Economic Impact Analysis for Lotus Wind Project

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Dr. Loomis has published over 38 peer-reviewed articles in leading energy policy and economics journals. He has raised and managed over $7 million in grants and contracts from government, corporate and foundation sources. He received the 2011 Department of Energy's Midwestern Regional Wind Advocacy Award and the 2006 Best Wind Working Group Award. Dr. Loomis received his Ph.D. in economics from Temple University in 1995.

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Strategic Economic Research, LLC (SER) provides economic consulting for renewable energy projects across the US. We have produced over 200 economic impact reports in 30 states. Research Associates who performed work on this project include Ethan Loomis, Madison Schneider, Zoe Calio, Patrick Chen, Kathryn Keithley, Morgan Stong, Mandi Mitchell, Paige Afram, Coryell Birchfield, and Tim Roberts.

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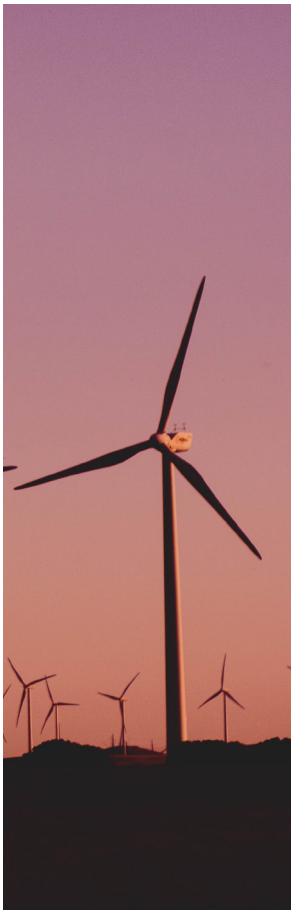

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I. Executive Summary

Apex is developing the Lotus Wind Project in Macoupin County, Illinois. The purpose of this report is to evaluate the economic impact of this Project on Macoupin County and the State of Illinois. The basis of this analysis is to study the direct, indirect and induced impacts on job creation, wages, and total economic output.

The Lotus Wind Project consists of an estimated 200 megawatts ("MW") of capacity of wind turbines and the associated access roads, transmission and communication equipment, storage areas, and control facilities (the "Project"). For purposes of this report, a total nameplate capacity of 200 MW in Macoupin County was assumed. The Project represents an investment of over $415 million in Macoupin County. The total development is anticipated to result in the following:

Jobs

- 689 new jobs during construction for Macoupin County
- 1,708 new jobs during construction for the State of Illinois
- 30.6 new long-term jobs for Macoupin County
- 39.8 new long-term jobs for the State of Illinois

Earnings

- Over $51.5 million in new earnings during construction for Macoupin County
- Over $149 million in new earnings during construction for the State of Illinois
- Over $1.3 million in new long-term earnings for Macoupin County annually
- Over $2.8 million in new long-term earnings for the State of Illinois annually

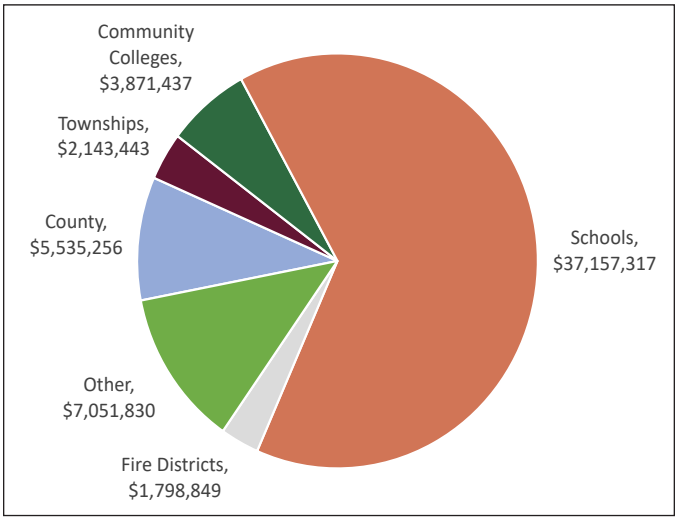
Output - the value of production in the state or local economy. It is an equivalent measure to the Gross Domestic Product.

- Over $98 million in new output during construction for Macoupin County
- Over $331 million in new output during construction for the State of Illinois
- Over $5.9 million in new long-term output for Macoupin County annually
- Over $9.3 million for the State of Illinois in new long-term output annually

Property Taxes

- Over $37.1 million in total school district revenue over the life of the Project
- Over $5.5 million in property taxes for Macoupin County over the life of the Project
- Over $57.5 million in property taxes in total for all taxing districts over the life of the Project

Figure 1 – Total Property Taxes Paid by Lotus Wind Project



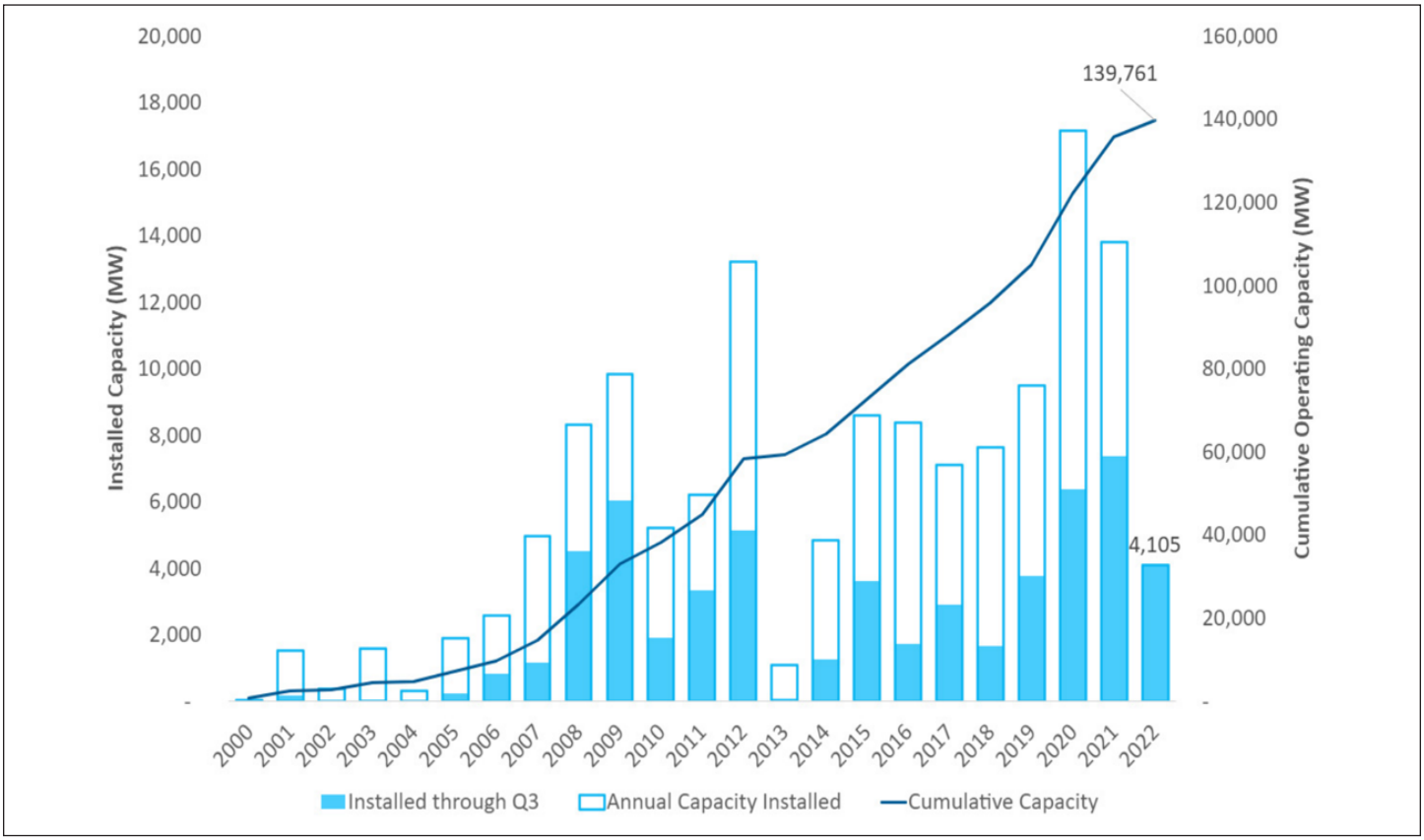
II. Wind Industry Growth and Economic Development

