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# **The Energy Sector in Indiana:**

## **Getting Down and Dirty on Clean Energy Opportunities**

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A Higher Road for a Better Tomorrow

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## Introduction

Affordable energy is crucial to a thriving economy. It is vital for Indiana to promote energy policies that support both the regional economy and the environment. Indiana needs to develop effective long-term energy strategies to ensure low prices for residents and businesses and, as a result, a stable economy in the future. These policies should address the state's energy production deficit and potential for increased renewable energy production.

For millions of years, Indiana was covered by inland seas and lush swamps, creating geographic layers that contain an abundance of fossil fuels like coal, oil, and natural gas (EIA, 2017). Bituminous coal has become one of Indiana's most valuable resources since its discovery in 1736. Today, Indiana still heavily relies on coal for its energy production and consumption; the state is 8<sup>th</sup> in coal production and 3<sup>rd</sup> in coal consumption. However, eco-friendly policies coupled with declining wind and solar costs have resulted in more states— including Indiana— relying less on coal for electricity than they once did.

## Energy Production and Consumption

Indiana consumes far more energy than it produces. In 2015, Indiana consumed 3.5 percent of the country's total energy, yet produced only 1.2 percent (Figure 1). To encourage future economic growth, the state should strive to produce as much energy as it consumes. When the supply of energy meets the demand from Indiana's consumers and businesses, the state becomes energy independent.

As shown in Figure 1, Indiana's share of the country's population, civilian labor force, and gross domestic product are all fairly consistent (around 2 percent), yet considerably lower than its share of energy consumption and significantly higher than its energy production. Indiana ranks 18<sup>th</sup> in total energy production but 10<sup>th</sup> in total energy consumption. Investment in new energy sources and new technologies should be considered to make-up this energy shortage.

Coal is the state's largest energy source. Indiana produced 776.5 trillion Btu (British thermal units) in 2015 (Figure 1). This accounts for 4.3 percent of the nation's coal production. However, renewable energy production has increased in Indiana over time, with 237 trillion Btu renewable energy produced in the state in 2015. Crude oil and natural gas production are relatively low in the state as a whole. In 2015, Indiana accounted for 0.02 percent of the nation's crude oil production and 0.06 percent of the nation's natural gas production.

As illustrated in Figure 2, the state's annual energy production has gradually increased by approximately 350 trillion Btu (British thermal units) from 2000 and 2015. Coal and renewable energy production are the main reasons for increased energy production since 2000. Coal production has increased by 155 trillion Btu from 2000 to 2015, while renewable energy production has increased by 193 billion Btu from 2000 to 2015. This increase in production, paired with a gradual decline in total energy consumption, helps match the state's energy supply to its

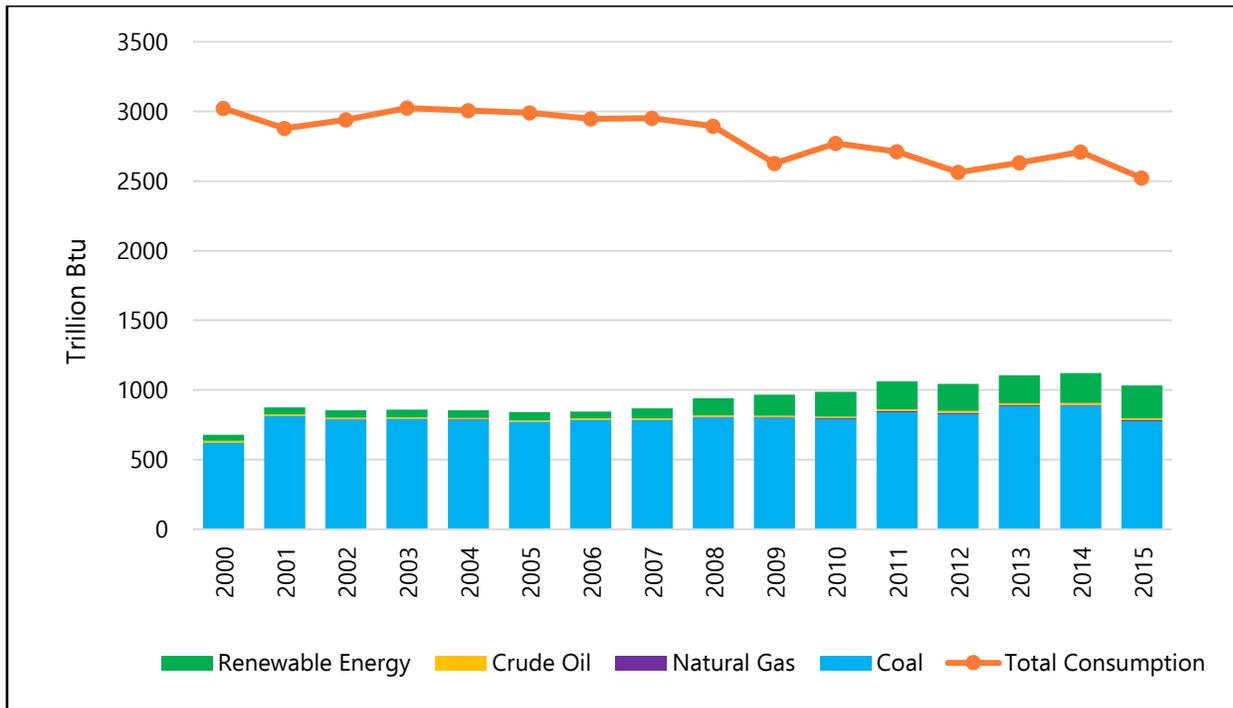
consumption. Indiana's energy consumption has declined from 3,000 trillion Btu in 2000 to 2,500 trillion Btu in 2015.

