



INDIANA

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: Indiana

Heavier precipitation, droughts, and warmer temperatures are projected to damage Indiana's agriculture and tourism industries, cause flooding, drought and soil erosion, and contaminate the water supply.¹ The yield from corn crops, specifically, is expected to drop by 10²- 42%.³

Severe storms and evaporation will likely cause the contaminants in Lake Michigan to increase and its water levels to drop—potentially jeopardizing the value of the \$4.6 billion dollars of shorefront real estate.⁴

In 2007, at least 10% of Hoosiers were employed in trades that will be critical to the future production of green technologies, such as wind and solar power.⁵

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 Indiana \$21.8 billion in GDP and over 130,000 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 Indiana faces significant losses in industries crucial to its economy if no action is taken.

Moreover, data shows Indiana is poised to benefit from the research, development, and distribution of renewable energy technologies. Although Indiana's green job market has steadily grown over the last decade, exceeding the national average,⁶ there is still considerable room for expansion and capitalization. Should we fail to take action, Indianans has much to lose.

Pay Later: The Cost of Inaction

By 2030, temperatures could increase by an estimated 3-4°F in summer and 2°F during winter.

Precipitation is projected to decrease by 15% during the summer months,⁷ and extreme storms will increase in frequency and intensity.⁸ The consequences—heat waves, pests, water contamination and disease, flooding, and drought—each take a toll on the state's many and varied industries and its economic security as a whole. Indiana's agricultural sector will be among the most affected. Production levels, yields, and revenue will likely drop. Scorching heat waves and drought will also damage the state's important tourism and recreation industries.

Costs to the Agricultural Sector

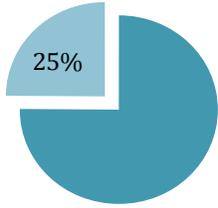
Indiana will see more rainfall in the form of extreme storms, and less of the precipitation necessary for crop growth. **Flooding, tornadoes and extreme weather over a 7-day period in March 2009 cost nearly \$15 million in individual assistance.**⁹

An increase in such events, causing both direct and indirect costs, could seriously damage Indiana's gross state product (GSP).

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It is predicted, that the Corn Belt—specifically Indiana—will remain the best place for the production of corn and soybeans, the state's main crops.¹⁰ Projections regarding crop yields and market values vary. Nonetheless, the state's aggregate income is expected to, in all likelihood, experience billions in agriculture losses.¹¹ **A National Wildlife Foundation study projects a 42% decline in corn production by the end of the century.**¹² However, the U.S. Global Change Research

Indianan Labor Force Projected to be Directly Affected



Source: Indiana Department of Workforce Development

Program (USGCRP) predicts a higher yield in northern Indiana—but, accordingly, lower prices and profits. In some southern regions of Indiana, USGCRP projects corn production will fall by 10-20%,¹³ significant for

such a crucial industry. In 2009, corn accounted for almost 40% of Indiana’s agricultural revenue.¹⁴

Warmer weather and higher CO₂ levels will lengthen the growing season, potentially by an additional three to six weeks by 2100.¹⁵ The increase in heat waves and severe storms, however, is likely to counter many of these benefits, causing production levels to fall.

