

# FACTS

## SOUTH DAKOTA

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: South Dakota

Climate change has the potential to negatively impact South Dakota's cornerstone agricultural industry—which generates \$19 billion for the state's economy.<sup>1</sup>

Climate shifts threaten the wildlife dependent on South Dakota's various ecosystems. The Missouri River reservoir, which records eight million visitor days per year, is already at historically low levels.<sup>2</sup>

South Dakota has enough wind energy potential to generate 50 times the state's current electricity production—enough to power more than 86 million homes.<sup>3</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 South Dakota \$500 million in GDP and over 2,000 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, however, allow us to see that South Dakota faces significant losses to its economy if no action is taken.

Moreover, data shows South Dakota is in a position to benefit from the research, development, and use of renewable energy technologies. Thanks to its unique geography, South Dakota could greatly benefit from further production of wind, hydropower, and biomass energy resources. Should we fail to take action against climate change, South Dakota would have much to lose.

## Pay Later: The Cost of Inaction

Climate change is expected to produce warmer, drier summers in the state and increase the frequency of high intensity weather events such as droughts. These environmental shifts will threaten the wildlife, agricultural crops, and freshwater access on which South Dakota depends.

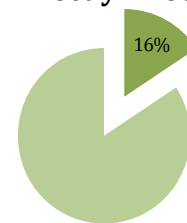
### An Agrarian Heritage under Stress

Agriculture is one of the state's most important industries, contributing nearly \$3.5 billion to the economy—nearly 9.5% of the gross state product (GSP).<sup>4</sup> Combined with forestry and hunting, the industry employs 6.5% of the workforce;<sup>5</sup> the cattle industry

alone employs 17,000 people. **As agriculture supports other facets of the economy, overall the agricultural industry has a \$19 billion impact on the state's economy.**<sup>6</sup>

Under a business-as-usual scenario, climate change threatens this paramount industry. Predictions indicate higher temperatures, limited water supplies, and a rise in diseases and pests. Corn crops favor a range of 64-72°F and begin to fail at 95°F, experiencing significant losses if temperatures reach such highs during pollination. Given an increase of 2°F—and South Dakotan temperatures could increase by over 6°F by the end of the century—one study projects a 3% reduction in corn crop revenue across the country.<sup>7</sup> In South Dakota, **corn losses are projected to reach \$63 million annually.**<sup>8</sup> Some analysts predict the northern crops will fare better than their southern counterparts; temperature and precipitation shifts may aid the agricultural industry in these states, resulting in a \$540 million gain in South Dakota, according to one study.<sup>9</sup>

### South Dakotan Labor Force Projected to be Directly Affected



Source: Bureau of Economic Analysis<sup>10</sup>

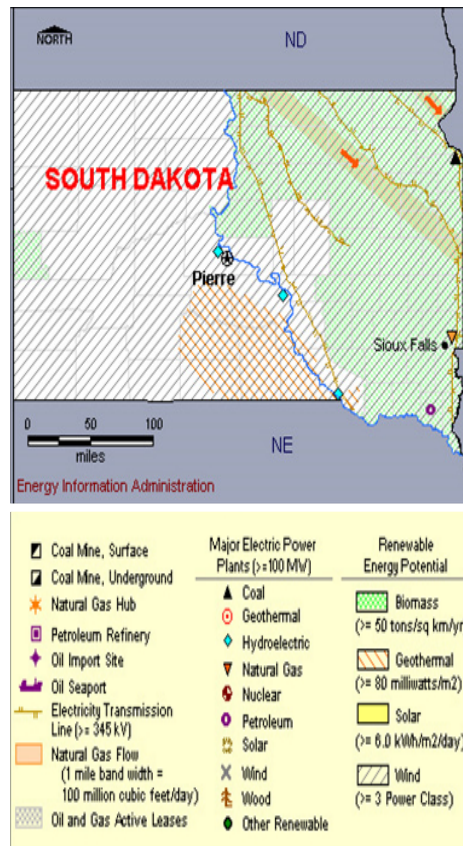
## Costs to Wildlife and Related Industries

South Dakota is home to a rich diversity of wildlife and game animals in its variety of ecosystems, from the Missouri River to the Black Hills. Not only are these wildlife habitats a rich part of the state's heritage, they are also a strong pillar of South Dakota's economy.

According to polls, 97% of South Dakota residents believe that healthy wildlife and fish populations are important to the state's economy—wildlife tourism numbers support this belief. The Missouri River reservoirs alone record more than eight million visitor days annually.<sup>11</sup> **The hunting, fishing, and wildlife industries supported nearly 9,000 jobs and brought in more than \$499 million in 2006.**<sup>12</sup>

Climate change, however, threatens the wildlife habitats in South Dakota. Shifting temperatures and environments will likely change whole ecosystems, thereby forcing wildlife to move or adapt. Additionally, the drier summers combined with rising temperatures are expected to increase the potential for wildfires in the Black Hills National Forest, threatening the wildlife that depend upon it.<sup>13</sup> **The tens of thousands of hunters that visit South Dakota each fall would likely see fewer pheasant (the state currently has the highest pheasant population in the United States) and other popular hunting game.**<sup>14</sup>

