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de Koff, Jason P., "State of the Energy Industry" (2015). *Extension Publications*. 56.  
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# Bioenergy

## State of the Energy Industry

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The U.S. energy industry produces our heat, electricity and transportation fuels and is largely dominated by fossil fuel production and consumption. This presents some difficulty in managing risks related to price volatility and uncertainty that these sources are known to encounter (especially for transportation fuels like petroleum). This document identifies current trends in fossil fuels and biofuels in the U.S. and the energy produced in Tennessee.

### U.S. Fossil fuels

In general, overall U.S. fossil fuel production has increased since 2005 and consumption has decreased since around 2007. The U.S., however, still relies on other countries for over 3 billion barrels of crude oil each year (Fig. 1). In 2014, the top 5 countries that the

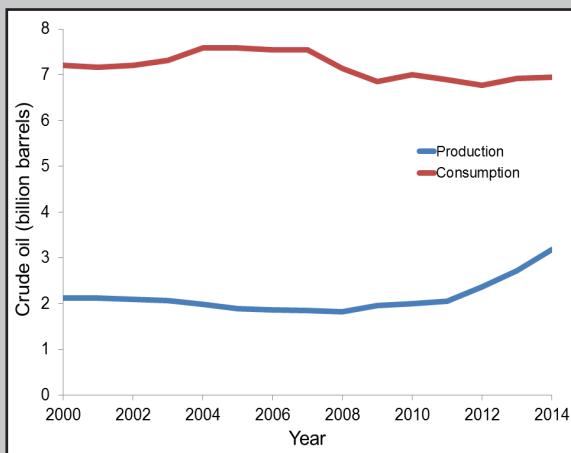


Figure 1. U.S. crude oil production and consumption between 2000 and 2014.

U.S. imported oil from included Canada, Saudi Arabia, Mexico, Venezuela and Russia (Fig. 2). These imports can influence U.S. foreign policy because they provide other countries with some leverage over our economic security. Therefore, expanding energy production into other sources can enhance U.S. national security.

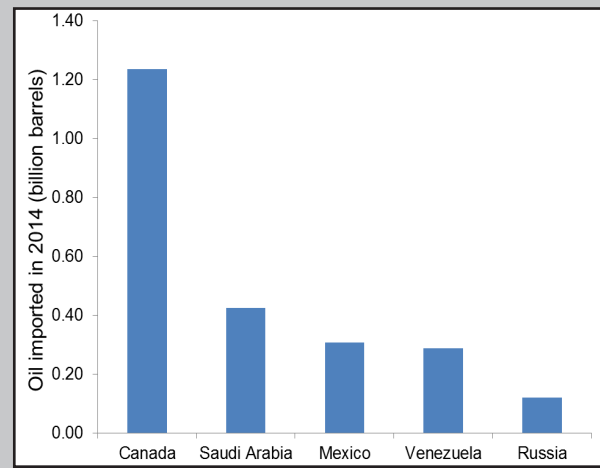


Figure 2. Top 5 countries importing oil to the U.S.

In 2014, the energy consumed in the U.S. largely came from fossil fuels (79%) with smaller portions from nuclear (9.5%) and renewable (11%) energy sources (Fig. 3).

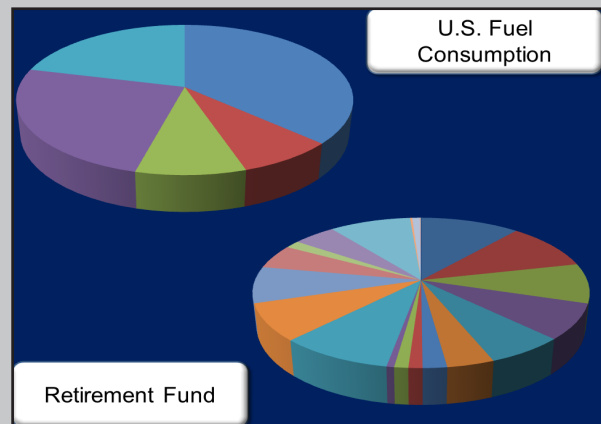


Figure 3. Comparison of U.S. fuel consumption (largest sections represent the fossil fuels) with a retirement fund.

Currently, biomass energy (mostly from wood and corn ethanol) makes up about 4.7% of total energy production. Having multiple investments in a retirement plan is a

good example of a way to mitigate risk from financial crisis and can be a goal for the U.S. energy sector (Fig. 3). In a well-structured retirement plan, a decrease in market prices will have less effect because it is balanced out by more stable investments. Having more sources of energy will provide greater stability in energy prices because if the cost of one source increases, another can be used in its place.