a. United States Wind Industry Growth

The United States wind industry grew at a rapid pace from 2006-2021, pausing only in 2013 due to federal policy uncertainty. In 2020, the U.S. set a new record of 16,913 MW far surpassing the previous annual peak of 13,131 MW of wind power installed in 2012 (American Clean Power (ACP), 2020). The industry rebounded with steady growth of 8,115 MW installed in 2015; 8,203 MW in 2016; 7,017 MW in 2017; 7,588 MW in 2018; and 9,143 MW in 2019 (ACP, 2020). The total wind capacity installed in 2021 was 12,747 MW (ACP, 2021).

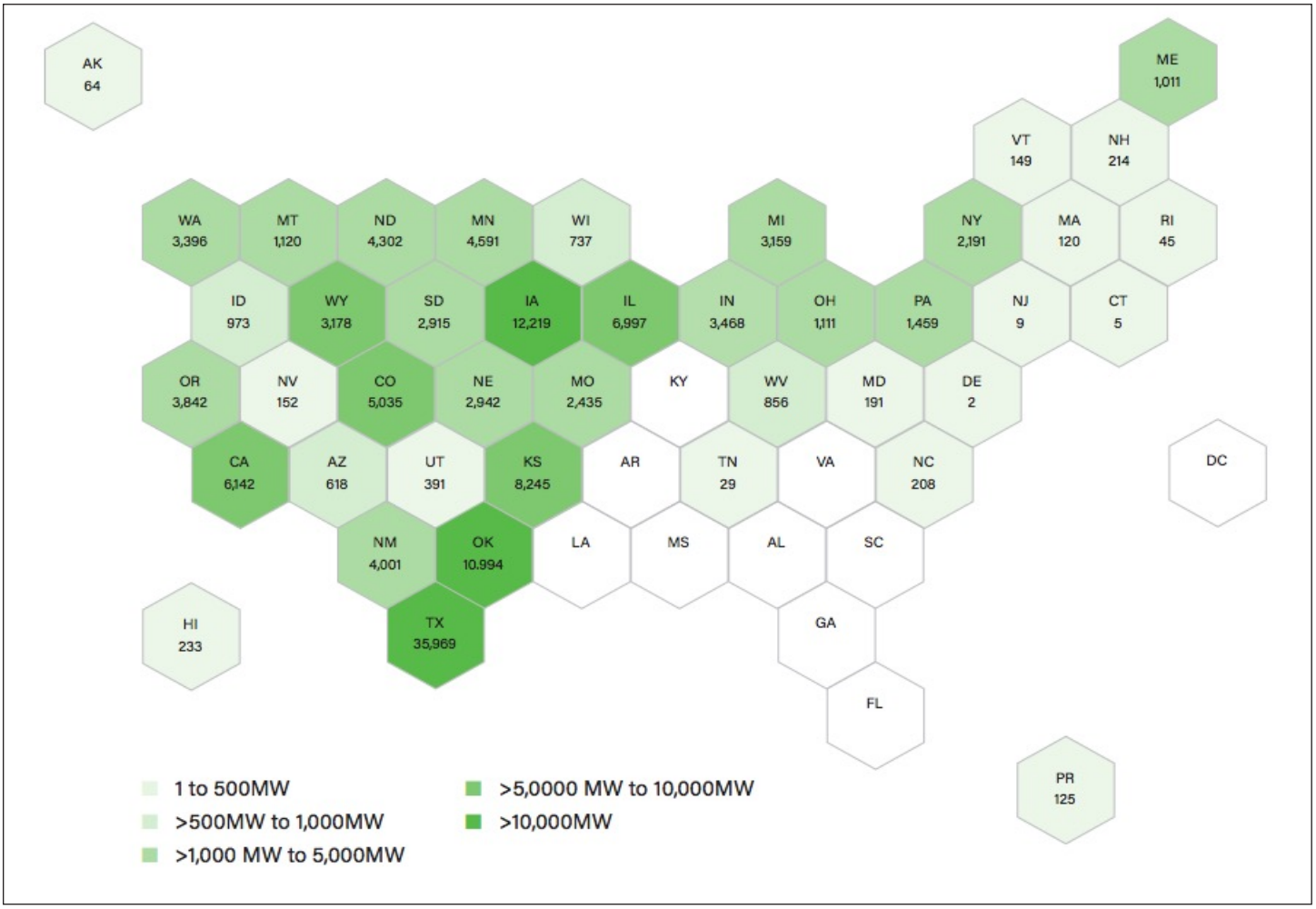
The total amount of wind capacity in the U.S. by the end of 2021 was 134,996 MW (ACP, 2021). China is the global leader with 278,324 MW of installed capacity, with Germany in third place with 55,122 MW of installed capacity (2020 figures with the United States in second place) (GWEC, 2021). Figure 2 shows the growth in installed annual capacity and cumulative capacity in the U.S. and Figure 3 shows the state-by-state breakdown of installed capacity by the end of 2021.

Figure 2 – United States Annual and Cumulative Wind Power Capacity Growth



Source: ACP Q3 Market Report 2022

Figure 3 – Total Wind Capacity by State



Source: ACP Annual Market Report 2021

Several factors have spurred the continued growth of wind energy in recent years. First, new technology and rigorous competition among turbine manufacturers lowered the cost of wind turbines. Second, larger capacity wind turbines and higher hub heights produced more output and lowered the cost of wind energy production. Finally, several large corporate buyers increased the demand for wind energy beyond the traditional electric utility market.

b. Illinois Wind Industry Growth

Illinois is a national leader in the wind energy industry (American Clean Power, 2022). As of January 2023, Illinois is ranked 6th in the United States in existing wind, solar, and energy storage capacity with over 7,887 MW (ACP, 2022). Table 1 has a list of the operational wind farms in Illinois through 2022 (some small projects below 50 MW were omitted from the table). The year-by-year and cumulative growth in Illinois' wind energy capacity is shown in Figure 4. In 2009, Illinois had sixteen projects completed with an annual total installed capacity of 638.3 MW. Eight projects were completed in 2012 with an annual total installed capacity of 823.3 MW. Growth exploded in 2020 with six projects completed with the largest total annual installed capacity of 1,059 MW.

