



Texas Biomass/Bioenergy Overview

FACT SHEET 2.14

In 2003, Texas consumed an estimated 12.4 quadrillion Btu (3,625 trillion kWh) of energy, ranking 1st nationally.¹ Petroleum accounted for about 46 percent of total consumption, with natural gas and coal each providing 37 and 13 percent of the state's energy respectively. Another major energy source was nuclear energy, which accounted for about 3 percent of the state's total energy consumption, respectively. Biomass supplied over 78.6 trillion Btu (23 billion kWh), or about 1 percent of Texas's total consumption, ranking it 15th compared to other states nationwide.¹

Texas's total energy consumption increased by over 3.0 quadrillion Btu (870.4 trillion kWh) between 1980 and 2001, an average annual increase of 1.4 percent. Electricity consumption increased by over 466.19 billion Btu (136.6 million kWh), an annual increase of 2.7 percent over the same period. Annual per capita petroleum use for transportation was estimated to be 22 barrels for 2001, an increase of 0.8 barrels since 1980.²

An estimated 460 quadrillion Btu (134 trillion kWh) of electricity could be generated using biomass fuels in Texas.³ Of this amount, 109 quadrillion Btu (31.9 trillion kWh) would come from agricultural wastes, 150 quadrillion Btu (43.9 trillion kWh) from woody wastes, 51 quadrillion Btu (14.9 trillion kWh) from biogas, and 150 quadrillion Btu (43.9 trillion kWh) from landfill biomass.³

FOREST-BASED RESOURCES

Texas has more than 11.9 million acres of forestland.⁴ In 2003, logging operations in the state produced 1.4 million dry tons of forest residues.⁵ Softwoods made up 69 percent of these residues while hardwoods made up 31 percent. Tops, limbs, and other debris accounted for 2.8 tons while stumps accounted for another 0.6 tons.⁶ A 1999 study indicated that at \$40/dry ton, 814,000 dry tons of forest residues would be available for bioenergy use.⁷ At \$50/dry ton, more than 1 million dry tons would be available.⁷

Based on 2003 data, the Texas Forest Service estimates that more than 5.9 million tons of mill residues were produced in east Texas, 85 percent of which was softwood and 15 percent was hardwood.⁶ Components of the residues included chips (50 percent), bark (36 percent), sawdust (8 percent), and shavings (6 percent). At \$30/dry ton, 1.6 million dry tons of residues would be available for bioenergy.⁷ At \$50/dry ton, over 4 million dry tons would be available.⁷

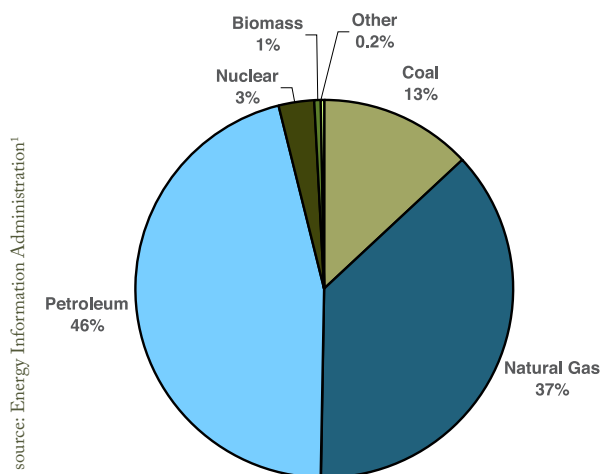


Figure 1. Texas Energy Consumption by Source, 2003



Urban wood wastes also provide a viable feedstock. Texas produces 2.3 million dry tons of urban wood biomass annually.⁸

Studies in Texas are also researching the potential of using mesquite and other range resources to produce bioenergy.

TEXAS'S BIOMASS RESOURCES	
Corn Produced (Silage and Grain) ¹⁹	7,312,600 tons
Soybeans Produced ¹⁹	111,600 tons
Wheat Produced ¹⁹	1,008,000 tons
Conservation Reserve Program ²⁰	4,044,892 acres enrolled
Municipal Solid Waste ²¹	45,898,387 tons generated
Logging Residues ⁵	1.4 million dry tons
Poultry ¹⁹	672,782,000 head
Livestock ¹⁹	17,090,000 head