**Figure 1: Indiana's Demographic, Economic, and Energy Indicators**

	Indiana	Share of U.S./Rank	Period
<b>Demography</b>			
Population	6.6 million	2.1% / 17	2016
Civilian Labor Force	3.3 million	2.0%	17-Nov
<b>Economy</b>			
Gross Domestic Product	\$341.9 billion	1.7% / 16	2016
Vehicle Miles Traveled	78,311 million miles	2.6% / 12	2013
Land in Farms	14.7 million acres	1.6% / 19	2015
<b>Energy</b>			
Total Energy Production	1,033 trillion Btu	1.2% / 18	2015
<i>Coal</i>	<i>776.5 trillion Btu</i>	<i>4.3%</i>	<i>2015</i>
<i>Crude Oil</i>	<i>12.7 trillion Btu</i>	<i>0.02%</i>	<i>2015</i>
<i>Natural Gas - Marketed</i>	<i>7.4 trillion Btu</i>	<i>0.06%</i>	<i>2015</i>
<i>Renewable Energy</i>	<i>236.5 trillion Btu</i>	<i>2.5%</i>	<i>2015</i>
Total Energy Consumption	2,846 trillion Btu	3.5% / 10	2015
Total Energy Consumption Per Capita	430 million Btu	9	2015

Source: Energy Information Administration, U.S. Department of Energy; Federal Highway Administration, U.S. Department of Transportation; U.S. Department of Commerce; U.S. Department of Agriculture

**Figure 2: Indiana Energy Production and Consumption Estimates, 2000-2014**



Source: Energy Information Administration, U.S. Department of Energy

However, Indiana is still heavily dependent on other states for its energy consumption. As an industrial center and transportation hub, Indiana is a big energy user – ninth in the country in per capita energy consumption. Indiana consumes almost two and a half times its energy production. At the same time, Indiana is home to the highest-polluting power plants in the United States. Despite that, a survey conducted by the Opinion Research Corporation found that just 7 percent of Hoosiers favor coal as an energy source for power plants, and 75 percent of respondents want to see an investment in clean energy and energy efficiency instead (Cohen, 2017). As a result of new technologies making renewable energy sources economically competitive against traditional energy sources, the state should strongly consider development of homegrown clean energy sources as it pursues energy independence.

**Energy Prices**

In general, lower energy prices are important to the state’s economy because they contribute to a reduced cost of living for residents and a favorable climate for businesses. In 2015, Indiana ranked 12<sup>th</sup> in the nation for per-capita energy expenditures, indicating that the state experiences moderate energy costs. Figure 3 illustrates that Indiana’s residential and commercial natural gas prices are significantly lower than the U.S. average, with the state ranking 37<sup>th</sup> in the nation for residential gas prices. Commercial natural gas prices are 33.7 percent below the national average, while residential natural gas prices are 22.5 percent lower. Residential and commercial electricity prices are also 3.4 percent and 4.6 percent below the national average, respectively.

The average sales price of coal and price of industrial electricity is higher in Indiana than the United States (Figure 3). Indiana’s industrial electricity price is 7.3 percent above the national average. The average sales price of coal in Indiana is about \$45 per short ton and about \$31 per short ton in the United States, a 46 percent difference. While Indiana has the benefit of low natural gas prices and electricity prices, coal prices make the state less attractive compared to other states.

