SunGrant INITIATIVE
Southeastern Regional Center
Tennessee Agricultural Experiment Station

Tennessee *Biomass and Bioenergy Overview*

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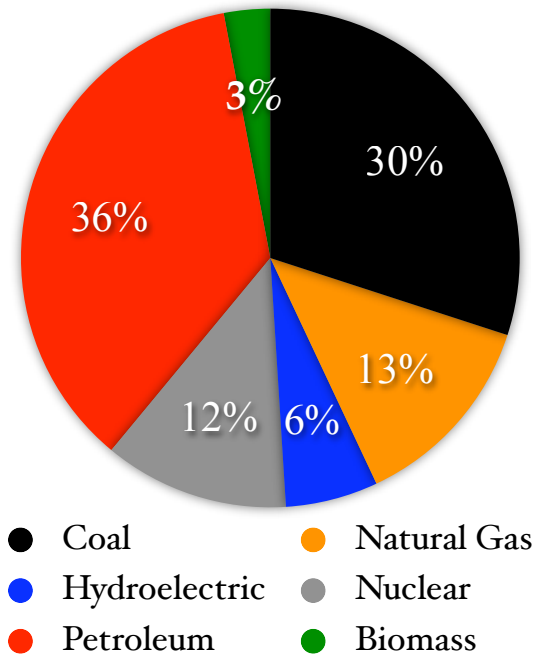
GENERAL OVERVIEW

In 2003, Tennessee consumed an estimated 2,268.9 trillion Btu (664.9 billion kWh) of energy, ranking 15th nationally.[1] Petroleum accounted for about 36 percent of total consumption, with coal providing another 30 percent. Other major energy sources were natural gas and nuclear, which accounted for approximately 13 and 12 percent of the state's total energy consumption, respectively. Biomass supplied over 59.1 trillion Btu (17.3 billion kWh), or about 3 percent of Tennessee's total consumption, ranking it 17th compared to other states nationwide.[1]

Tennessee's total energy consumption increased by over 447 trillion Btu (131 billion kWh) between 1980 and 2001, an average annual increase of 1.1 percent. Electricity consumption increased by 74.7 trillion Btu (21.9 billion kWh) over the same period. Per capita petroleum use was estimated to be 20 barrels for 2001, an increase of 4.5 barrels since 1980.[2] Annual per capita petroleum use for transportation was estimated to be 18 barrels for 2001, an increase of 2.4 barrels since 1980.[2]

Tennessee Energy Consumption by Source, 2003



Source: Energy Information Administration[1]

FOREST-BASED RESOURCES

Tennessee has over 14.4 million acres of forestland.[3] It is estimated that 760,000 dry tons of harvesting residues are produced in the state each year.[4] In 2003, the processing of primary wood products in the state generated over 124.6 million cubic feet of wood and bark residues. Approximately 42 percent of these residues were used for industrial fuels and 31 percent were used for fiber products. An additional 18 percent went toward other products, leaving 9 percent of the residues unused.[6] Urban wood residues in Tennessee could contribute another 614,000 dry tons of biomass annually.[5]

AGRICULTURAL RESOURCES

Tennessee has approximately 7 million acres of cropland.[7] It has been estimated that the state could produce 1.5 million dry tons of agricultural residue biomass annually.[5] It has also been estimated that an additional 6.6 million dry tons of dedicated energy crops could be produced at $40/dry ton.[8] One study estimated that on Conservation Reserve Program (CRP) land alone, 1.4 million dry tons of switchgrass and 1.1 million dry tons of willow and hybrid poplar could be produced each year.[5] Management of farm animal manure could provide an additional 20,000 tons of methane annually.[5]

CURRENT ACTIVITIES

Governor Phil Bredesen announced in January 2007 the creation of the Tennessee Biofuels Initiative. The state, in cooperation with the University of Tennessee (UT) and Oak Ridge National Laboratory (ORNL), will develop and build a pilot cellulosic biorefinery in east Tennessee that will produce 5 million gallons of ethanol per year as well as other byproducts. The facility will utilize switchgrass and wood residues as its feedstocks. It will serve as a research hand demonstration facility to build cellulosic ethanol production as an industry around the state. The Initiative represents the state's commitment of $73 million dollars. See http://www.agriculture.utk.edu/Biofuel/index.htm for more information.