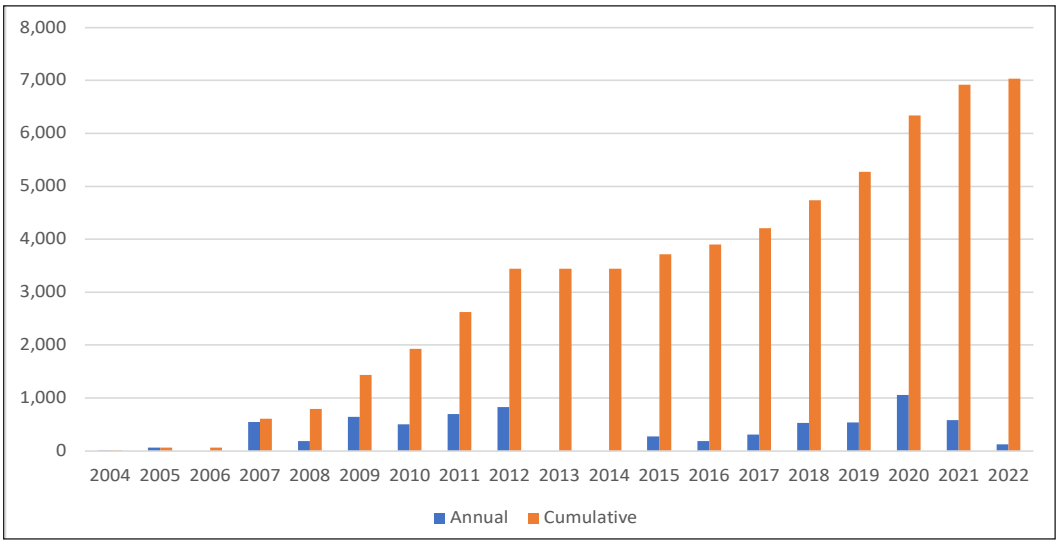
The Energy Information Administration (EIA) calculated the number of megawatts generated from different energy sources in 2021. As shown in Figure 5, the greatest percentage of electricity generated in Illinois comes from nuclear energy with 53.3% followed by coal with 23.9% and natural gas with 11.6%. Approximately 10.3% of the total electricity power generated in Illinois came from wind in 2021.

The U.S. Department of Energy sponsors the U.S. Energy and Employment Report each year. Electric Power Generation covers all utility and non-utility employment across electric generating technologies, including fossil fuels, nuclear, and renewable technologies. It also includes employees engaged in facility construction, turbine and other generation equipment manufacturing, operations and maintenance, and wholesale parts distribution for all electric generation technologies. According to Figure 6, employment in the wind energy industry (9,105) is much larger than solar energy generation (5,526) and natural gas generation (4,252).

Table 1 – Illinois Wind Farm Projects

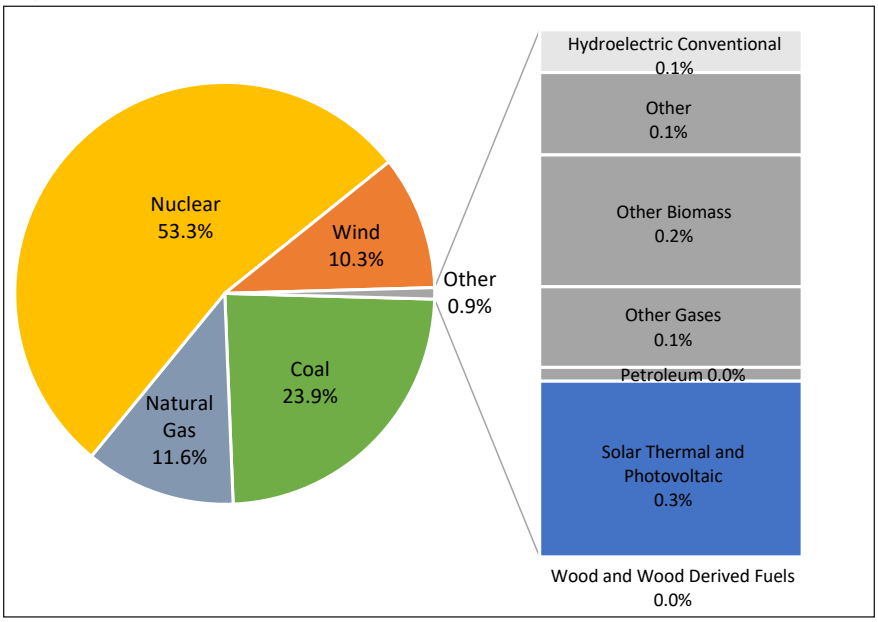
Wind Farm	Capacity (MW)	Year Online
Bennington	93.1	2021
Big Sky Wind Facility	239.4	2011
Bishop Hill	424.5	2012
Blooming Grove	260.9	2020
Bright Stalk Wind Farm (Lexington Chenoa)	205.2	2019
California Ridge	217.1	2012
Camp Grove	150	2007
Cardinal Point	150	2020
EcoGrove	100.5	2009
Ford Ridge	120.4	2022
Glacier Sands	184.9	2021
Grand Ridge	210	2008
Green River	194.3	2019
Harvest Ridge Wind Farm (Broadlands)	199.8	2020
HillTopper	185	2018
Hoopeston Wind	98	2015
Kelly Creek	184	2016
Lee/DeKalb	217.5	2009
Lincoln Land	301.7	2021
Lone Tree	88.1	2020
Mendota Hills Wind Farm	76.1	2019
Minonk	200	2012
Otter Creek	158.2	2020
Pilot Hill	175.1	2015
Pioneer Trail Wind Farm	150.4	2011
Providence Heights Wind Farm	72	2008
Radford's Run	305.8	2017
Rail Splitter	100.5	2009
Settlers Trail Wind Farm	150.4	2011
Shady Oaks	109.5	2012
Streator Cayuga Ridge South	300	2010
Sugar Creek	202	2020
Top Crop Wind Farm	300	2009
Twin Groves	396	2007
Walnut Ridge	212	2018
White Oak Energy Center	150	2011
Whitney Hill	65.2	2019

