



FACTS TENNESSEE

A M E R I C A N S E C U R I T Y P R O J E C T

Pay Now, Pay Later: Tennessee

Damage to Tennessee's agriculture and forests caused by climate change could affect industries worth \$78.9 billion that employ over 500,000 Tennesseans.¹

Energy costs in the southeast United States will rise by \$59.2 billion by 2100 due to increasing temperatures.²

Energy reform in Tennessee could reduce energy costs by \$1.6 billion annually by 2020 and \$3.1 billion each year by 2030³—over \$450 in annual savings for every state resident by 2030.⁴

According to a new study, a failure to mitigate the effects of climate change could begin to cause serious gross domestic product and job losses within the next several decades. Between 2010 and 2050, it could cost Tennessee \$58.5 billion in GDP and 440,000 jobs.*

**GDP numbers are based on a 0% discount rate. Job losses are measured in labor years, or entire years of fulltime employment. Backus, George et al., "Assessing the Near-Term Risk of Climate Uncertainty: Interdependencies among the U.S. States," Sandia Report (Sandia National Laboratories, May 2010), 141. https://cfwebprod.sandia.gov/cfdocs/CCIM/docs/Climate_Risk_Assessment.pdf (accessed March 23, 2011).*

Admittedly, the effects of climate change, a complex and intricate phenomenon, are difficult to predict with precision. Informed scientific and economic projections, as we have used in our research, however, allow us to see that Tennessee faces significant losses in industries crucial to its economy if no action is taken.

Moreover, data shows that Tennessee is poised to benefit from the research, development, and distribution of renewable energy technologies. For example, one study finds that a nationwide investment in a green economy—costing Tennessee \$1.9 billion, a rate of roughly \$42,200 for each position—could create nearly 45,000 jobs.⁵ Should we fail to take action against climate change, Tennesseans have much to lose.

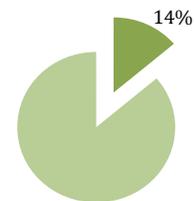
Pay Later: The Cost of Inaction

If no action is taken, average temperatures in Tennessee are projected to rise by nearly 7°F by the end of the century, increasing the likelihood of extreme weather events including droughts and floods.⁶ Immediate estimates placed damage caused by May 2010 flooding in Nashville at over \$1 billion.⁷ Floods like this could become more common, and droughts have the potential to significantly affect Tennessee's lumber and agricultural industries.⁸ Warming temperatures will also increase the rate of asthma among Tennesseans, raising medical costs for individuals and families across the state.⁹

Climate Change in the Hardwood Capital of the World

Tennessee has earned the moniker "Hardwood Capital of the World" for its tremendously productive lumber industry. The state is the number one producer of hardwood flooring in the United States.¹⁰ Climate change will cause increased droughts and wildfires, and change the composition of forests in Tennessee¹¹—all of which **jeopardize the \$21.7 billion forest industry, which employs over 180,000 Tennesseans.**¹²

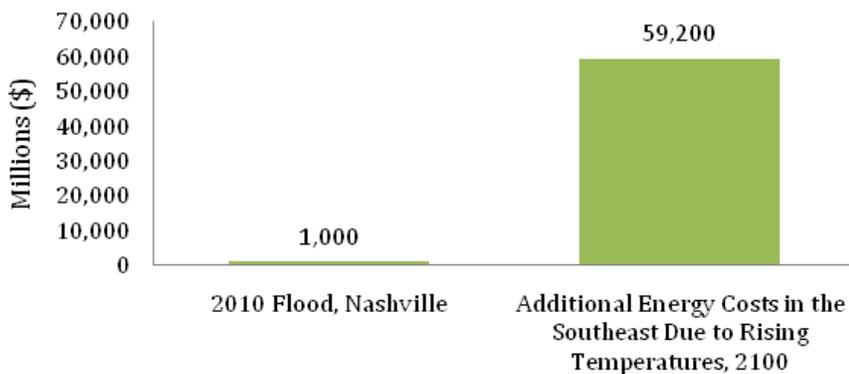
Tennesean Labor Force Projected to be Directly Affected



Source: Tennessee Department of Agriculture

Rising temperatures and increased levels of carbon dioxide will also damage Tennessee's agricultural industry, in particular the critical soybean and corn crops. Agriculture in Tennessee provides 347,000 jobs and generates \$51.4 billion in revenue,¹³ and in 2009, soybeans and soybean

Cost of 2010 Flooding Compared to Increased Energy Costs



Sources: CBS News; National Resources Defense Council

products alone made up nearly 30% of Tennessee's agriculture exports.¹⁴ **For every 1°C increase in temperature, corn yields will decrease by an estimated 8.3%.** Increasing temperatures have also been found to decrease soybean yields by nearly 3.5% for every increase of 1.2°C.¹⁵

Economic Impact of Biodiversity and Wetlands

Tennessee's wetlands provide immeasurable economic benefits to the state, both as a natural water filtering system and as a habitat for game animals that contribute to Tennessee's thriving \$500 million hunting industry. **Predicted declines in Tennessean wildlife, such as duck, geese and trout populations, could cost the state's hunting industry at least \$80 million in lost revenue.**¹⁶ Outdoor activities are a part of the state's culture that will be hard to sustain with such environmental changes.

