

FACTS

NORTH CAROLINA

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: North Carolina

The iconic Outer Banks are visited by thousands of tourists each year, but beginning in 2030, spending by out-of-state tourists will fall 16% each year, dropping by 48% each year as of 2080.¹

The increase in global temperatures will shrink North Carolina's booming \$70.8 billion agricultural industry by nearly 23% by the end of the century, a loss of over \$1,700 per North Carolinian.²

North Carolina is poised to receive \$4.3 billion in green energy investments, which will create around 51,000 jobs for state residents,³ providing jobs for over one in 10 unemployed North Carolinians.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 North Carolina \$63.4 billion in GDP and over 492,000 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 North Carolina faces significant losses in industries crucial to its economy if no action is taken.

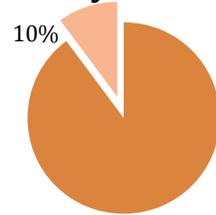
Moreover, data shows North Carolina is poised to benefit from the research, development, and distribution of renewable energy technologies. With few conventional energy resources, such as oil and coal, North Carolina can wean itself off of non-renewable energy sources without negatively affecting the state's economy. Because the state receives so little of its energy from renewable energy sources, North Carolina has much to gain from developing a green energy industry. Should

we fail to take action against climate change, North Carolina has much to lose.

Pay Later: The Cost of Inaction

There is ample evidence that North Carolina will face significant economic losses as a result of climate change under a business-as-usual scenario. Unfortunately, the consequences of climate change will devastate the state's agricultural and tourism industries, potentially eliminating thousands of jobs and costing the state billions of dollars in lost revenue. North Carolina's economic security is at stake.

North Carolinian Labor Force Projected to be Directly Affected



Source: Bureau of Economic Analysis⁵

Costs to Tourism and Recreation

Each year, the tourism and recreation sectors bring in approximately \$22 billion in total economic demand, accounting for nearly 4.3% of the state's economy. They also employ over 378,000 North Carolinians.⁶ Tourists are drawn to the state's beautiful beaches, inland forests and mountains, and extensive wildlife system. However, climate change will devastate all of these ecosystems unless North Carolina implements expensive adjustment initiatives: estimates hold that **spending by out-of-state tourists will fall 16% each year by 2030 and 48% each year by 2080.**⁷

The state's wildlife and associated industries are also a major source of revenue. In 2006, nearly 3.4 million people spent more than \$2.7 billion in North Carolina, which in turn supported nearly 55,000 jobs in the sector.⁸ The projected increase in global

temperatures will endanger animal habitats, resulting in a loss of tourism dollars.

Like those of other coastal states, North Carolina's beaches will be severely affected by rising sea levels, which are projected to rise significantly—between 19⁹ and 32 inches—by the end of the century. Losses related to the southernmost beaches alone will reach an estimated \$93 million annually by 2030 and \$223 million a year by 2080.¹⁰ Furthermore, **given a high-emissions scenario, roughly \$4 billion (11%) of the current property value—over 12,800 homes and businesses—is estimated to be at risk by 2080.**¹¹ **“A sea-level rise of less than 14 inches would inundate about 770 square miles of the North Carolina coast, an area nearly the size of Great Smoky Mountains National Park.”**¹² Protecting the shores from flooding will prove to be an expensive undertaking.¹³ Official estimates place the cost of developing a sea wall or bulkhead along the coast at \$1.89 billion.¹⁴

The state's skiing industry generated \$23 million in revenue in 2002–2003. Over the same period, this sector indirectly contributed \$120 million to local businesses while employing 100,000 North Carolinians. According to environmental models, the rise in global temperatures threatens to cut the number of skiing days every year, thus reducing profits and time on the slopes.¹⁵