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## Limited Water Access

South Dakota depends heavily on its water resources for everyday human use, agriculture, and hydroelectric power. However, warmer average summer temperatures are expected to result in lower groundwater and stream levels, thereby putting pressure on the state's precious water resources.<sup>15</sup>

Drier conditions combined with warmer weather are already showing their effects in some areas. For instance, snowpack in the mountains and valleys of the Missouri River basin watershed has been below average for 14 of the past 16 years, and South Dakotan reservoir levels have reached historic lows in recent years.<sup>16</sup> Lake Oahe, the 4<sup>th</sup> largest man-made reservoir, is a prime example. The lake, which straddles the border of South

and North Dakota, is a major source of wildlife recreation, water and irrigation supply, and hydroelectric power. However, water and wildlife levels have been steadily decreasing, and are expected to decrease further due to the effects of climate change. **The Lake Oahe fishery produced \$27.64 million annually in the mid-1990s; by 2004, the lake was producing less than \$11.25 million annually.** Lower levels also decrease hydropower production in the lake, potentially compromising expansion and reducing options for alternative energy in the state.<sup>17</sup>

Climate change will also increase the frequency of intense weather events, such as droughts, which affect the water supply. Droughts are already costly to the state, and climate change will only serve to exacerbate the negative economic impact. **The 2002 drought, for example, cost the state an estimated \$1.4 billion, including \$642 million in farm losses.**<sup>18</sup>

## Pay Now: The Benefits of Taking Action

South Dakota stands to lose part of its traditional income due to climate change. Fortunately, the state is also positioned to benefit from further developing renewable energy resources. Should the state impose strict limits on the emissions of various greenhouse gases, it would lower its GSP by \$776 million and reduce employment by 2,718,<sup>19</sup> but South Dakota has even more to gain by tapping into its resources and promoting renewable energy.<sup>20</sup>

The state has already adopted some positive objectives: in February 2008, South Dakota implemented a voluntary objective to have 10% of all elec-

tricity generation sourced from renewable resources by 2015. These goals promise to benefit the state, as do more ambitious aims. For instance, **a 20% standard by 2025 would create 1,250 new jobs from the development of a green economy and attract \$906 million in new capital investment.** Additionally, by 2020, it would likely save consumers \$18 million in reduced electricity and natural gas bills, translating to nearly \$60 a year for each household.<sup>21</sup>

South Dakota has considerable renewable energy resources, including wind, hydroelectric, biomass, and solar. Thanks to its vast flatlands, South Dakota is the fourth largest potential producer of wind power in the U.S., with the potential to generate over one trillion kWh of power<sup>22</sup>—**more than 50 times the current electricity production, and enough to power more than 86 million homes.**<sup>23</sup> The Missouri River also provides great potential for hydroelectric power, which generates roughly half of South Dakota's electricity needs.<sup>24</sup> Hydroelectric power could be threatened, however, by droughts and decreasing water levels resulting from a changed climate.

Comprehensive energy and climate legislation increasing the use of biomass in the nation's energy mix to 25% by 2025 could add an additional \$180 billion to net farm income nationally.<sup>25</sup> South Dakota is also currently one of the nation's leading producers of ethanol, but the vast corn production in the eastern part of the state provides even greater potential for expanded ethanol production.<sup>26</sup> South Dakota has the potential to produce 4,500-5,500 watt-hours per square meter of photovoltaic systems. **This means that using only one square mile in the state for solar power would provide enough electricity for approximately 1,200 households annually.**<sup>27</sup>

## Conclusion

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

**South Dakotans 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.

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### (Endnotes)

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- 4 South Dakota Governor's Office of Economic Development, *South Dakota Profile: Industry*, September 2009, 11. <http://www.sdreadytowork.com/ds/profile/industry.pdf> (accessed July 12, 2010).
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- 10 Includes agriculture, forestry, fishing, hunting and tourism (arts/entertainment and accommodation food services) industries (2008).
- 11 The Izaak Walton League of America, 3; Kenneth E. Hornback and Paul F. J. Eagles, *Guidelines for Public Use Measurement and Reporting at Parks and Protected Areas*, 1999, 11. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.115.5619&rep=rep1&type=pdf> (accessed November 12, 2010). A visitor day is described as the number of days (12 hours in many parks) visitors stay at a given attraction, park, protected area, etc. At times, the length of a “day” differs according to the agency in charge.
- 12 National Wildlife Federation, *Global Warming and South Dakota*, 2.
- 13 *Ibid.*, 1.
- 14 The Izaak Walton League of America, 3, 7.
- 15 National Wildlife Federation, *Global Warming and South Dakota*, 2.
- 16 The Izaak Walton League of America, 3.
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- 26 *Ibid.*, 39.
- 27 National Wildlife Federation, *Charting a New Path for South Dakota's Electricity Generation*, 2. [http://www.nwf.org/Global-Warming/-/media/PDFs/Global%20Warming/Clean%20Energy%20State%20Fact%20Sheets/SOUTH\\_DAKOTA\\_10-22-3.ashx](http://www.nwf.org/Global-Warming/-/media/PDFs/Global%20Warming/Clean%20Energy%20State%20Fact%20Sheets/SOUTH_DAKOTA_10-22-3.ashx) (accessed July 16, 2010).