Figure 4 – Installed Capacity of Illinois Wind Projects



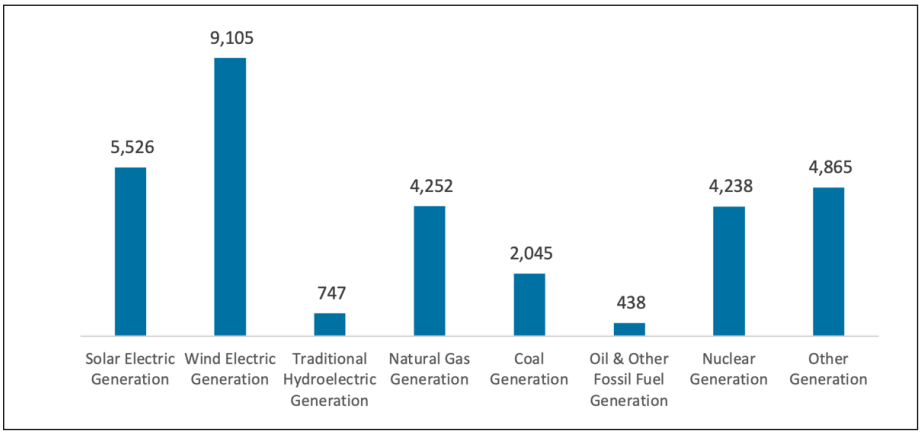
Source: American Clean Power, January 2023, Illinois

Figure 5 – Electric Generation by Fuel Type for Illinois in 2021



Source: U.S. Energy Information Association (EIA): Illinois, 2021

Figure 6 – Electric Generation Employment by Technology



Source: U.S. Energy and Employment Report 2021: Illinois

c. Economic Benefits of Wind Farms

Wind farms create numerous economic benefits that continue to last for decades. Wind farms create job opportunities in the local area during both the short-term construction phase and the long-term operational phase. Short-term construction jobs include both workers at the wind farm site and jobs created along the supply chain. Long-term operational jobs include wind turbine technicians, supervisors and supply chain jobs.

Wind developers typically lease the land for the turbines from local landowners without materially affecting ongoing agricultural uses. Only a small portion of the total project footprint is used for the turbines, access roads, feeder lines, and substations. For most wind projects, it is anticipated that approximately 1-2% of the total leased land will actually contain facilities. Each turbine and the associated access road will use approximately half an acre to one acre of farmland. Lease payments made to landowners provide a reliable source of long-term income which offsets the fluctuating prices received from crops or the impact of weather events on production. Landowners then have additional funds to make purchases in the local economy and elsewhere.

Wind projects enhance the equalized assessed value of property within the county. Typically, wind developers pay taxes based on that improved value unless preempted by law or mutual agreement. Wind farms, therefore, strengthen the local tax base helping to improve county services, schools, police and fire departments and fund infrastructure improvements, such as public roads.

Numerous studies have quantified the economic benefits across the United States. The National Renewable Energy Laboratory has produced economic impact reports for the State of Arizona (NREL, 2008a), State of Idaho (NREL, 2008b), State of Indiana (NREL, 2014), State of Iowa (NREL, 2013), State of Maine (NREL, 2008c), State of Montana (NREL, 2008d), State of New Mexico (NREL, 2008e), State of Nevada (NREL, 2008f), State of Pennsylvania (NREL, 2008g), State of South Dakota (NREL, 2008h), State of Utah (NREL 2008i), State of West Virginia (NREL, 2008j), State of Wisconsin (NREL, 2008k), and the State of North Carolina (NREL, 2009).

Loomis (2020) estimates the economic impact of wind and solar energy in Illinois resulting from the Path to 100 proposal which later became the Climate & Equitable Jobs Act which was enacted in 2021. The legislation is expected to result in constructing over 15,000 MW of wind and solar over the next 15 years yielding over 53,000 jobs during construction and over 3,200 jobs during operations. The analysis also looks at the 39 largest existing wind farms in Illinois and finds that they supported 29,295 jobs during construction and 1,307 jobs during operations for a total economic benefit of $10.2 billion over the life of the projects. In addition, a review of historical property tax records finds that existing utility-scale wind and solar projects paid over $305 million in property taxes statewide since 2003 and over $41.4 million in 2019 alone.

Jenniches (2018) performed a review of the literature assessing the regional economic impacts of renewable energy sources. After reviewing all of the different techniques for analyzing the economic impacts, he concludes "for assessment of current renewable energy developments, beyond employment in larger regions, IO [Input-Output] tables are the most suitable approach" (Jenniches, 2018, 48). Input-Output analysis is the basis for the methodology used in the economic impact analysis of this report.

Finally, Brunner and Schwegman (2022) examined the economic impacts of wind installations across the United States from 1995 to 2018. They found that wind energy projects resulted in "economically meaningful increases in county GDP per capita, income per capita, median household income, and median home values" (p. 165).

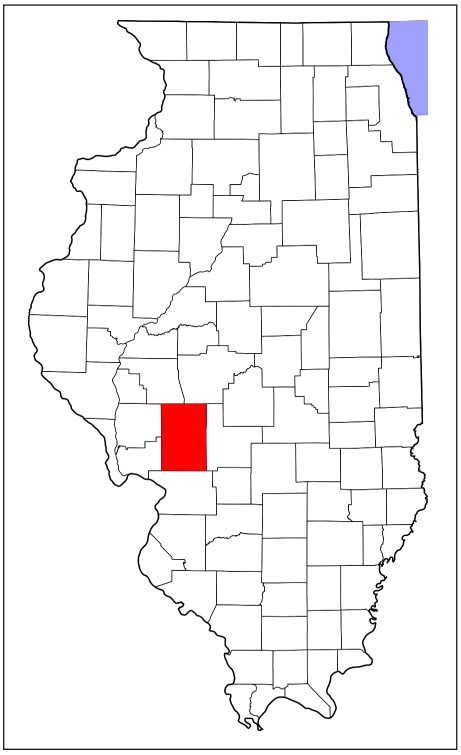
III. Project Description and Location

a. Lotus Wind Project Description

Apex is developing the Lotus Wind Project in Macoupin County, Illinois. The Project consists of an estimated 200 megawatts ("MW") of capacity of wind turbines and the associated access roads, transmission and communication equipment, storage areas, and control facilities. The Project represents an investment of over $415 million.

b. Macoupin County, Illinois

Figure 7 – Location of Macoupin County, Illinois



Macoupin County is located in the western part of Illinois (see Figure 7). It has a total area of 868 square miles and the U.S. Census estimates that the 2020 population was 44,967 with 21,023 housing units. The county has a population density of 55 (persons per square mile) compared to 232 for the State of Illinois. Median household income in the county was $58,227 (U.S. Census Bureau).