**Figure 3: Indiana and U.S. Average Energy Prices**

	Indiana	U.S. Average	Percent Above/Below U.S. Average	Period
<b>Natural Gas</b>				
City Gate	\$3.68/thousand cu ft	\$4.04/thousand cu ft	-33.66%	Oct-17
Residential	\$10.46/thousand cu ft	\$13.50/thousand cu ft	-22.52%	Oct-17
<b>Coal</b>				
Average Sales Price	\$44.55/short ton	\$30.57/short ton	+45.73%	Jul-16
<b>Electricity</b>				
Residential	12.40 cents/kWh	12.84 cents/kWh	-3.43%	Oct-17
Commercial	10.32 cents/kWh	10.82 cents/kWh	-4.62%	Oct-17
Industrial	7.46 cents/kWh	6.95 cents/kWh	+7.34%	Oct-17

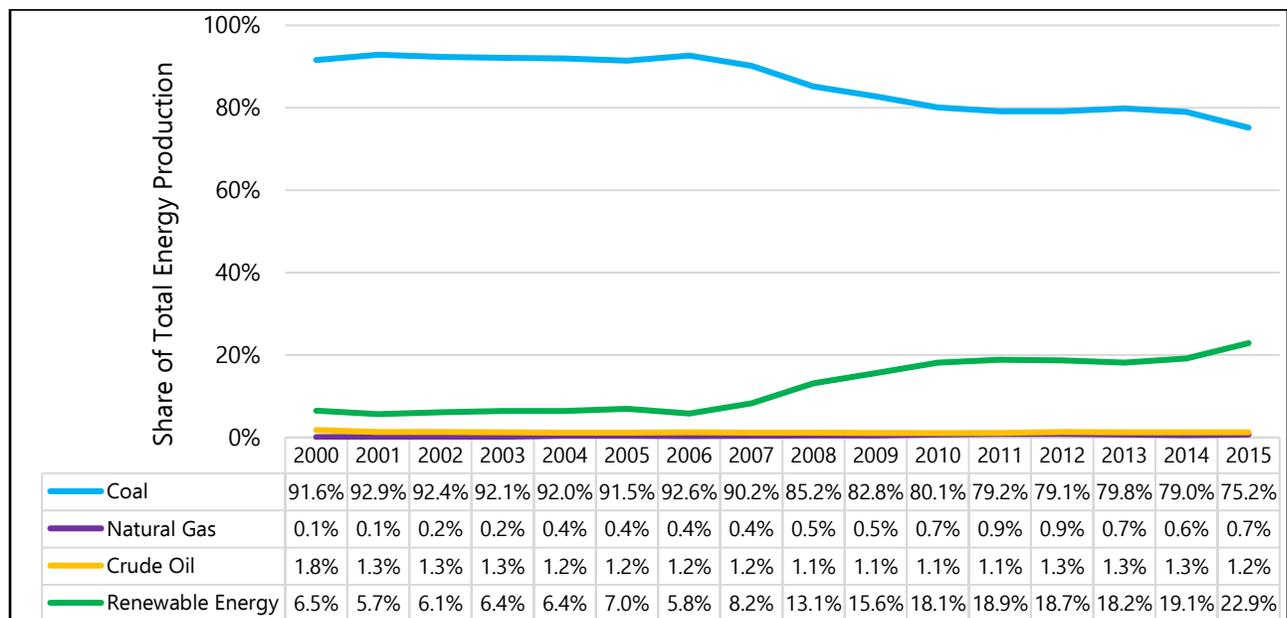
Source: Energy Information Administration, U.S. Department of Energy

## Clean Energy

Renewable energy has taken the stage at both the federal and state levels in recent years. The Clean Air Act, signed into law by President Lyndon B. Johnson and updated in 1990 under the George H. W. Bush Administration was designed to combat air pollution (EPA, 2017). Clean Power Plan, enacted under President Barack Obama and the Environmental Protection Agency (EPA) in 2015, set specific CO<sub>2</sub> emissions targets for each state. However, former Indiana Governor Mike Pence said Indiana would not comply with the Clean Power Plan under his administration (McCall, 2015). Then, in March of 2017, President Donald Trump signed an Executive Order mandating the EPA review the Clean Power Plan. While the Plan is being debated on the federal level, Indiana should continue to pursue clean energy options.

In the Midwest, climate change has made investing in clean energy essential. The average air temperature in the region increased by 4.5 degrees from 1980 to 2010. In addition, the Great Lakes have experienced less ice coverage and the number of days with “very heavy precipitation” has increased by 27 percent in the Midwest since the late 1950s. Climate change has impacted energy infrastructure across the Midwest, with flooding, high winds, ice, snow, and storms causing damage to above-ground electricity and transmission lines (Craighead, 2017).

