



# FACTS ALABAMA

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: Alabama

Climate change puts Alabama's extraordinary biodiversity at risk, threatening the natural wealth that enriches both the state's beauty and its bottom line.<sup>1</sup>

Over one in eight employed Alabamans work in an industry sensitive to climate change.<sup>2</sup>

Alabama generates a significant portion of its electricity from nuclear and renewable sources, and has the capacity to generate substantially more renewable energy<sup>3</sup>—and jobs.<sup>4</sup>

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 Alabamans \$29.2 billion in GDP and over 246,000 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](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 Alabama faces significant losses in industries crucial to its economy if no action is taken.

Moreover, data shows Alabama is poised to benefit from the research, development, and distribution of renewable energy technologies. Although Alabama possesses significant coal and natural gas deposits, roughly 25% of its electricity comes from nuclear power. It is also one of the largest hydroelectric producers east of the Rockies,<sup>5</sup> and is only beginning to exploit its tremendous biofuel capacity.<sup>6</sup> Should we fail to take action against climate change, Alabamans have much to lose.

## Pay Later: The Cost of Inaction

Ask twenty Alabamans what's most distinct about their state, and you may well hear twenty different answers. Alabama's landscape rolls from mountains to coastline, with distinctive ecoregions such as Blackland Prairie and Lime Hills in between.<sup>7</sup> It has a saltwater coast, roughly 1,300 miles of navigable inland waterways,<sup>8</sup> and profits from shrimping and oystering in the zones where saltwater and freshwater meet.<sup>9</sup> Alabama is rich in forests<sup>10</sup> and farmland,<sup>11</sup> and boasts a diverse economy.<sup>12</sup> Climate change puts many of Alabama's beloved features in danger, and as one scientist has noted, its "future will be, most likely, far different from the past."<sup>13</sup> Most at risk are Alabama's extraordinary biodiversity, jobs sensitive to

climate change, and residents' quality of life.

### Less Temperate, More Tropical

Alabama harbors incredible biodiversity, ranking 4<sup>th</sup><sup>14</sup> or 5<sup>th</sup><sup>15</sup> among states and 2<sup>nd</sup> only to Florida in the number of species per square mile.<sup>16</sup> The combination of geological diversity and regular precipitation patterns makes Alabama something of a miniature, extraordinarily biodiverse version of the entire Southeast.<sup>17</sup> Together, agriculture, forestry, and wildlife-related industries in Alabama account for approximately \$20 billion annually,<sup>18</sup> or roughly 12% of gross state product (GSP).<sup>19</sup>

Alabama is rich in forests and farmland, and boasts a diversified economy. Climate change puts many of Alabama's beloved features in danger, and as one scientist has noted, its future will be, most likely, far different from the past."

Alabama's coastal regions are projected to get warmer and drier, putting all current crops at risk and dramatically increasing the need for irrigation; Alabama currently has the fewest irri-

gated acres in the country.<sup>20</sup> Although the state may find conditions increasingly favorable for cotton, corn, and new citrus crops, traditional favorites including peaches, apples, soybeans, and wheat will suffer. More pesticides and herbicides will also be required under any projected scenario.<sup>21</sup>

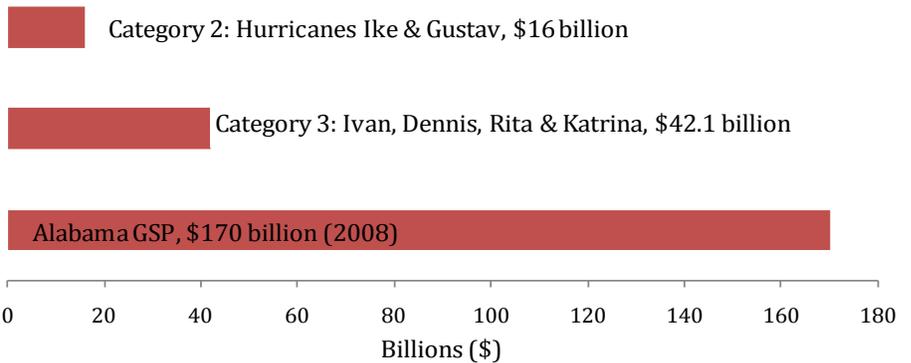
Harder hit would be Alabama's forests. Climate models disagree as to whether inland Alabama would get wetter or drier, but neither bodes well for the Loblolly Pine, a workhorse tree in Alabama's managed pine forests.<sup>22</sup> A drier future would convert some forests into grasslands and increase forest fires, while a wetter one would attract more pests and favor hardwoods over softwoods.<sup>23</sup> Also likely to suffer, and enjoyed by over 2.3 million people, would be hunting, fishing, and wildlife viewing,<sup>24</sup> which heavily depend on the state's biodiversity.