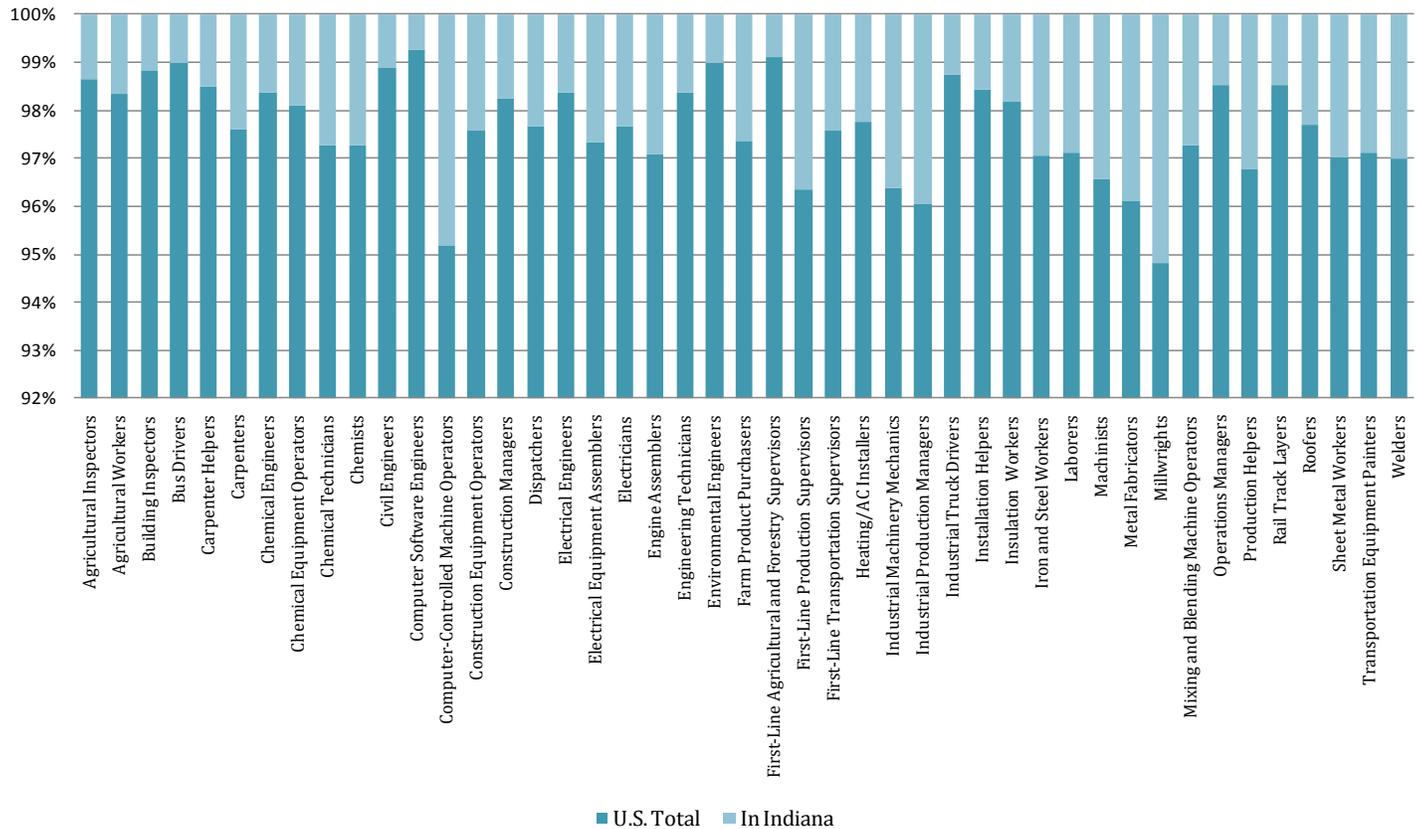
Pest infestation and disease will also increase with warmer temperatures, which will harm production levels¹⁶ and require expensive pesticides that will decrease profits. Adaptation costs will require plant breeding based on accurate climate forecasts. This includes, but is not limited to, genetic engineering and modified planting and harvesting dates.¹⁷

Climate change will directly affect one in four members of the Indianan labor force. The manufacturing and related industries and the agricultural, forestry, fishing, hunting, leisure, and hospitality sectors are most at risk.¹⁸ Combined, these industries made up over a third of Indiana’s 2008 GSP.¹⁹

Costs to Tourism and Recreation

Indiana has \$4.6 billion dollars of real estate on Lake Michigan. A study produced by Health Lakes and the Council of Great Lakes Industries found that the shore is visited by two million people and sees three million swimming days; the tourism industry as a whole is responsible for generating over \$9 billion each year.²⁰

Green Economy Jobs in Indiana Compared to the U.S. Total



Source: Pollin & Wicks-Lim²⁹

Yet heavier rainfall will increase runoff and lake contamination, which already plagues the Great Lakes. The increasing frequency of severe storms associated with global warming is projected to jeopardize this source of revenue for the state of Indiana.²¹ In 2007, 93% of Indiana's beaches and 14% of beach days were affected by pollution notifications, up from 52% and 3%, respectively, the year before. At least 21% of the time, "storm-related runoff" was reported to be part of the cause.²² Furthermore, coastal real estate values vary directly with water quality; if Lake Michigan's waters become increasingly contaminated, property values will fall.²³

Pay Now: The Benefits of Taking Action

Between 1998 and 2007, Indiana saw a green job growth of 17.9%—compared to 1% overall decrease in jobs during this time. Green jobs in Indiana numbered 17,298 and companies 1,268 in 2007—0.5% of the civilian labor force.²⁵ There is room for and benefits from expansion, as well as the need for it.

