

America's current energy system is dominated by fossil fuels, which pose serious threats to our health and environment and leave us vulnerable to price spikes and supply shortages. With the threat of global warming becoming increasingly urgent, we must make responsible energy choices today that ensure a safe, reliable power supply and a healthy environment for future generations.



Photo: PPM Energy

Fortunately, there are practical and affordable ways to achieve this goal. Homegrown renewable energy resources—such as wind, solar, bioenergy, and geothermal—can help reduce our dependence on polluting fossil fuels. These clean energy sources can also help stabilize energy prices, stimulate the development of innovative new technology, and create high-quality jobs and other economic benefits for Tennessee and the nation.

Strong national policies can ensure

these benefits are fully realized. The policy that has proven most effective and popular at the state level is a renewable electricity standard (also known as a renewable portfolio standard or RPS), which requires electricity providers to supply a minimum percentage of their power from clean energy sources. As of June 2007, renewable electricity standards have been adopted in 23 states. At the national level, the U.S. Senate has passed a 10 percent by 2020 national renewable electricity standard three times since 2002—most recently in June 2005.

Momentum continues to grow for a strong national standard. A 20 percent by 2020 standard was introduced in the House of Representatives in February 2007, and a 15 percent by 2020 standard is under consideration in the Senate.¹ Using a model from the Energy Information Administration (EIA), the Union of Concerned Scientists (UCS) examined the long-term effects that a national 20 percent by 2020 standard would have on the economy and the environment, under two different scenarios: an "EIA case," which assumes no changes to the model, and a "UCS case," which makes several modifications (described in the "Modeling Methods" on the back page). Our analysis found that, under both cases, a national standard would provide significant benefits for Tennessee. The findings from the UCS case 20 percent national standard are presented below, followed by

20 Percent by 2020: How Tennessee Benefits from a National Renewable Electricity Standard

Job Creation

4,300 new jobs from renewable energy development

Economic Development

\$538 million in new capital investment, \$1.79 billion in income to farmers and rural landowners, and \$21 million in new local tax revenues

Consumer Savings

\$90 million in lower electricity and natural gas bills by 2020 (growing to \$280 million by 2030)

Climate Solutions

Reductions in U.S. global warming pollution equal to taking 36.4 million cars off the road

findings for the EIA case 20 percent standard.

CONSUMER SAVINGS

Under a 20 percent national standard, consumers in all sectors of Tennessee's economy would experience a reduction in both their cumulative electricity and natural gas costs compared with business as usual. Cumulative savings would reach \$90 million by 2020 and, by 2030, would grow to \$280 million (\$80 million for households, \$70 million for commercial customers, and \$130 million for industrial customers).²

The national renewable standard saves consumers money by reducing the demand for fossil fuels and creating new competitors in the U.S. energy market. As a result, energy companies are limited in their ability to raise fossil fuel prices in the future. Compared with business as usual, natural gas (and coal) therefore cost less for electricity genera-

tion, as well as for other purposes, benefiting both electricity consumers and natural gas consumers.

JOBS AND OTHER BENEFITS TO LOCAL ECONOMIES

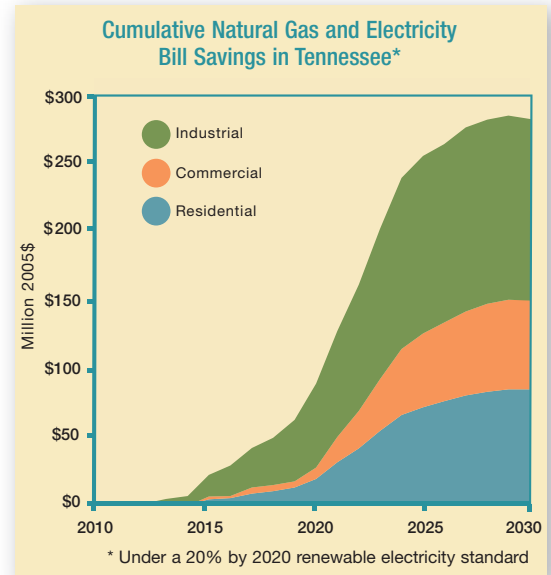
A renewable electricity standard would benefit Tennessee's economy in other significant ways. For example, dollars invested in clean energy go toward high-quality jobs in manufacturing and construction, as well as jobs in operations, maintenance, finance, sales, shipping, and other industries. Jobs are also created when these workers spend their income on goods and services and when consumer energy bill savings are spent in the local economy.