Table 2 – Employment by Industry in Macoupin County

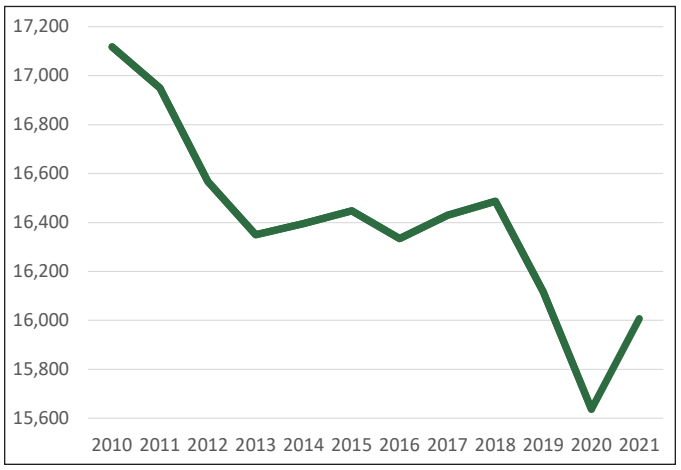
Industry	Number	Percent
Health Care and Social Assistance	1,983	12.3%
Administrative Government	1,751	10.8%
Retail Trade	1,731	10.7%
Other Services (except Public Administration)	1,662	10.3%
Agriculture, Forestry, Fishing and Hunting	1,200	7.4%
Accommodation and Food Services	1,106	6.8%
Construction	1,097	6.8%
Manufacturing	962	5.9%
Professional, Scientific, and Technical Services	866	5.4%
Wholesale Trade	844	5.2%
Finance and Insurance	695	4.3%
Administrative and Support and Waste Management and Remediation Services	506	3.1%
Real Estate and Rental and Leasing	443	2.7%
Transportation and Warehousing	441	2.7%
Educational Services	227	1.4%
Government Enterprises	196	1.2%
Arts, Entertainment, and Recreation	148	0.9%
Utilities	137	0.8%
Information	72	0.4%
Management of Companies and Enterprises	63	0.4%
Mining, Quarrying, and Oil and Gas Extraction	38	0.2%

Source: Impact Analysis for Planning (IMPLAN), County Employment by Industry, 2021

As shown in Table 2, the largest industries in the county are "Health Care and Social Assistance" followed by "Administrative Government," "Retail Trade," and "Other Services (except Public Administration)." These data for Table 2 come from IMPLAN covering the year 2021 (the latest year available).

Table 2 provides the most recent snapshot of total employment but does not examine the historical trends within the county. Figure 8 shows employment from 2010 to 2021. Total employment in Macoupin County was at its highest at 17,118 in 2010 and its lowest at 15,637 in 2020 (BEA, 2023).

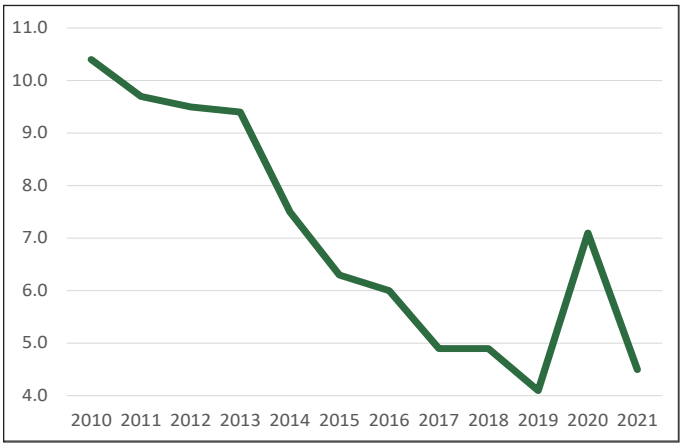
Figure 8 – Total Employment in Macoupin County from 2010 to 2021



Source: Bureau of Economic Analysis, Regional Data, GDP and Personal Income, 2010-2021

Unemployment rate signifies the percentage of labor force without employment in the county. Figure 9 shows unemployment rates from 2010 to 2021. Unemployment in Macoupin County was at its highest at 10.4% in 2010 and its lowest at 4.1% in 2019 (FRED, 2023).

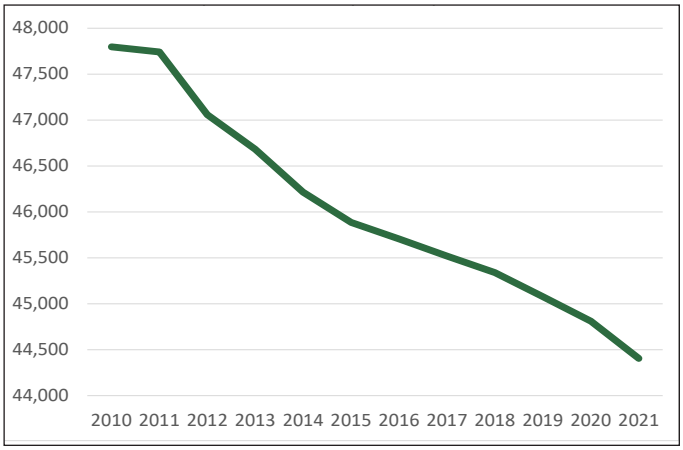
Figure 9 – Unemployment Rate in Macoupin County from 2010 to 2021



Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Unemployment Rates, 2010-2021

Similar to the downward trend of unemployment, the overall population in the county has been decreasing steadily, as shown in Figure 10. Macoupin County population was 47,798 in 2010 and 44,406 in 2021, a loss of 3,392 (FRED, 2023). The average annual population decrease over this time period was 308.

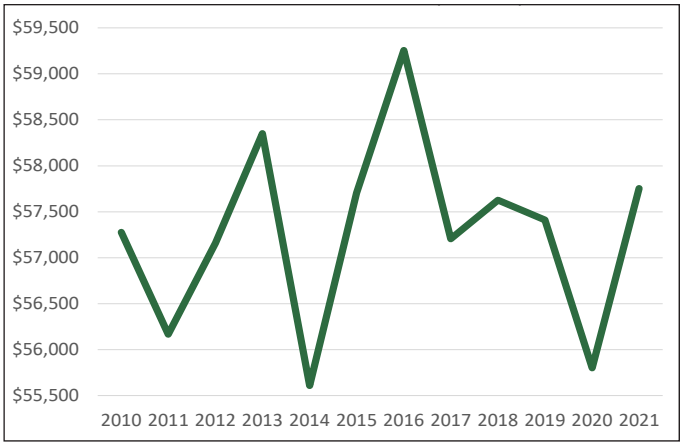
Figure 10 – Population in Macoupin County from 2010 to 2021



Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Population Estimates, 2010-2021

Unlike the population trend, household income has fluctuated greatly in the county. Figure 11 shows the real median household income in Macoupin County from 2010 to 2021. Using the national Consumer Price Index (CPI), the nominal median household income for each year was adjusted to 2021 dollars. Household income was at its lowest at $55,610 in 2014 and its highest at $59,255 in 2016 (FRED, 2023).

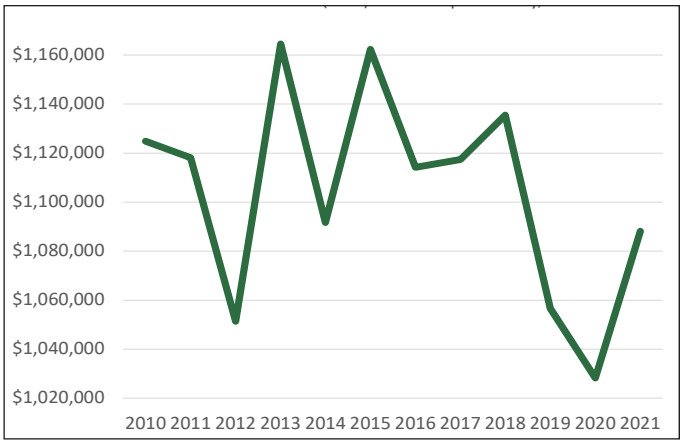
Figure 11 – Median Household Income in Macoupin County from 2010 to 2021



Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Estimate of Median Household Income, 2010-2021

Real Gross Domestic Product (GDP) is a measure of the value of goods and services produced in an area and adjusted for inflation over time. The Real GDP for Macoupin County has fluctuated since 2010, as shown in Figure 12 (BEA, 2023).