Table 1. Texas Biomass Resources

AGRICULTURAL RESOURCES

Determining the amount of agricultural biomass that could be available from crops, but more importantly crop residues, is difficult to quantify. Texas has about 38.7 million acres of cropland.⁹ Residues include corn stover, rice hulls, and other plant stalks. In Texas, about 6 million dry tons of agricultural residue biomass could be used for bioenergy.¹⁰ For dedicated energy crops, such as hybrid poplars and switchgrass, an estimated 9.1 million dry tons could be produced each year for \$50/dry ton.⁷

Livestock manure also provides another significant resource. Manure produced from the 7.2 million head fed each year amounts to more than 5 million tons/year on an as-collected basis.¹¹ Additionally, an estimated 2.3 million tons of poultry litter and 472,000 tons of swine manure was produced in 2004.¹¹ Altogether, manure management could provide 58,000 dry tons of matter annually.⁸

CURRENT ACTIVITIES

When constructing a new building or reconstructing an older building, all Texas state agencies must analyze the cost of providing energy through conventional sources versus alternative energy sources. If the use of alternative energy sources is economically feasible, it must be used in construction.¹²

The Austin City Council has approved a 10-year Strategic Plan proposed by Austin Energy. The plan sets a renewables portfolio standard of 20 percent by 2020.¹¹ Net metering is also provided to Austin Energy customers with on-site generating capabilities. Customers must be interconnected with the utility's system. The maximum capacity is 20 kW and the power must be generated by a renewable energy source such as solar, wind, geothermal, hydroelectric, and biomass or biomass-based waste products. Statewide, net metering is allowed for qualifying facilities with a generating capability of 50 kW using renewable energy sources.¹²

In 1999 the Public Utility Commission of Texas (PUCT) adopted rules for the state's Renewable Energy Mandate, establishing a renewable portfolio standard (RPS), a renewable-energy credit (REC) trading program, and renewable-energy purchase





requirements for competitive retailers in Texas. The 1999 standard called for 2,000 megawatts (MW) of new renewables to be installed in Texas by 2009, in addition to the 880 MW of existing renewables generation at the time. In August 2005, Senate Bill 20 increased the renewable-energy mandate to 5,880 MW by 2015 (about 5 percent of the state's electricity demand), including a target of 500 MW of renewable-energy capacity from resources other than wind. The 2005 legislation also set a goal of reaching 10,000 MW in renewable energy capacity by 2025. As of early 2005, 1,190 MW of new renewable energy had been added, representing about 3 percent of the state's total electric generating capacity.

The PUCT also established a REC-trading program that began in July 2001 and will continue through 2019. Under PUCT rules, one REC represents one megawatt-hour (MWh) of qualified renewable energy that is generated and metered in Texas. A Capacity Conversion Factor (CCF) is used to convert MW goals into MWh requirements for each retailer in the competitive market. Each energy retailer in Texas is allocated a share of the mandate based on that retailer's pro rata share of statewide retail energy sales. The program administrator maintains an REC account for program participants to track the production, sale, transfer, purchase, and retirement of RECs. Credits can be banked for three years, and all renewable additions have a minimum of 10 years of credits to recover over-market costs.

In February 2006, the State Energy Conservation Office sponsored a workshop entitled "Road to Renewables '06 Ethanol/Biodiesel Workshop and Expo." The expo brought together all sectors of the alternative fuels industry to discuss the development of this new industry in Texas.¹³

City Public Service of San Antonio is the first fleet in Texas to use corn and forestry-derived ethanol as an alternative fuel for its fleet. About 37 percent (130 vehicles) of the CPS fleet are flex-fuel vehicles.¹³

The State's Innovative Energy Demonstration Program works to increase public awareness of the state's renewable energy sources, increase infrastructure, and demonstrate new technology. Solar, wind, and biomass demonstration projects are funded.¹⁴

Nacogdoches Power is beginning to develop a 100 mW wood-fueled plant in east Texas. Estimates are that the plant would create 500 jobs for the area.¹⁵

Panda Ethanol has recently announced plans to build three manure gasification facilities in the northern panhandle of Texas. The towns of Hereford, Sherman, and Muleshoe will each be home to a 105 million gallon per year ethanol plant.¹⁶

Seven constructed and/or announced ethanol production facilities are scattered throughout the state of Texas. Fuels for these plants include corn, grain sorghum, cotton gin residues, and cattle manure.¹⁷ Texas also currently has 19 landfills that are producing methane for energy production and another 54 identified as potential sites.¹⁸