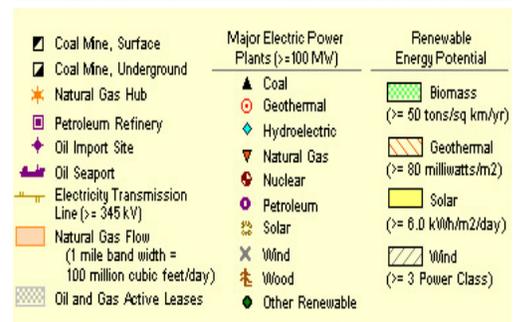
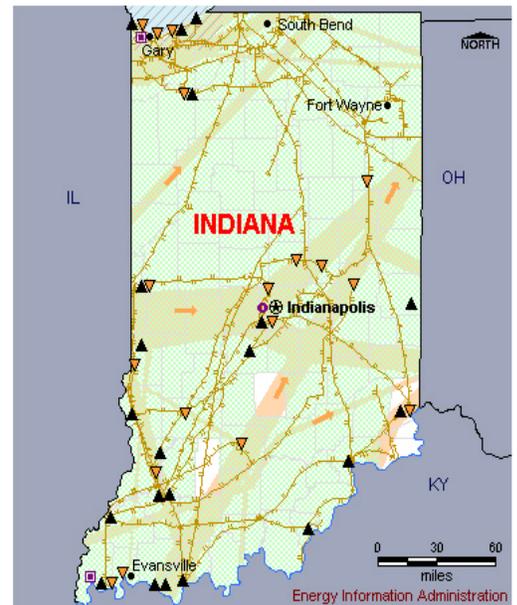
Electricity consumption accounts for most of Indiana's emissions. The Midwest region is responsible for roughly 25% of U.S. carbon emissions (5% of the global total)—the 5th largest emitter worldwide.²⁶ Though electricity costs would rise in the event of mitigating legislation, Hoosiers currently pay some of the lowest electricity prices in the country,²⁷ at a cost to their livelihoods and well-being. One study found pollution from power plants to be responsible for nearly 900 deaths in Indiana each year, a majority of which could be avoided given a reduction in fine particle emissions

(such as sulfur dioxide). Power plant pollution, according to the study, is also found to be behind 845 hospital admissions and almost of 1,500 heart attacks.²⁸

Indiana could attract an additional 38,000 jobs and \$3.1 billion in investment profits by moving to a green economy. The industrial sector provides Indiana with about one-third of its GSP. A shift to the manufacture of green, renewable technologies would not likely cause a drop in the employment level. Indiana's welders, electricians, and industrial machinery mechanics—just to name a few—are likely to be as necessary as they ever were. For example, in 2007 Indiana employed nearly 3% of the electrical equipment assemblers in the United States; this skill set is required in the production of solar and wind power.³²

Heavier rainfall will increase runoff and lake contamination, which already plagues the Great Lakes. The increasing frequency of severe storms associated with climate change is projected to jeopardize this source of revenue for the state of Indiana.

Not only will these products be available for export to other states, but Indiana can also greatly benefit from distributing the energy internally. Not taking into account out-of-state providers, 96% of Indiana's electricity is currently generated by coal, greatly exceeding the U.S. average of 50%. Mercury, released largely by coal-fired electricity plants, contaminates the already vulnerable water supply and is



especially harmful to pregnant women and children.³⁴

Fortunately, the state has the capacity to provide solar power generated electricity to 1,100 households annually. Moreover, Indiana produces 18.6 million tons of biomass annually, which can potentially produce 3,700 MW of electricity.³⁵

Conclusion

Indiana must consider action on climate change not just in terms of cost, but also in terms of opportunities. If we give Indiana's population, businesses, and investors clear and

consistent signals by properly offering initiatives and cultivating demand, investment and innovation in renewable technologies will follow.