## Tennessee Energy

Tennessee has few fossil fuel reserves and produces a lot of its electricity from nuclear and renewable (primarily hydropower) fuel (Fig. 4).

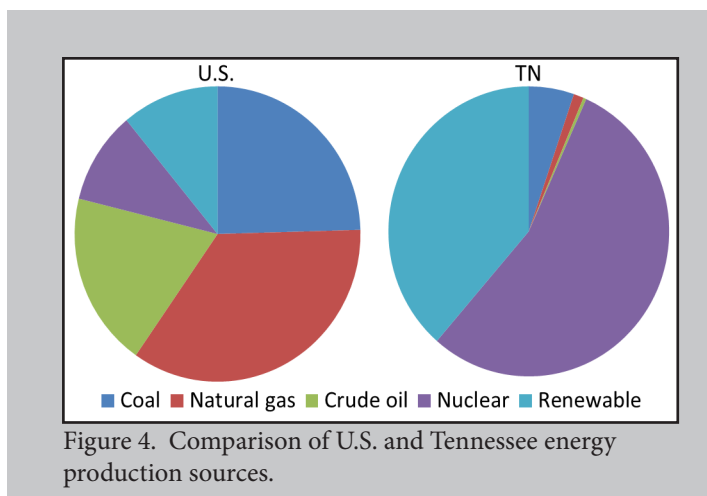


Figure 4. Comparison of U.S. and Tennessee energy production sources.

Tennessee currently has 52 power plants producing electricity and the fuel sources range from hydropower to fossil fuels to nuclear, wind, solar, and biomass energy (Fig. 5).

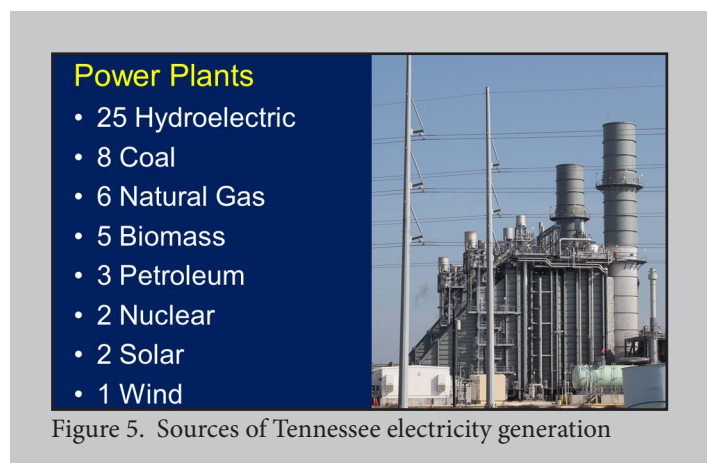


Figure 5. Sources of Tennessee electricity generation

Of the 5 biomass plants in Tennessee, two are associated with landfills where they presumably use the methane produced in these areas to produce electricity. The remaining three are located with paper product

manufacturing plants which burn their waste product to produce electricity.

In addition to electricity production, there are two ethanol production plants in Tennessee that produce about 110-120 million gallons of corn ethanol each year. There are also some small commercial biodiesel production plants that produce 2-5 million gallons per year, primarily from waste cooking oils.

According to the 2012 Census of Agriculture, there are a number of different renewable energy systems employed on Tennessee farms (Fig. 6).

Renewable Energy System	Farms
Solar panels	606
Geoexchange systems	213
Biodiesel	162
Ethanol	135
Small hydro systems	101
Wind turbines	80
Methane digesters	53

Figure 6. Renewable energy on Tennessee farms (Census of Agriculture, 2012)

Tennessee is working toward increasing renewable energy production, particularly biomass energy, through different ventures in cellulosic ethanol and biodiesel production and education. This will provide benefits like job growth and economic development to the state since there are few fossil fuel reserves and the use of these sources will enhance environmental quality.

## References and Resources

U.S. Energy Information Administration  
[www.eia.gov/state](http://www.eia.gov/state)

U.S. Census of Agriculture  
<http://www.agcensus.usda.gov/Publications/2012/>

TSU Extension Publications  
[http://www.tnstate.edu/extension/publication\\_index.aspx](http://www.tnstate.edu/extension/publication_index.aspx)

*Support for this publication was provided by the USDA National Institute of Food and Agriculture through a Capacity Building Grant.*

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