### A Job Drought

**Alabama's population is expected to increase by some 700,000 people by 2025,<sup>25</sup> but jobs may not grow as quickly.** In fact, there's much to suggest that climate change will depress employment in some key state industries—at least 261,000 Alabama jobs may be threatened by climate change.<sup>26</sup> Agriculture and wildlife-related industries collectively support over 102,000 jobs,<sup>27</sup> with nearly 33,000 more in forest-related wood, paper, and furniture manufacturing businesses.<sup>28</sup> Yet they are far from the only potentially affected industries.

Alabama falls within the Gulf Coast region's integrated network of roads, ports, and rail lines;<sup>29</sup> wholesale trade, transportation and warehousing account for over 126,500 jobs state-wide.<sup>30</sup> Yet the Union of Concerned Scientists notes that "27% of the major

## The Threat of Stronger Storms: Average Cost by Hurricane Category v. Alabama GSP

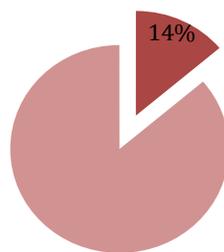


Sources: U.S. Energy Information Administration, State Energy Profiles: Alabama; National Climatic Data Center

roads, 9% of the rail lines, and 72% of the ports" within the region are built at or below the level reached by a potential four-foot rise in sea level, and estimates that "60,000 miles of coastal highway are already exposed to periodic flooding from coastal storms and high waves."<sup>31</sup> Even if the worst-affected roads are not located in Alabama, the interconnectedness of the network threatens its economy.

from climate change, some of the most felt effects will be those staining shirts and straining air conditioners. **According to the Union of Concerned Scientists, by century's end summer temperatures could increase by 3-7°F, with the July heat index—a determination of how it "feels" when temperature and humidity are combined—10-25°F higher.**<sup>32</sup> Since Alabama already averages 80°F in mid-summer,<sup>33</sup> in the future it could feel 90°F or hotter every day during the summer.

## Alabaman Labor Force Projected to be Directly Affected

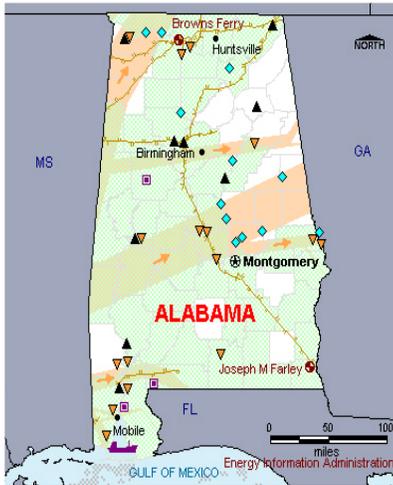


Source: Alabama Department of Industrial Relations

### Less Sweet Home, Alabama

Despite the significant challenges to Alabama's landscape and industry

Alabama will be vulnerable to heat waves, particularly in major cities such as Birmingham, Montgomery, and Mobile. Increased ground level ozone and smog could become persistent health hazards for urban residents in cities (such as Birmingham) where air quality already fails to meet federal standards. Industrial, agricultural, and residential competition for fresh water could threaten supplies, while increasingly frequent extreme precipitation events would contribute to contaminated runoff and disease transmission.<sup>34</sup> These changes could also interrupt the predictability of work and home life.