Costs to Agriculture and Farming

Climate change threatens to devastate the state's agricultural and farming industries, leaving North Carolinians desperate to recover lost revenue. **North Carolina's agricul-**

tural industry is responsible for producing \$70 billion—18% of the state's income—and employs 17% of the workforce.¹⁶ More than 25% of the state's 31 million acres has been converted to farmland. North Carolina is the nation's largest producer of tobacco and sweet potatoes, and its \$2 billion hogging industry is the 2nd largest in the nation.¹⁷

Agricultural profits for the state are estimated to drop 22.6% due to erratic precipitation, increased global temperatures, and pests, such as the beetle outbreak in 2001 that cost nearly \$1 billion in lumber yields and an additional \$723 million in indirect costs. Damage could increase seven-fold as temperatures rise.¹⁸ Furthermore, heat stress threatens the livestock sector. Already, the state's poultry industry loses over \$2.6 million a year, and the hogging industry—worth \$2 billion in 2006—risks losing 10% of its yields with a temperature increase of 9°F. In fact, the entire livestock industry in the Appalachian region is projected to lose 10% of its yields given such a change.¹⁹

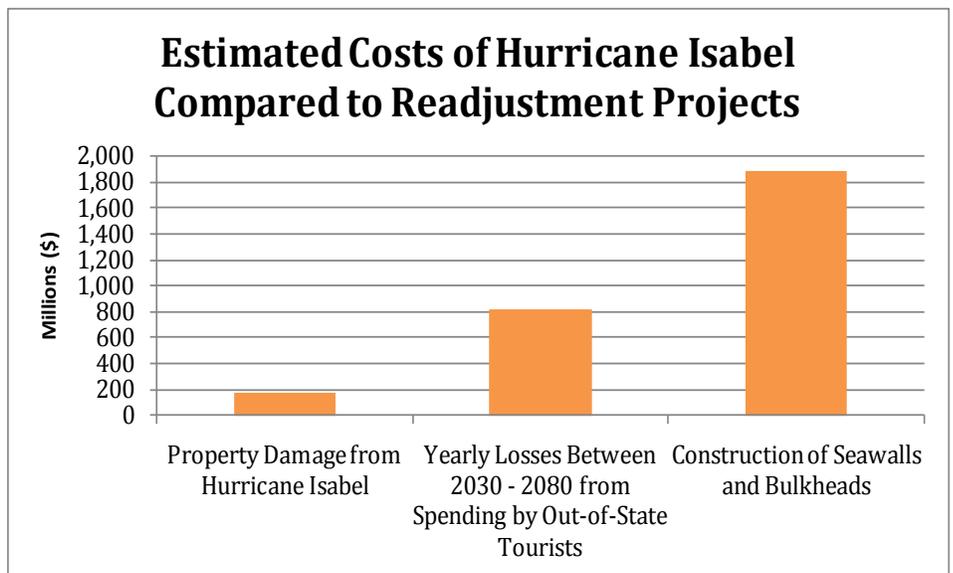
Furthermore, the rise in global temperatures may make North

Carolina's climate inhospitable for the crops it currently produces. Climate change will increase the state's susceptibility to drought, floods, and reduced rainfall—all of which can devastate the state's forestry and agricultural sectors. **Between 1996 and 2006, 14 tropical storms and hurricanes caused over \$2.4 billion of damage to the state's agricultural industry.**²⁰ The state's 2002 drought cost the industry \$398 million and affected over 4,300 jobs.²¹

Costs at Home

Climate change will increase the frequency and severity of the tropical storms and hurricanes that devastate the state every year. **Interruption to businesses is projected to cost \$34 million in lost economic output per storm by 2030 and \$157 million with each storm by 2080 in New Hanover, Dare, Carteret, and Bertie counties alone.**²²

The rise in global temperatures will also increase the frequency and severity of droughts in a state that recently experienced the worst droughts in its history. Aside from the \$398 million



