of the land in the contiguous U.S.
 - **Forestland resources:** 504 million acres of timberland, 91 million acres of other forestland
 - **Agricultural resources:** 342 million acres cropland, 39 million acres idle cropland, 68 million acres cropland pasture
- **Forest Resources:** logging residues, forest thinning, conventional wood, fuelwood, primary and secondary mill residues, pulping liquors and urban wood wastes
- **Agricultural Resources:** crop reisdues, grains to biofuels, perennial grasses, perennial woody crops, animal manures, food/feed processing residues, MSW and landfill gas

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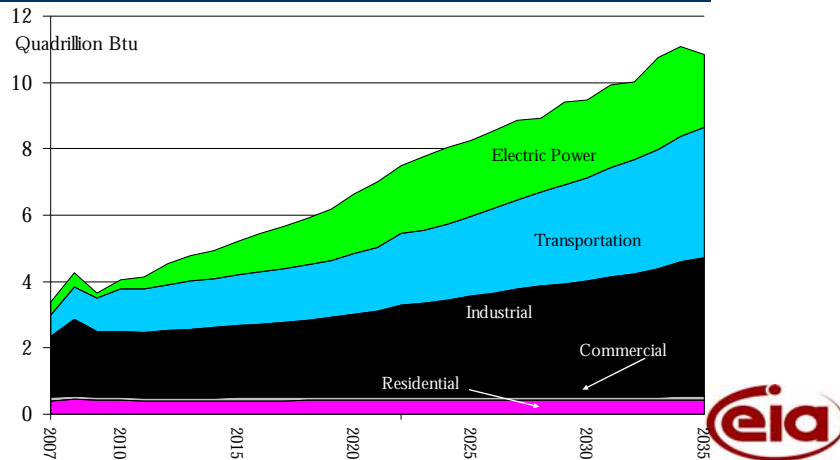
Biomass Supply Curve



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Biomass Consumption by Industry



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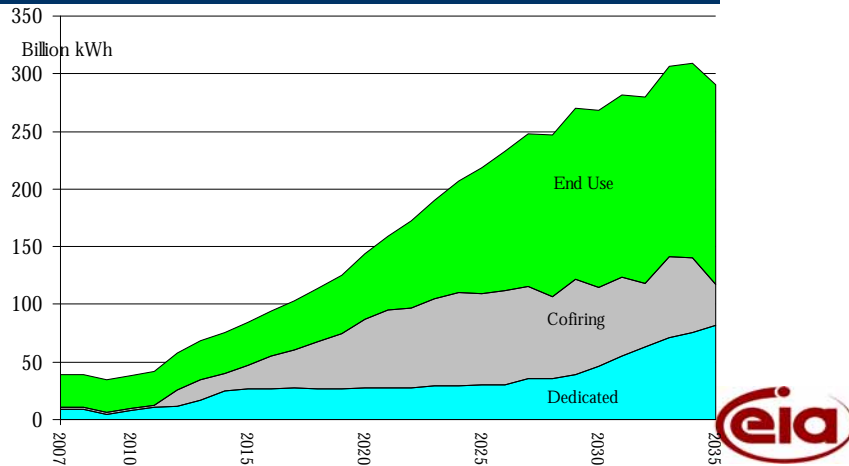
Biomass for Electricity

- Dedicated capacity - Biomass Integrated Gasification Combined Cycle
 - Standard unit includes storage and biomass handling, magnetic separators and ash handling equipment. Also includes a solid and gas recycling system and a hot gas filtration unit.
 - Costs are consistent with coal gasifier costs
- Cofiring – processed biomass is mixed with coal and combusted in existing coal facilities
 - can occur up to a max of 15% fuel/5% heat content
 - No additional fuel handling costs are assumed
- End use – waste biomass is combusted on-site for electricity, which is either used in-house or sold

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Biomass Consumption for Electricity



