



# Tennessee's 25x'25 Energy Future

## The Economic Impacts and Land Use Changes of Increased Biomass Production

### The Vision

*By 2025, America's farms, forests and ranches will provide 25 percent of the total energy consumed in the United States, while continuing to produce safe, abundant and affordable food, feed and fiber.*

### A National Study

An economic analysis conducted by researchers at the University of Tennessee on behalf of the 25x'25 Initiative outlines how America's vast natural resources can be utilized to produce 25 percent of the nation's energy supply from renewable sources by 2025.

The study assumes that of the 29.42 quads of total renewable energy needed, 1) 15.45 additional quads would come from biomass, 2) the continuation of current farm program features, 3) continued production technology improvement, and 4) that cellulosic conversion will be economic by 2012. The national study focuses on wind, solar, geothermal, hydro and biomass contributions, excluding woody biomass from standing timber. The national study also includes estimates for energy production from livestock, and the impact on livestock and poultry.

A 25x'25 future presents tremendous opportunities for each state as revealed by the study. With continued advancements in technology and significant shifts in cropping patterns, U.S. farmers, ranchers and foresters in each state can contribute to this energy goal while still providing abundant supplies of food, feed and fiber; improving soil, water and air resources; and enhancing wildlife habitat.

### Opportunities for Tennessee

The study estimates that by 2025, Tennessee's wind, solar and biomass resources will have the potential to produce 2.35 billion gallons of biofuels and 39.43 kilowatt hours of renewable electricity — an 898.3 percent increase from 2003 levels. As renewable energy production in the state increases, Tennessee's net farm and forest income will increase. By 2025, the projected increase in net income will exceed \$1.3 billion. Economic impacts caused by changes in crop prices, shifts in crop acres, additions of dedicated energy crops and the decreases in government payments will result in \$6.3 billion in increased economic activity in the state. An additional \$7.3 billion in economic activity will occur in the conversion of feedstocks to energy. Total economic impacts are estimated at nearly \$13.6 billion and over 170,000 additional jobs will be created in Tennessee.

### Tennessee's Role in a 25x'25 Energy Future will Result in:

- **\$1.3B** increase in net farm income
- **\$13.6B** increase in total economic impacts
- **170,000** additional jobs



### What Do These Mean?

**Quad:** a measure of energy equivalent to one quadrillion British Thermal Units (BTUs). About 4.4 million American households would consume a quad of energy through electricity and gasoline use in one year.

**BTU** (British Thermal Unit): A unit for measuring heat. A BTU is defined as the amount of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit.

**Biomass:** Any biological matter that is available on a renewable or recurring basis, including agricultural crops and trees, wood and wood wastes and residues, plants (including aquatic plants), grasses, residues, fibers, and animal wastes, municipal wastes, and other waste materials.

**Woody biomass:** Any material produced by trees, bushes and shrubs in any form of processing (chips, sawdust, leaves, needles, etc.).

**Biofuel:** Any liquid fuel produced from biomass. Biofuels sometimes are referred to as renewable fuels. However, renewable fuels also include biogas.

**Feedstock:** Any crop grown to provide the raw material for producing biofuels, electricity, or other energy or biobased application or product.

### More Information:

A copy of the national study, "25% Renewable Energy for the United States By 2025: Agricultural and Economic Impacts," is available at [www.25x25.org](http://www.25x25.org).

## Feedstock Quantities

By 2025, Tennessee's renewable energy production needs will create an increase in demand of over 35 million dry tons of dedicated energy crops and 4.1 million dry tons of wood.

### Quantities of Feedstock Supplied for Tennessee by Selected Year to Meet the 25x'25 Vision

Feedstock	2010	2015	2020	2025
Million tons				
Corn	0.10	0.14	0.18	0.46
Soybeans	0.03	0.07	0.10	0.14
Million dry tons				
Wood	0.00	4.80	4.11	4.12
Dedicated Energy Crops	0.00	4.97	22.60	35.47
Corn Stover	0.00	0.16	0.41	0.55
Wheat Straw	0.00	0.13	0.21	0.27
Total Cellulose	0.00	10.06	27.34	40.41

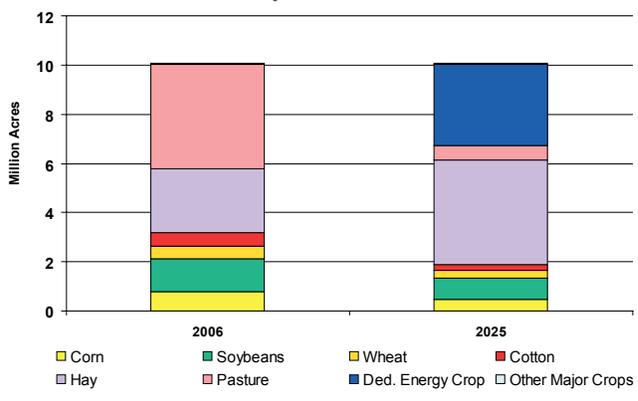
A copy of this brochure, the 86-page state-by-state analysis, and the national study, "25% Renewable Energy for the United States By 2025: Agricultural and Economic Impacts," are available at: [www.25x25.org](http://www.25x25.org).

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## Land Use Impacts

Tennessee's agricultural and forestry sectors will be strongly impacted by the development of a renewable energy future that relies on a significant amount of biomass. By 2025, hay acreage will increase as pasture is converted to hay production and dedicated energy crops. An estimated 3.3 million acres of dedicated energy crops are projected by 2025.

Land Use Comparison 2006 and 2025



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## Tennessee Moves Forward on Renewable Energy Initiatives

In May 2007, Governor Phil Bredesen became the 25th state governor to embrace and endorse the 25x'25 Renewable Energy Vision. His announcement was made at the first-ever Governor's Conference on Biofuels at Montgomery Bell State Park. The Governor's Alternative Fuels Working Group had recommended Governor Bredesen endorse the 25x'25 Vision.



The Alternative Fuels Working Group, created by Executive Order 33, is charged with developing a comprehensive alternative fuels strategy for Tennessee. Executive Order 33 also makes the production, distribution and use of biofuels an economic development priority for the state. The Working Group is also supporting an alternative fuels public education and outreach campaign called **BioTenn: A Partnership for Homegrown Energy**.

Governor Bredesen proposed and the Tennessee General Assembly recently approved \$72 million to



support a range of alternative fuels activities for Tennessee. The proposal includes \$40 million to help fund the Tennessee Biofuels Initiative. The Tennessee Biofuels Initiative is a partnership between the State of Tennessee, Oak Ridge National Laboratory and the University of Tennessee. The Initiative aims to build and

operate a pilot demonstration-scale biomass ethanol plant that will utilize biomass crops such as switchgrass as a feedstock. Biomass crops represent significant new markets for Tennessee farmers.

The strength of the 25x'25 Alliance rests with its partners. It is these partners that shape and guide the implementation of the 25x'25 Renewable Energy Vision. Tennessee partners include:

**Department members of the Alternative Fuels Working Group; Tennessee Farm Bureau Federation; East Tennessee Clean Fuels Coalition; Clean Cities of West Tennessee; Milagro Biofuels; Bioenergy Engineering, LLC.**