UT is a major contributor to biomass and bioenergy related knowledge in the state. The UT Agricultural Experiment Station is one of five university locations around the country to coordinate a regional Sun Grant Program, funded by the Depts. of Energy, Agriculture, and Transportation. The Southeastern Sun Grant Center will coordinate a competitive grants research program for universities across the south. The Experiment Station is also conducting in-house research on wood utilization as a feedstock for bioenergy and bioproducts. Research on feedstock characterization and pre-processing is also ongoing. Significant work on policy analysis and development is being undertaken by the university's Dept. of Agricultural Economics. One of the early results of the Sun Grant Initiative will be the Sun Grant Bioweb website which will contain a major overview of the current state of biomass and bioenergy knowledge. UT is co-coordinating this effort. A major Dept. of Energy funded project focusing on switchgrass is also in progress, with plantings across the state. The University also works closely with the Oak Ridge National Laboratory on a variety of projects. The National Laboratory, located in Oak Ridge, is a leader in biomass feedstock research. The Lab also has emphases in biofuels, biochemicals, and associated processing.

Tennessee State University received a grant from USDA for a project entitled Development of Internet-Based Education for Biobased Product Information: Preparing Students for Careers in Agriculture. The University has also worked with a private company to develop regional education workshops throughout the state through a Dept. of Energy grant.

Some private companies are developing bio-based enterprises in Tennessee. In addition to an existing biochemical and ethanol plant, Tate and Lyle PLC and DuPont have teamed up to build a $100 million bioproducts facility. The plant will use renewable resources to produce products that replace petrochemicals, specifically 1,3 propanediol, a key ingredient in DuPont's new polymer Sorona. Sorona is used in clothing and other products. The production of bio-propanediol will save approximately 10 million gallons of gasoline each year.[9] There are six biodiesel production facilities in operation and at least one ethanol production facility in Tennessee. Tennessee currently has six landfills producing methane for energy, with 13 more landfills identified as potential program sites.[10] Overall, the state currently has 23 facilities producing some type of biopower.[11]

Tennessee's Biomass Resources
Corn Produced (Silage and Grain)[14]
2,502,000 tons
Soybeans Produced[14]
1,322,100 tons
Wheat Produced[14]
364,800 tons
Conservation Reserve Program[15]
276,502 acres enrolled
Municipal Solid Waste[16]
12,928,999 tons generated
Logging Residues[4]
760,000 dry tons
Poultry[14]
2,629,500 head
Livestock[14]
2,672,000 head

At the state government level, the Tennessee Dept. of Economic and Community Development, Energy Division offers grants to counties for the installation biodiesel tanks and pumping equipment. The Division also offers low-interest loans of up to $100,000, with terms of up to 7 years, for renewable energy and energy efficiency projects. Businesses with fewer than 300 employees or less than $3.5 million in annual gross sales or receipts are eligible. The Tennessee Department of Transportation conducts a grant program called the Biofuel Green Island Corridor project. This program provides funds for fuel retail stations to install pumps to sell biodiesel and E-85 ethanol.[12] The TVA Green Power Program is also available through most Tennessee electrical utilities.[13]

LINKS TO OTHER TENNESSEE RESOURCES

Tennessee Department of Agriculture
http://www.state.tn.us/agriculture/

Tennessee Department of Economic and Community Development, Energy Division
http://www.state.tn.us/ecd/energy.htm

Tennessee Dept. of Agriculture, Division of Forestry
http://www.state.tn.us/agriculture/forestry/index.html

CITATIONS

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