By acting as a natural filtering system, Tennessee's wetlands provide a valuable service to the state's residents. Wetlands lower the amount of pollutants in the water, which sustains industries dependent on wildlife, and

also decrease water treatment costs for Tennessee residents. An Environmental Protection Agency study found that replicating the natural filtering system that one acre of wetland provides would cost \$350-25,000.¹⁷

A loss of 20% of Tennessee's wetlands could cost the state upwards of \$55 million, potentially as high as \$4 billion.¹⁸

Health Hazards of Climate Change

Climate change will not only affect the pocketbooks of Tennesseans, but also their health. Increasing temperatures will increase smog and ozone levels, which are directly linked to increased incidence of asthma.¹⁹ **In 2006, over 750,000 Tennessee residents suffered from asthma, which caused or contributed to 192 deaths among residents and cost the state \$125.6 million.**²⁰ An increase in heat waves will compound the health hazards, especially to the very young and very old.

In addition to respiratory problems, temperature increases resulting from climate change cause droughts, lead to electrical outages, and increase strains on the water systems.²¹ In testimony before the United States Senate, the Commissioner of the Tennessee Department of Public Health reported that an 11 day heat wave in 2007 resulted in water restrictions, rolling electrical outages in some areas, and 15 deaths.²² What's more, a recent report found that, as of 2009, Tennessee does not have a plan for addressing the health impacts of climate change nor does the state receive grants from the Centers for Disease Control for Environmental Health Tracking or for asthma prevention.²³

Pay Now: The Benefits of Taking Action

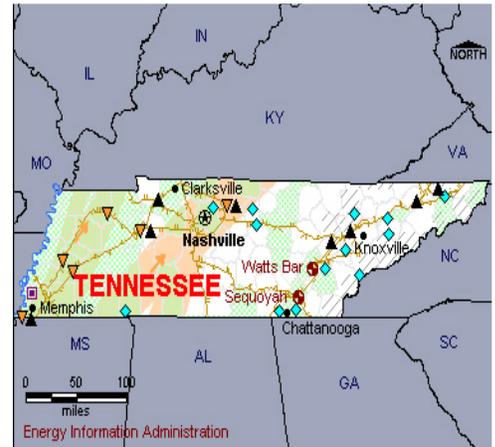
If Tennessee acts now, it stands to gain substantial economic benefits. Reforms and increased energy efficiency measures are predicted to save money and create jobs for Tennessee residents.

Increasing energy efficiency could generate 15,600 new jobs in Tennessee by 2020, and 21,500 jobs by 2030. Energy efficiency would also save \$1.6 billion annually by 2020, and \$3.1 billion each year by 2030. Energy efficient technology such as heat pump water heaters, geothermal heat pumps, and super boilers can improve energy efficiency. These energy saving devices can reduce Tennessee's energy consumption and create new jobs for Tennessee residents.²⁴

Tennessee's strong agricultural sector has great potential to produce a number of renewable fuels. The University of Tennessee has partnered with the Mascoma Corporation to build the nation's first switchgrass-

based ethanol plant, which has the capacity to produce 5 million gallons of ethanol annually.²⁵ Switchgrass is estimated to produce 500 gallons of biofuel per acre, is non-invasive, and adapts well to a variety of climates.²⁶

The government of Tennessee has encouraged investment in clean energy by offering low-interest loans for renewable energy projects and grants to businesses for the installation of renewable energy systems.²⁷ Tennessee has already started the transition to a greener economy: as of 2007, it had over 15,000 jobs and 1,000 businesses in the clean energy sector.²⁸ Private investment in the clean energy economy totaled \$16 million during the same time period.²⁹ However, with almost 300,000 unemployed workers, Tennessee could benefit substantially from increased investment in clean energy.³⁰



Conclusion

Tennessee residents must consider action on climate change not just in terms of cost, but also in terms of opportunities. If we give Tennessee’s population, businesses, and investors clear and consistent signals by properly offering initiatives and cultivating demand, investment and innovation in renewable technologies will follow.

Tennessee residents will have to pay for the effects of climate change. The only remaining question is whether they will pay now, or pay later and run the risk of paying significantly more.

(Endnotes)

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