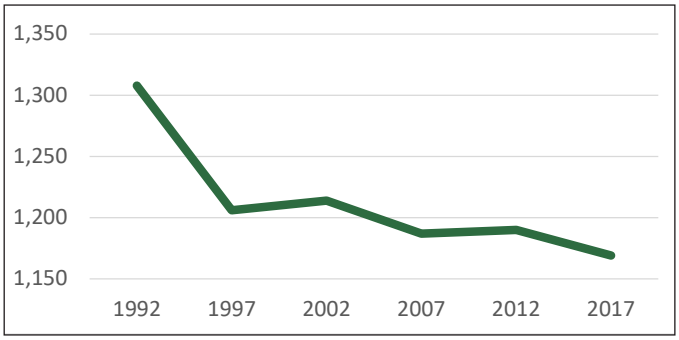
Figure 12 – Real Gross Domestic Product (GDP) in Macoupin County from 2010 to 2021



Source: Bureau of Economic Analysis, Regional Data, GDP and Personal Income , 2010-2021

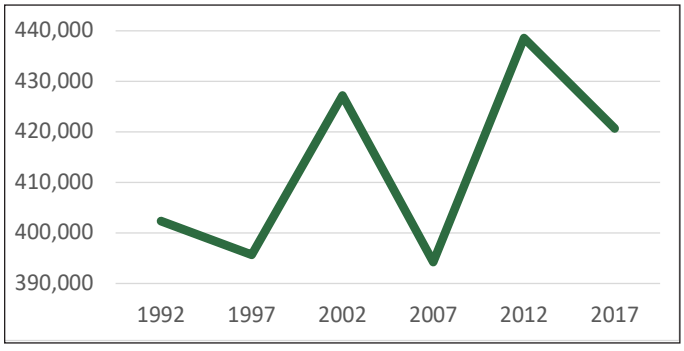
The farming industry has declined in Macoupin County. As shown in Figure 13, the number of farms hit a high of 1,308 in 1992 and a low of 1,169 in 2017. The amount of land in farms has fluctuated greatly. The county farmland hit a low of 394,228 acres in 2007 and a high of 438,592 acres in 2012 according to Figure 14.

Figure 13 – Number of Farms in Macoupin County from 1992 to 2017



Source: Census of Agriculture, 1992-2017

Figure 14 – Land in Farms in Macoupin County from 1992 to 2017



Source: Census of Agriculture, 1992-2017

IV. Methodology

The economic analysis of the wind power development presented here utilizes the National Renewable Energy Laboratory's (NREL's) latest Jobs and Economic Development Impacts (JEDI) Wind Energy Model (W6-28-19). NREL is the U.S. Department of Energy's primary national laboratory for renewable energy and energy efficiency research and development. The JEDI Wind Energy Model is an input-output model that measures the spending patterns and location-specific economic structures that reflect expenditures supporting varying levels of employment, income, and output. Essentially, JEDI is an input-output model which takes into account the fact that the output of one industry can be used as an input for another. For example, when a wind farm developer purchases turbines to build a wind farm, those wind turbines are made of components such as fiberglass, aluminum, steel, copper, etc. Therefore, purchases of wind turbines impact the demand for these components. In addition, when a wind farm developer purchases a wind turbine from a manufacturing facility, the manufacturer uses some of that money to pay employees, and then the employees spend that money on goods and services within their community. In essence, JEDI reveals how purchases of wind project materials not only benefit turbine manufacturers but also the local industries that supply the concrete, rebar, and other materials (Reategui et al., 2009). The JEDI model uses construction cost data, operating cost data, and data relating to the percentage of goods and services acquired in the state to calculate jobs, earnings, and economic activities that are associated with this information. The results are broken down into the construction period and the operation period of the wind project. Within each period, impacts are further divided into direct, turbine and supply chain (indirect), and induced impacts.

The JEDI Model was developed in 2002 to demonstrate the economic benefits associated with developing wind farms in the United States. The model was developed by Marshall Goldberg of MRG & Associates, under contract with the National Renewable Energy Laboratory. The JEDI model utilizes state specific industry multipliers obtained from IMPLAN (IMpact Analysis for PLANning). IMPLAN software and data are managed and updated by the Minnesota IMPLAN Group, Inc. using data collected at federal, state, and local levels. The JEDI model considers 14 aggregated industries that are impacted by the construction and operation of a wind farm: agriculture, construction, electrical equipment, fabricated metals, finance/insurance/real estate, government, machinery, mining, other manufacturing, other services, professional service, retail trade, transportation/communication/public utilities, and wholesale trade (Reategui et al., 2009). This study does not analyze net jobs. It analyzes the gross jobs that the new wind farm development supports.

Direct impacts during the construction period refer to the changes that occur in the onsite construction industries in which the direct final demand (i.e., spending on construction labor and services) change is made. Final demands are goods and services purchased for their ultimate use by the end user. Onsite construction-related services include engineering, design, and other professional services.

Direct impacts during operating years refer to the final demand changes that occur in the onsite spending for wind farm workers. Direct jobs consist primarily of onsite wind turbine technicians.

The initial spending on the construction and operation of the wind farm creates a second layer of impacts, referred to as "turbine and supply chain impacts" or "indirect impacts."

Indirect impacts during the construction period consist of the changes in inter-industry purchases resulting from the direct final demand changes, and include construction spending on materials and wind farm equipment and other purchases of goods and offsite services. Essentially, these impacts result from "spending related to project development and on-site labor such as equipment costs (turbines, blades, towers, transportation), manufacturing of components and supply chain inputs, materials (transformer, electrical, HV line extension, HV substation and interconnection materials), and the supply chain of inputs required to produce these materials" (JEDI Support Team, 2009, 2). Concrete that is used in turbine foundations increases the demand for gravel, sand, and cement. As a result of the expenditure for concrete, there is increased economic activity at quarries and cement factories and these changes are indirect impacts. The accountant for the construction firm and the banker who finances the contractor are both considered indirect impacts. All supply chain component impacts/manufacturing-related activities are included under indirect impacts; therefore, the late stage turbine assembly process, which includes gearbox assembly, blade production, and steel rolling are all included under the construction period indirect impacts category.

Indirect impacts during operating years refer to the changes in inter-industry purchases resulting from the direct final demand changes. Essentially, these impacts result from "expenditures related to on-site labor, materials, and services needed to operate the wind farms (e.g., vehicles, site maintenance, fees, permits, licenses, utilities, insurance, fuel, tools and supplies, replacement parts/equipment); the supply chain of inputs required to produce these goods and services; and project revenues that flow to the local economy in the form of land lease revenue, property tax revenue, and revenue to equity investors" (JEDI Support Team, 2009, 3). All land lease payments and property taxes show up in the operating-years portion of the results because these payments do not support the day-to-day operations and maintenance of the wind farm but instead are more of a latent effect that results from the wind farm being present (Eric Lantz, February 25, 2009, e-mail message to Jennifer Hinman).