By 2020, the total new renewable energy development needed to meet a 20 percent national standard would generate 4,300 new jobs in Tennessee. State level policies—primarily renewable electricity standards—would make an important contribution toward this job creation as well as spur other economic benefits. Excluding the development from full compliance with state standards, renewable energy technologies would

create more than two times as many jobs as producing an equivalent amount of electricity from fossil fuels—resulting in a net benefit of 1,675 jobs. These additional jobs would generate an additional \$46 million in state income and \$114 million in gross state product.

Renewable energy technologies tend to create more jobs than fossil fuel technologies because a larger share of the expenditures for renewable energy is spent on manufacturing equipment, installation, and maintenance, all of which are typically more labor intensive than extracting and transporting fossil fuels. Renewable energy facilities also do not need to export cash to import fuel from other states, regions, or countries (with bioenergy, money is spent on locally produced fuel), keeping money circulating in the local economy.

Many of the new jobs would be located in rural areas where the renewable energy generating facilities would be sited. However, a national standard can also provide the opportunity to manufacture and assemble components for renewable energy



facilities. For example, based on an analysis by the Renewable Energy Policy Project completed for this study, we found that, in Tennessee, the renewable energy developed to meet a 20 percent national standard would create 960 new long-term jobs manufacturing components for wind turbines, solar photovoltaic panels and films, biomass facilities, and geothermal power plants—ranking Tennessee 17th among all states. Developing a strong manufacturing base can also create promising export opportunities, given the rapidly growing commitment of the rest of the world to expand renewable energy use.

In addition to creating jobs, a 20 percent by 2020 national standard would provide an important boost to Tennessee's economy in the following ways:

- \$538 million in new capital investment in renewable energy
- \$1.79 billion in new income for farmers and rural landowners who produce biomass energy and/or lease their land to wind developers
- \$21 million in new property tax revenues to help local communities pay for schools and vital public services

ENERGY DIVERSITY

In 2005, 90 percent of Tennessee's elec-

Manufacturing Clean Energy in Tennessee

In this southeastern state, the renewable energy industry is generating high-skilled jobs and economic opportunity. At a Chattanooga plant that was once used to manufacture equipment for nuclear power plants, Wisconsin-based Aerisyn now annually produces up to 200 steel towers that support the rotor and generator of commercial-size wind turbines. The facility, which opened in summer 2005 after Aerisyn invested more than seven million dollars into equipment and capital improvements, employs a workforce of 133 employees supplying towers for wind facilities in Wisconsin, California, and Arizona.

Up to a football field in length, 15 feet wide, and more than an inch thick, each turbine tower requires a considerable amount of steel, which in turn supports jobs and investments in that industry. Chattanooga's existing manufacturing infrastructure and large shipping port made it an ideal location for the facility, and will allow the company to expand as it seeks to meet the growing U.S. clean energy market.

tricity was generated from just two sources: coal and nuclear. This heavy reliance on fossil and nuclear fuels makes the state's consumers and economy vulnerable to potential energy supply shortages and interruptions, as well as price spikes and price manipulation. Increasing the use of renewable energy helps diversify the energy mix by meet-

Dollars invested in clean energy go toward high-quality jobs in manufacturing and construction, as well as jobs in operations, maintenance, finance, sales, shipping, and other industries.

ing a larger portion of Tennessee's power demand and reducing the projected growth in coal and natural gas use for electricity. Our analysis found that under a 20 percent standard, Tennessee would increase its total homegrown renewable power generating capacity to 1,970 megawatts (MW) by 2020. This development would come from the state's wind, bioenergy, and solar power resources, producing

enough electricity to serve the needs of more than 2 million typical homes, and supply 11 percent of total state electricity sales.³ It would also reduce the need to import fossil fuels; in 2005, Tennessee imported all of the coal delivered to its electric utilities, sending \$431 million out of the state, primarily to Kentucky, Wyoming, and Colorado.