Sources: Leutze; National Hurricane Center; Center for Integrative Environmental Research, University of Maryland.²³

in direct agricultural costs, the state's 2002 drought caused an estimated additional \$233 million worth of damages to the state's non-agricultural industries.²⁴ During the 2007 drought, 340 public water systems, representing 53% of the state's total capacity, called for approximately 5 million residents to subsequently restrict their water use.²⁵

Pay Now: The Benefits of Taking Action

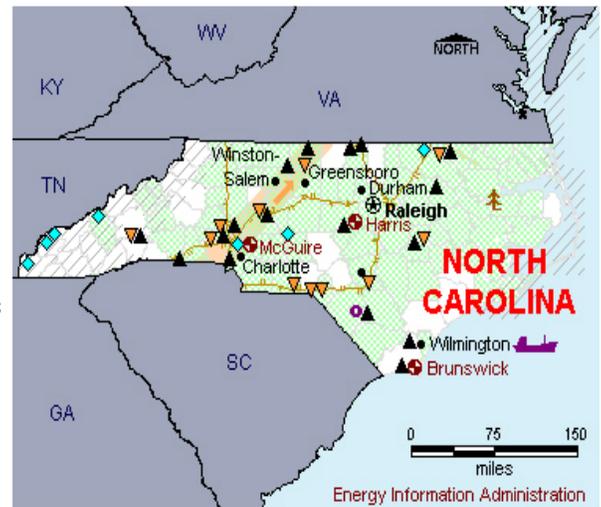
As a state without the capacity to produce conventional energy,²⁶ North Carolina can develop green energy technologies without making any cuts to its non-renewable energy sector.

Furthermore, there is ample evidence that the state will benefit by investing in a green-energy industry. The McCain-Lieberman Climate Stewardship Act of 2003 (voted down by the Senate) was predicted to generate 15,000 more jobs in its first 10 years—and a further 24,000 in its first 20 years—than would a business-as-usual economy.²⁷

The state's booming green energy industry currently employs almost 17,000 Tar Heels. Between 1998 and 2007, the industry grew 15.3%, considerably faster than the rest of the state economy. Venture capitalists invested nearly \$83 million in North Carolina's clean energy businesses between 2006 and 2008.²⁸

Because it depends on imported non-renewable energy sources for the majority of its energy needs, North Carolina can greatly benefit by developing a renewable energy industry. Although it is one of the nation's top manufacturing states, it has been most affected by outsourcing—an estimated one in five factory jobs, 165,000 total, have been lost. In Robeson County alone, 10,000 of 18,000 manufacturing jobs were lost over a ten-year period.²⁹ By developing a green energy industry, North Carolina can create approximately 10,964 and 11,062 new jobs in the manufacturing of wind power and solar power components, respectively.³⁰ The North Carolina Sustainable Energy Association estimates that the state's fledgling renewable energy and energy efficiency industries already create \$3.5 billion in annual revenue.³¹

If harnessed correctly, North Carolina's skilled manufacturing sector can help power the whole state. The state's entire electricity demand can be met—and surpassed—by employing its offshore wind capacity, according to the National Renewable Energy Laboratory.³²



Major Electric Power Plants (>=100 MW)		Renewable Energy Potential
▲ Coal	▲ Coal	■ Biomass (>= 50 tons/sq km/yr)
○ Geothermal	○ Geothermal	▨ Geothermal (>= 80 milliwatts/m ²)
◆ Hydroelectric	▼ Natural Gas	■ Solar (>= 6.0 kWh/m ² /day)
● Nuclear	● Petroleum	▨ Wind (>= 3 Power Class)
● Solar	● Wind	
● Wood	● Other Renewable	
■ Coal Mine, Surface		
■ Coal Mine, Underground		
★ Natural Gas Hub		
■ Petroleum Refinery		
◆ Oil Import Site		
■ Oil Seaport		
— Electricity Transmission Line (>= 345 kV)		
■ Natural Gas Flow (1 mile band width = 100 million cubic feet/day)		
■ Oil and Gas Active Leases		

Conclusion

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

North Carolinians 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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