Induced impacts during construction refer to the changes that occur in household spending as household income increases or decreases due to the direct and indirect effects of final demand changes. Local spending by employees working directly or indirectly on the wind farm project who receive their paychecks and then spend money in the community is included. Additional local jobs and economic activity are supported by these purchases of goods and services. Thus, for example, the increased economic activity at quarries and cement factories results in increased revenues for the affected firms and raises individual incomes. Individuals employed by these companies then spend more money in the local economy, e.g., as workers receive income, they may decide to purchase more expensive clothes, or higher quality food along with other goods and services from local businesses. This increased economic activity may result from "construction workers who spend a portion of their income on lodging, groceries, clothing, medicine, a local movie theater, restaurant, or bowling alley;" or a "steel mill worker who provides the inputs for turbine production and spends his money in a similar fashion, thus supporting jobs and economic activities in different sectors of the economy" (JEDI Support Team, 2009, 2).

Induced impacts during operating years refer to the changes that occur in household spending as household income increases or decreases as a result of the direct and indirect effects from final demand changes. Some examples include a "wind farm technician who spends income from working at the wind farm on buying a car, a house, groceries, gasoline, or movie tickets;" or a "worker at a hardware store who provides spare parts and materials needed at the wind farm and who spends money in a similar fashion, thus supporting jobs and economic activities in different sectors of the economy" (JEDI Support Team, 2009, 3).

This methodology has been validated by a paper in the peer-reviewed economics literature. In the article, "Ex Post Analysis of Economics Impacts from Wind Power Development in U. S. Counties," the authors conduct an ex post econometric analysis of the county-level economic development impacts of wind power installations from 2000 through 2008. They find an aggregate increase in county-level personal income and employment of approximately $11,000 and 0.5 jobs per megawatt of wind power capacity during that time which is consistent with the JEDI results at the county level (Brown, 2012).

V. Results

The results were derived from project cost estimates supplied by Apex. In addition, Apex helped estimate the percentages of project materials and labor that will be coming from within Macoupin County and the State of Illinois.

Two separate JEDI models were run to show the economic impact of the Project. The first JEDI model used the 2021 Macoupin County multipliers from IMPLAN. The second JEDI model used the 2021 State of Illinois multipliers from IMPLAN and the same project costs. Because the multipliers and the local content percentage are different for the two models, the results are independent from one another. However, any local content coming from Macoupin County obviously comes from the State of Illinois as well. Similarly, the State of Illinois multipliers will generally be larger than Macoupin County multipliers, but some individual sectors of the economy could be stronger.

The output from these models is shown in Tables 3-5. Table 3 lists the total employment impact from the Project for Macoupin County and the State of Illinois. Table 4 shows the impact on total earnings and Table 5 contains the impact on total output. The results are divided into one-time construction impacts and ongoing annually recurring operations impacts that are expected to last for the full life of the Project which is estimated to be 30 years. Project Development and Onsite Labor Impacts correspond to direct impacts as defined in the methodology section. Turbine and Supply Chain Impacts are the indirect impacts during construction and Local Revenue and Supply Chain Impacts are indirect impacts during operations.

Table 3 – Total Employment Impact from Lotus Wind Project

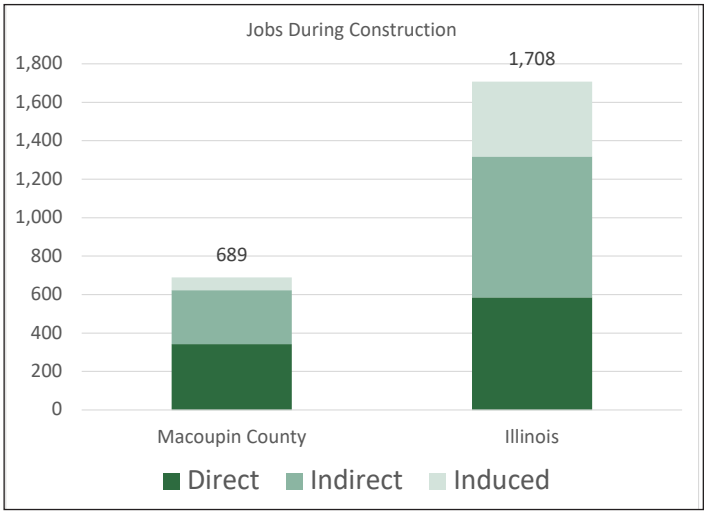
	Macoupin County Jobs	State of Illinois Jobs
Construction		
Direct Impacts: Project Development and Onsite Labor Impacts	342	586
Indirect Impacts: Turbine and Supply Chain Impacts	281	732
Induced Impacts	66	390
New Local Jobs during Construction	*689*	*1,708*
Operations		
Direct Impacts: Onsite Labor Impacts	8.0	8.0
Indirect Impacts: Local Revenue and Supply Chain Impacts	17.2	18.0
Induced Impacts	5.4	13.8
New Local Long-Term Jobs	*30.6*	*39.8*

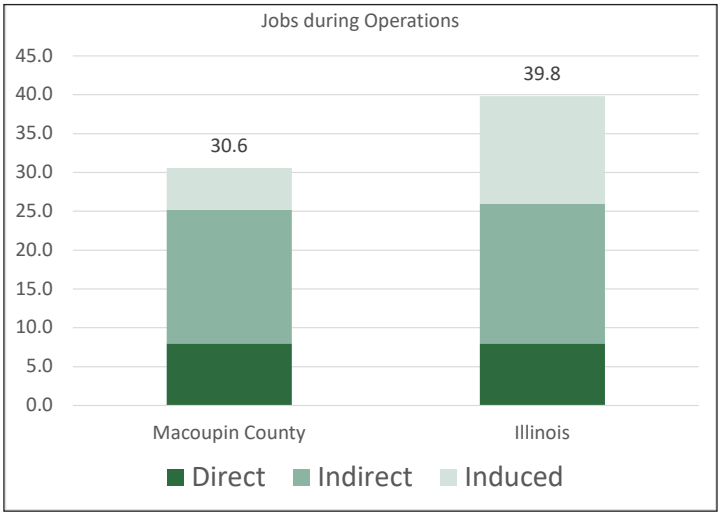
The results from the JEDI model show significant employment impacts from the Lotus Wind Project. Employment impacts can be broken down into several different components. Direct jobs created during the construction phase typically last anywhere from 6 months to over a year depending on the size of the project; however, the direct job numbers present in Table 3 from the JEDI model are based on a full-time equivalent (FTE) basis for a year. In other words, 1 job = 1 FTE = 2,080 hours worked in a year. A part time or temporary job would constitute only a fraction of a job according to the JEDI model. For example, the JEDI model results show 342 new onsite jobs during construction in Macoupin County, though the construction of the Project could actually involve hiring closer to 684 workers for 6 months.