**Figure 4: Share of Indiana Energy Production by Source, 2000-2015**



Source: Energy Information Administration, U.S. Department of Energy

While some Midwestern states have taken action to address the negative impacts on infrastructure systems due to extreme climate patterns, Indiana has done little to implement renewable energy standards or diversify energy production to meet Indiana’s energy needs. Coal-fired power plants are not disappearing in Indiana; however, renewable energy is becoming an increasingly larger

share of energy production (Figure 4). In 2000, renewable energy accounted for only 7 percent of energy production in Indiana; however, in 2015, renewable energy accounted for about 23 percent. In addition, coal production in Indiana has fallen over time; in 2000, coal accounted for 92 percent of total energy production and in 2015 it decreased to 75 percent of total energy production (Figure 4).

While “clean coal” plants help to address the environmental issues with standard coal plants, the costs associated with retrofitting a plant remain prohibitive (*The New York Times*, 2016). In 2006, Duke Energy Corp. proposed a “clean coal” plant – the Edwardsport plant – in southwest Indiana. Most coal-fueled power plants burn pulverized coal to produce steam. Edwardsport is an integrated gasification combined cycle (IGCC) plant, where coal is converted to synthesis gas pre-combustion, allowing much of the air pollution to be stripped out. Unfortunately, the \$3.5 billion cost of Edwardsport was almost double its original estimate and the plant does not produce as much energy as predicted (Tomich, 2017). “Clean coal” plants are less likely to be built in the future due to the high cost and relatively low return on energy production, even though they are more environmentally friendly. Instead, Indiana should continue to diversify its sources of energy production, such as wind energy.

### **Economic and Environmental Impacts of Wind Energy**

Although Indiana does not have the strongest winds in the Midwest region, its central location offers an advantage for wind development. Indiana ranks 14<sup>th</sup> in the nation for wind development and operating capacity and almost one-third of Indiana has commercially viable wind resources. For example, Meadow Lake Wind Farm is the 12<sup>th</sup> largest wind project in the United States with 303 wind turbines, stretching across White, Jasper, and Benton Counties in Indiana (AWEA, 2017).

The state has just begun to develop its substantial wind resources. Only about 5 percent of Indiana’s electricity power production comes from wind. However, the U.S. Department of Energy projects that Indiana could produce enough wind energy by 2030 to power 4.9 million homes (AWEA, 2017).

Expanding renewable energy production has been associated with lower levels of pollution. Nearly half of all Americans reside in counties where unhealthy levels of smog increase their risk of respiratory illnesses and lung disease (AWEA, 2009). Reduced pollution from wind turbines has helped to prevent asthma attacks, heart attacks, and other health problems – saving the United States economy over \$100 billion in total health care costs (Sierra Club, 2014). In Indiana, wind power prevents 3.1 million metric tons of state carbon dioxide emissions annually, equivalent to the emissions of 655,000 automobiles (AWEA, 2017).

Wind energy projects also create and save good, blue-collar jobs. Indiana is ranked second in the nation for per capita manufacturing job creation from renewable resources – such as building wind turbine pieces (Cohen, 2010). Short-term construction jobs require skilled craft workers, while the long-term operations and maintenance provide careers for Hoosier workers. Utility and

power engineers, geophysical engineers, truck drivers, crane operators, wind farm operators, laborers, electricians, and field technicians are all employed at wind power installation sites.

Wind energy and other renewable energy resources are key to diversifying Indiana's energy production. While Indiana continues to heavily rely on coal for energy, in recent years the state has increased its renewable energy production. Continuing this trend will be vital, as the population and economy in Indiana grow and as climate change continues to impact infrastructure systems across the state (Craighead, 2017).

## Conclusion

Affordable energy for Indiana's residents and businesses is crucial to maintaining a stable economy in the future. Indiana's current energy production does not match the state's consumption and is largely dependent on one energy source, which is not sustainable over the long run. As strategies are developed to achieve energy independence and replace aging infrastructure, renewable energy and wind power should be among the primary sources considered. Clean energy investments can increase the state's economic competitiveness, provide high-paying jobs, improve health and environmental wellness, and encourage business growth in Indiana. The state is well-positioned to take advantage of renewable energy sources for sustainable energy production that provides both economic and environmental benefits.

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### **Cover Photo Credit**

Klemme, Johnny. (2015). "Wind Farm in Benton County Indiana." *Geswein Farm & Land Realty, LLC*.