Major Electric Power Plants (>=100 MW)		Renewable Energy Potential	
Coal Mine, Surface	▲ Coal	Biomass	(>= 50 tons/sq km/yr)
Coal Mine, Underground	○ Geothermal	Geothermal	(>= 80 milliwatts/m2)
Natural Gas Hub	◆ Hydroelectric	Solar	(>= 6.0 kWh/m2/day)
Petroleum Refinery	◇ Natural Gas	Wind	(>= 3 Power Class)
Oil Import Site	● Nuclear	Other Renewable	
Oil Seaport	○ Petroleum		
Electricity Transmission Line (>= 345 kV)	✕ Wind		
Natural Gas Flow (1 mile band width = 100 million cubic feet/day)	⊕ Wood		
Oil and Gas Active Leases	● Other Renewable		

Of the 70 natural disasters that caused \$1 billion or more in damage in the United States between 1980 and October 2007, at least 21 of them affected Alabama,<sup>35</sup> including two Category 2 hurricanes and six Category 3 hurricanes.<sup>36</sup> A recent report notes that with climate change in the Southeast, the “intensity, power, and destructive energy... of hurricanes is likely to increase.”<sup>37</sup> That is significant, since more powerful storms have been shown to cause, on average, far greater damage.<sup>38</sup> Rising sea levels will also exacerbate damaging storm surges; mid-range projections anticipate a sea level rise of up to 15 inches by 2100.<sup>39</sup>

## Pay Now: The Benefits of Taking Action

Alabamans have the opportunity to take important and beneficial steps to combat climate change. Demanding that renewable energy sources constitute at least 20% of electricity generation by 2020 is a good and readily achievable start.<sup>40</sup> Alabama could also spearhead implementation of available technologies to reduce demand by 20-30% by 2020.<sup>41</sup> Alabama already supports nearly 8,000 jobs in clean energy and related industries,<sup>42</sup> and could gain nearly 30,000 more from a major clean energy initiative.<sup>43</sup> Biomass is extremely promising in Alabama;<sup>44</sup> it has one of the world’s largest solid biofuel factories—with a capacity to produce 520,000 metric tons of wood pellets—but most of its production is currently shipped overseas.<sup>45</sup>

Trees can play an important role in this heavily forested state, from homeowners reducing residential energy consumption by planting strategically placed trees,<sup>46</sup> to the replacement of Loblolly Pines with Longleaf Pines, a more drought- and fire-resistant species.<sup>47</sup> Investment in biofuel research can also pay dividends, since parts of Alabama are favorable for switch-grass, which can be cultivated for biofuel.<sup>48</sup>

## Conclusion

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

**Alabamans 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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- 8 Economic Development Partnership of Alabama, *Alabama Business Climate*, 2008, 4. <http://www.edpa.org/docs/Business-Climate-Facts-2008.pdf> (accessed August 3, 2010).
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- 14 Ibid., 8.
- 15 Twilley and Wetzel, 3.
- 16 Davenport, 8.
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- 19 Caitlin E. Coakley, Daniel A. Reed and Shane T. Taylor, *Gross Domestic Product by State: Advance Statistics for 2008 and Revised Statistics for 2005–2007*, Survey of Current Business, Bureau of Economic Analysis, June 2009. [http://www.bea.gov/scb/pdf/2009/06%20June/0609\\_gdp\\_state.pdf](http://www.bea.gov/scb/pdf/2009/06%20June/0609_gdp_state.pdf) (accessed August 3, 2010). Alabama's 2008 GSP was \$170 billion, of which \$20 billion represents 11.8%.
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- 40 National Wildlife Federation, *Charting a New Path*, 1.
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- 45 Burning wood for fuel is a centuries old practice, currently making up 2% of American total energy use. While wood pellet combustion does release carbon monoxide and other particulates, sometimes producing acid rain, it is still superior to the burning of fossil fuel, and clean-burning technology is available. Burning wood waste also saves companies money they would otherwise have to spend on purchasing electricity. U.S. Energy Information Administration, *Renewable Biomass*. [http://www.eia.doe.gov/kids/energy.cfm?page=biomass\\_home-basics](http://www.eia.doe.gov/kids/energy.cfm?page=biomass_home-basics) (accessed September 23, 2010). Ibid.
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