A SMART CLIMATE SOLUTION

If left unchecked, heat-trapping emissions such as carbon dioxide (CO₂) are expected to cause dangerous global warming that threatens our health and environment. Increased renewable energy use would provide an affordable global warming solution by reducing fossil fuel demand, thereby reducing CO₂ emissions from the largest U.S. source: power plants. The 20 percent standard would reduce power plant CO₂ emissions nationally by 223 million metric tons per year by 2020 (8 percent below business as usual and a 63 percent reduction in EIA's projected growth of power plant CO₂ emissions from today's levels), equivalent to taking 36.4 million cars off the road.

In addition to cutting CO₂ emissions, lower fossil fuel demand would reduce other harmful air pollutants from power plants such as mercury and sulfur dioxide, and would limit the damage done to our water and land by fossil fuel extraction and



Photo: Craig Miller Productions and DOE, NREL

transport, conserving natural resources for future generations.

BENEFITS UNDER THE EIA CASE

The EIA case 20 percent standard, which has higher cost and worse performance assumptions for most renewable energy technologies, would still provide significant—and in some instances, greater—consumer and environmental benefits for Tennessee (see table). For example, the EIA's more optimistic cost projections for biomass technologies results in additional biomass development (and its associated benefits) compared with the UCS case. In addition, because the EIA projects more coal development in its reference case forecast, the EIA case 20 percent standard displaces a larger amount of coal generation, leading to more CO₂ emission reductions compared with the UCS case.



Photo: Wind Capital Group

Wind energy creates high-quality construction jobs in Tennessee during turbine installation, as well as operation and maintenance jobs throughout the project's lifetime.

A CLEANER, SAFER ENERGY FUTURE

A national renewable electricity standard would make Tennessee's—and the nation's—energy supply more reliable and secure. It would use local energy sources to create high-skilled jobs in the state, improve local economies, put energy dollars back into the pockets of Tennessee's consumers, and reduce the dangers of global warming and air pollution. Using existing technologies, we can shift away from our dependence on an unstable, dirty fossil fuel supply, and toward a future built on clean, renewable energy. We have a responsibility and a compelling financial interest to make the renewable electricity standard a cornerstone of America's national energy policy.



Photo: ©iStockphoto

Comparison of Tennessee Benefits, UCS and EIA Cases

	20% by 2020 UCS case	20% by 2020 EIA case
New capital investment in renewable energy	\$538 million	\$1.27 billion
Consumer energy bill savings (through 2030)	\$280 million (0.20 percent)	-\$80 million (-0.06 percent)
Biomass energy payments	\$1.79 billion	\$2.23 billion
Property tax revenues	\$21 million	\$32 million
Wind power land lease payments	\$3 million	\$1 million
Annual CO ₂ emission savings from U.S. power plants	223 million metric tons	310 million metric tons

MODELING METHODS

UCS conducted its analysis using the EIA's National Energy Modeling System. We examined the economic and environmental benefits under a 20 percent by 2020 standard using two scenarios. The "EIA case" assumes no changes to EIA's model, while the "UCS case":

- uses costs and performance assumptions for wind, coal, natural gas, and nuclear technology developed by Black & Veatch (a global engineering, consulting, and construction company) as part of a broad stakeholder process for the U.S. Department of Energy's (DOE) National Wind Collaborative;
- uses costs and performance assumptions for solar, geothermal, and biomass technologies that are more in line with projections by the DOE's Office of Energy Efficiency and Renewable Energy, and National Renewable Energy Laboratory; and
- takes into account recent cost increases from actual conventional and renewable energy projects.

We also evaluated the contribution made by states with renewable electricity standards that fully achieve their annual targets. (The EIA assumed that states will only achieve a fraction of their annual targets.)

ENDNOTES

¹ H.R. 969, introduced by Representatives Tom Udall (D-NM), Todd Platts (R-PA), and 13 original co-sponsors.

² Unless otherwise noted, results are presented in 2005 dollars using a 7 percent real discount rate.

³ Under H.R. 969, electricity sales from small utilities and hydroelectric facilities are exempt from the national renewable electricity standard. As a result, the total renewable energy development in Tennessee resulting from the 20 percent national standard would be more than enough to meet the annual targets.

A fully referenced version of this fact sheet is available online at www.ucsusa.org/clean_energy.

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