Hoosiers 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)

- 1 Detailed below in “Costs to the Agricultural Sector” and “Costs to Tourism and Recreation.”
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- 3 National Wildlife Federation, *Global Warming and Indiana*, January 2009, 2. <http://www.nwf.org/Global-Warming/-/media/PDFs/Global%20Warming/Global%20Warming%20State%20Fact%20Sheets/Indiana.ashx> (accessed April 28, 2010).
- 4 U.S. Global Change Research Program; John C. Austin et al., *America’s North Coast: A Benefit–Cost Analysis of a Program to Protect and Restore the Great Lakes*, September 2007, 45, 47. http://www.healthylakes.org/site_upload/upload/America_s_North_Coast_Report_07.pdf (accessed April 28, 2010).
- 5 Robert Pollin, James Heintz, and Heidi Garrett-Peltier, *The Economic Benefits of Investing in Clean Energy*, Political Economy Research Institute, University of Massachusetts, Amherst and Center for American Progress, June 2009. http://www.american-progress.org/issues/2009/06/pdf/peri_report.pdf (accessed April 27, 2010).
- 6 Pew Charitable Trusts, *The Clean Energy Economy: Repowering Jobs, Businesses and Investments across America*, June 2009, 30. http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf (accessed April 27, 2010).
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- 10 Purdue Climate Change Research Center, *Impacts of Climate Change for the State of Indiana*, February 2008, 11, 19. <http://www.purdue.edu/climate/pdf/ClimateImpactsIndiana.pdf> (accessed April 27, 2010).
- 11 Ibid.
- 12 National Wildlife Federation, *Global Warming and Indiana*, 2.
- 13 U.S. Global Change Research Program.
- 14 U.S. Department of Agriculture, *State Fact Sheets: Indiana*, September 10, 2010. <http://www.ers.usda.gov/StateFacts/IN.HTM> (accessed October 19, 2010).
- 15 Union of Concerned Scientists, *Climate Change in Indiana: Projected Climate Change in Indiana*.
- 16 Purdue Climate Change Research Center, 14.
- 17 U.S. Global Change Research Program.
- 18 This does not include those employed in the real estate, rental, and leasing business who could possibly be impacted by fewer visitors to the coast, for example. Indiana Department of Workforce Development, *Indiana Economic Analysis Report*, September 2009, 12. http://www.doleta.gov/Programs/2008ReportsAndPlans/Economic_Analysis_Reports/IN.pdf (accessed April 28, 2010).

- 19 Based on the 2008 GSP. Bureau of Economic Analysis, *Gross Domestic Product by State: Indiana*, June 2, 2009. <http://www.bea.gov/regional/gsp/action.cfm?series=NAICS&querybutton=Download%20CSV&selTable=200,400,300,700,900,800,500,600,1000&selFips=18000&selLineCode=ALL&selyears=2008> (accessed October 22, 2010).
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- 22 Environmental Protection Agency, *2007 Swimming Season Update: Indiana*, 2008. <http://www.epa.gov/waterscience/beaches/seasons/2007/in.html> (accessed April 28, 2010).
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- 24 Environmental Defense Fund, *Clean Energy Jobs in Indiana*. <http://www.edf.org/page.cfm?tagID=43247> (accessed April 28, 2010).
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- 28 Conrad G. Schneider, *Dirty Air, Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants*, Clean Air Task Force, June 2004, 14. http://www.catf.us/resources/publications/files/Dirty_Air_Dirty_Power.pdf (accessed November 15, 2010).
- 29 Robert Pollin and Jeannette Wicks-Lim, *Job Opportunities for the Green Economy: A State-by-State Picture of Occupations that Gain from Green Investments*, Political Economy Research Institute, University of Massachusetts, Amherst, 7-13. http://www.peri.umass.edu/fileadmin/pdf/other_publication_types/Green_Jobs_PERI.pdf (accessed April 28, 2010). Jobs listed in chart needed in the building retrofitting, mass transit, energy-efficient automobile, wind power, solar power, and cellulosic biofuel industries. Data from May 2007 labor statistics.
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- 32 Total electrical equipment engineers in Indiana is 5,910, which represents 2.7% of the 216,470 electrical equipment engineers in the United States. Robert Pollin and Jeannette Wicks-Lim, *Job Opportunities for the Green Economy*, 10-11, 13.
- 33 Tyner, 37.
- 34 Schneider, 8, 16.
- 35 Calculations based upon the projection that Indiana can produce 3,700 MW of electricity from 18.6 million dry tons of biomass. National Wildlife Federation, *Charting a New Path for Indiana's Electricity Generation and Use*, 2. http://www.nwf.org/Global-Warming/-/media/PDFs/Global%20Warming/Clean%20Energy%20State%20Fact%20Sheets/INDIANA_10-22-2.ashx (accessed April 28, 2010).