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Other Biomass Uses

- Residential & Commercial – biomass is mainly used for space heating
- Transportation – Biodiesel, ethanol & 2nd gen fuels
 - Ethanol is currently all corn, cellulosic comes on line in 2011
 - Fischer-Tropsch and pyrolysis liquids present opportunities for usage of other carbonaceous fuels such as wood
- Industrial – Cogeneration captive capacity in the wood and paper industries
 - Less than half the energy content is used for process heat and steam, the rest is used for electricity

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Urban Wood Waste and Mill Residues

- Waste woods from manufacturing and wood processing activities, as well as construction and demolition debris.

Table 6. Physical and Economic Characteristics of Urban Wood Wastes and Mill Residues

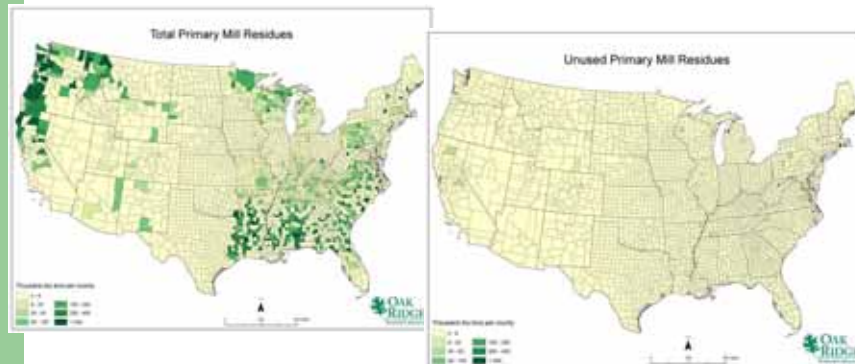
Residue Type	Moisture Content (Percent)	Heating Value, Wet (Btu per Pound)	Heating Value, Dry (Btu per Pound)	Collection and Processing Cost (Dollars per Wet Ton)
Bark Residue (Primary Mill)	40	4,667	8,629	4
Wood Residue (Primary Mill)	40	4,661	8,568	4
Woody Yard Trimmings	25	6,150	8,600	12
Construction Residues	15	7,103	8,568	12
Demolition Residues	15	7,103	8,568	12
Other Waste Wood	15	7,103	8,568	12

Source: Antares Group, Inc., *Business Residue Supply Curves for the United States (Update)*, Report for the U.S. Department of Energy and the National Renewable Energy Laboratory (June 1999).



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U.S. Primary Mill Residue Availability



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Forest Residues

- Data comes from Oak Ridge National Lab estimate based on updated USDA study
 - Analyzed forestry inventory, wood types, stocking densities, slope, equipment operability costs, logging and chipping costs and hauling distances and costs
 - \$12/dry ton hauling fees are added
 - Transportation costs can vary greatly depending in what manner and how far the chips are hauled
 - Stumpage fee of \$2/dry ton added to live cull, sound dead wood and logging residues
- EIA assumes heat conversion factor of 8600 btu/lb



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U.S. Logging Residues from Timberlands

\$20/dry ton

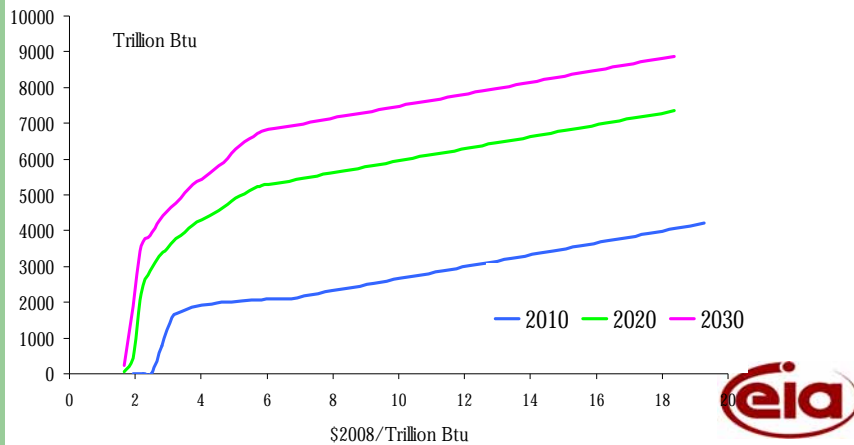


\$40/dry ton



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Agresid & Energy Crops supply curve