LINKS TO OTHER TEXAS BIOMASS/BIOENERGY RELATED INFORMATION

TEXAS STATE ENERGY CONSERVATION OFFICE
<http://www.seco.cpa.state.tx.us/>



TEXAS DEPARTMENT OF AGRICULTURE
<http://www.agr.state.tx.us/>

TEXAS FOREST SERVICE
<http://txforestservicetamu.edu/>

ENDNOTES

- 1 U.S. Department of Energy, Energy Information Administration, "Table S3. Energy Consumption Estimates by Source, 2003." http://www.eia.doe.gov/emeu/states/sep_sum/html/sum_btutot.html
- 2 Department of Energy, Energy Efficiency and Renewable Energy Program. Texas Energy Statistics. 2006. http://www.eere.energy.gov/states/state_specific_statistics.cfm/state=TX
- 3 Biomass: Nature's Most Flexible Energy Resource. Fact Sheet 15. Texas State Energy Conservation Office. <http://www.infinitepower.org/factsheets.htm>
- 4 Forest Inventory and Analysis Factsheet East Texas 2003. USDA Forest Service Forest Inventory and Analysis Unit. [http://srsfia2.fs.fed.us/states/tx/TX%20Factsheet%20\(FINAL\).pdf](http://srsfia2.fs.fed.us/states/tx/TX%20Factsheet%20(FINAL).pdf)
- 5 U.S. Department of Agriculture, Forest Service Forest Inventory and Analysis Unit Timber Product Output Data 2003. <http://srsfia1.fia.srs.fs.fed.us/>
- 6 Economic Development – FAQs. Texas Forest Service. <http://tfsweb.tamu.edu/sustainable/article.aspx?id=101>. [Accessed April, 2007].
- 7 Biomass Feedstock Availability in the United States: 1999 State Level Analysis. Marie E. Walsh, Robert L. Perlack, Anthony Turhollow, Daniel de la Torre Ugarte, Denny A. Becker, Robin L. Graham, Stephen E. Slinsky, and Daryll E. Ray. <http://bioenergy.ornl.gov/resourcedata/index.html>
- 8 Milbrandt, A. A Geographic Perspective on the Current Biomass Resource Availability in the United States. 2005. U.S. Department of Energy, National Renewable Energy Laboratory. <http://www.nrel.gov/docs/fy06osti/39181.pdf>
- 9 U.S. Department of Agriculture, National Agricultural Statistics Service. 2002 Census of Agriculture. Texas State Data. <http://www.nass.usda.gov/>
- 10 Texas Biomass Resource Assessment. Texas Energy Office. Accessed April 2007. <http://www.1-800-Texas.com/Energy/index.cfm?page=bioenergy>
- 11 Total Manure Production in Texas, Year 2004 Estimates. Texas Animal Manure Management Issues Unit, Texas A&M University. [http://tammi.tamu.edu/Manuretotals\(1\).pdf](http://tammi.tamu.edu/Manuretotals(1).pdf)
- 12 The Database of State Incentives for Renewable Energy (DSIRE). Texas Incentives for Renewables and Efficiency. <http://www.dsireusa.org/library/includes/map2.cfm?State=TX&CurrentPageId=1&EE=1&RE=1>
- 13 U.S. Department of Energy Efficiency and Renewable Energy, State Energy Program, Programs by State. Texas. http://www.eere.energy.gov/state_energy_program/project_briefs_by_state.cfm/state=TX
- 14 State Energy Conservation Office, Renewable Energy in Texas, Innovative Energy Demonstration Program <http://www.seco.cpa.state.tx.us/re.htm>
- 15 Nacogdoches Power. <http://www.nacogdochespower.com/>
- 16 Panda Ethanol. <http://www.pandaethanol.com/facilities/muleshoe/index.html>
- 17 State Energy Conservation Office, Texas Ethanol Plants. http://www.seco.cpa.state.tx.us/re_ethanol_plants.htm
- 18 U.S. Environmental Protection Agency Landfill Methane Outreach Program Active Program Map (April 3, 2007). <http://www.epa.gov/lmop/docs/map.pdf>
- 19 U.S. Department of Agriculture, National Agricultural Statistics Service. 2006 Statistics by Commodity. Accessed May, 2007. <http://www.nass.usda.gov/>
- 20 U.S. Department of Agriculture, Farm Service Agency. Conservation Reserve Program Summary and Enrollment Statistics, FY 06. http://www.fsa.usda.gov/Internet/FSA_File/06rpt.pdf
- 21 Simmons, P., N. Goldstein, S. Kaufman, N. Themelis, and J. Thompson Jr. 2006. The State of Garbage in America. *BioCycle*. 47(3) April 2006. PP. 26-43. <http://www.jgpress.com/biocyclus.htm>