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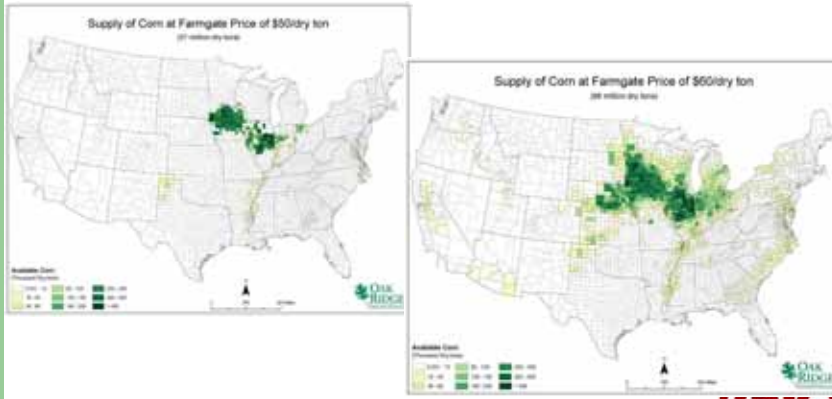
Agricultural Residues & Energy Crops

- Supply generated by POLYSYS, an agricultural sector model that forecasts crops, livestock, food, feed, industrial and export demand.
 - Uses the USDA 10 year baseline
 - Considers acreage of traditional crops, idled acreage, pasture and CRP
- Energy crops include hybrid poplar, hybrid willow and switchgrass
- Approximately 30-40% of ag. residues can be removed from soil post-harvest
 - Supply curves only include corn stover and wheat straw
 - Prices include cost of collecting the residues, transportation costs, and a participation premium paid to farmers
- EIA assumes heat conversion factor of 7700 btu/lb



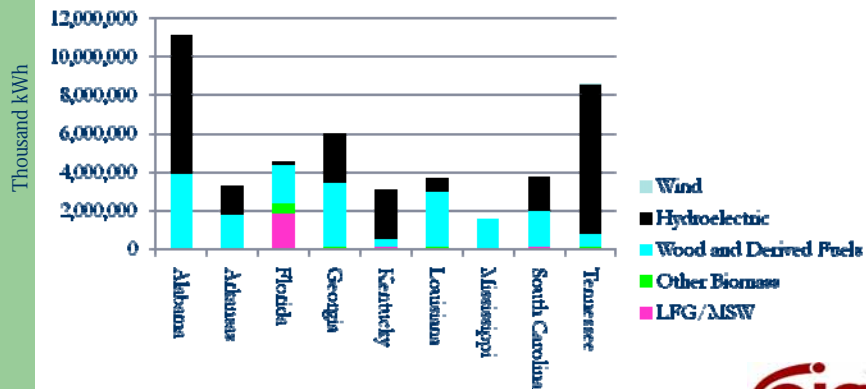
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U.S. Corn Stover Availability



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Southern Renewable Net Generation



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Other biomass includes agriculture byproducts/crops, sludge waste, and other biomass solids, liquids and gases.



U.S. Renewable Portfolio Standards



Source: DOE EERE



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Contact & Further Information

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- <http://www.eia.doe.gov/oiaf/aeo/assumption/index.html>
- <http://www.eia.doe.gov/emeu/aer/contents.html>
- <http://www.eia.doe.gov/cneaf/solar.renewables/page/wood/wood.html>



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