As shown in Table 3, new local jobs created or retained during construction total 689 for Macoupin County and 1,708 for the State of Illinois. New local long-term jobs created from the Project total 30.6 for Macoupin County and 39.8 for the State of Illinois.

Direct jobs created during the operational phase last the life of the wind farm, typically 25-40 years. Direct construction jobs and operations and maintenance jobs both require highly-skilled workers in the fields of construction, management, and engineering. These well-paid professionals boost economic development in rural communities where new employment opportunities are welcome due to economic downturns (Reategui and Tegen, 2008).

Figure 15 – Total Employment Impact for Lotus Wind Project



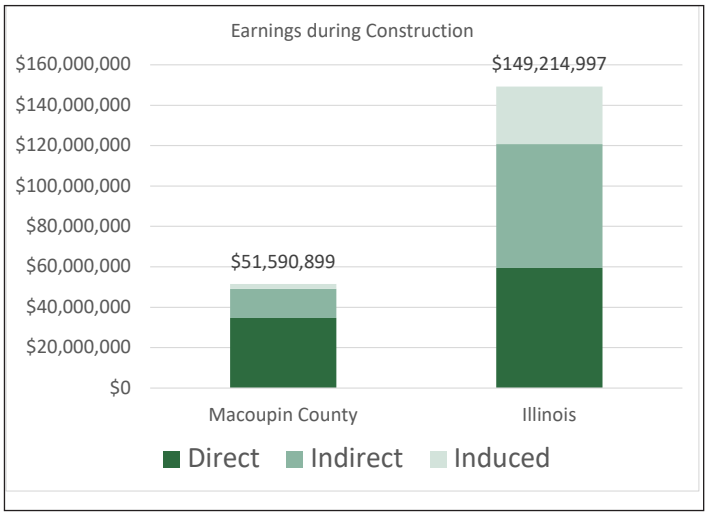


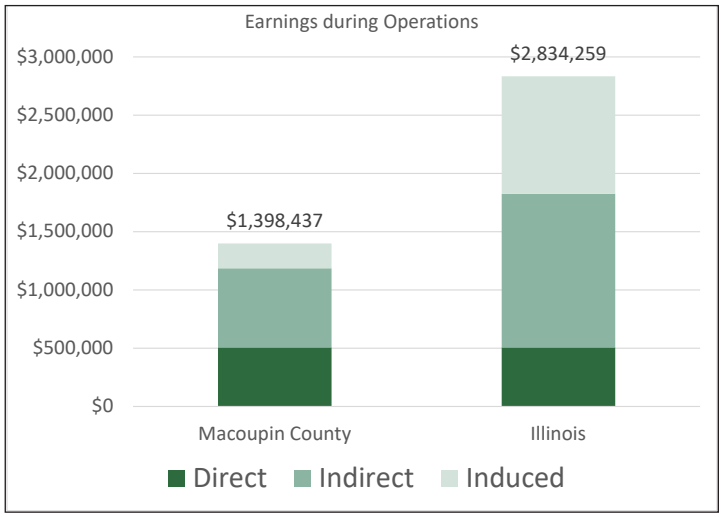
Accordingly, it is important to not just look at the number of jobs but also the earnings that they produce. The earnings impacts from the Project are shown in Table 4 and are categorized by construction impacts and operations impacts. The new local earnings during construction total over $51.5 million for Macoupin County and over $149 million for the State of Illinois. The new local long-term earnings total over $1.3 million for Macoupin County and over $2.8 million for the State of Illinois.

Table 4 – Total Earnings Impact from Lotus Wind Project

	Macoupin County	State of Illinois
Construction		
Direct Impacts: Project Development and Onsite Earnings	$34,666,402	$59,423,602
Indirect Impacts: Turbine and Supply Chain Impacts	$14,352,609	$61,401,635
Induced Impacts	$2,571,888	$28,389,760
New Local Earnings during Construction	*$51,590,899*	*$149,214,997*
Operations (Annual)		
Direct Impacts: Onsite Labor Impacts	$508,593	$508,593
Indirect Impacts: Local Revenue and Supply Chain Impacts	$678,802	$1,318,114
Induced Impacts	$211,042	$1,007,552
New Local Long-Term Earnings	*$1,398,437*	*$2,834,259*

Figure 16 – Total Earnings Impact for Lotus Wind Project





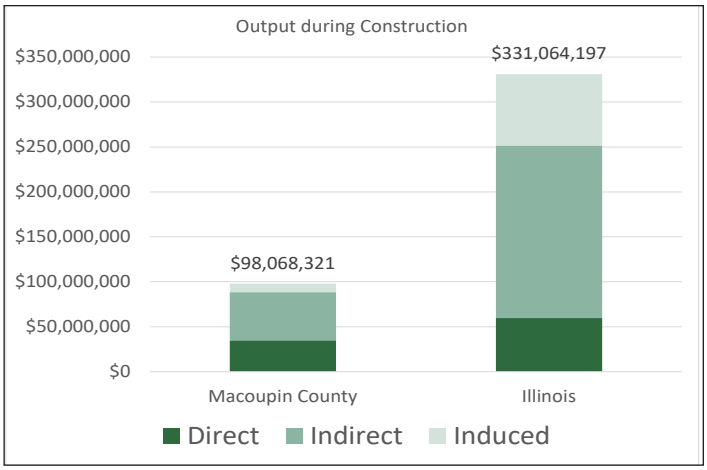
Output refers to economic activity or the value of production in the state or local economy. Economic output includes the earnings reported in Table 4 but also measures other factors such as landowner payments, property taxes, and other economic activity that is not earnings and benefits from employment. Local Revenue and Supply Chain Impacts include ongoing property taxes and are detailed in the next section.

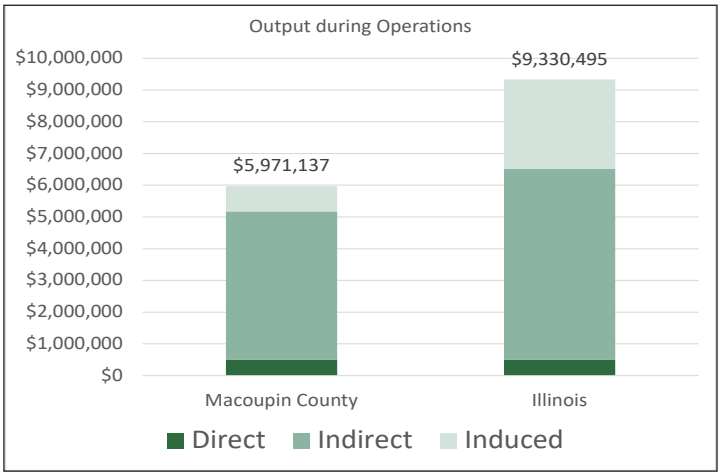
According to Table 5, the new local output during construction totals over $98.0 million for Macoupin County and over $331 million for the State of Illinois. The new local long-term output totals over $5.9 million for Macoupin County and over $9.3 million for the State of Illinois.

Table 5 – Total Output Impact from Lotus Wind Project

	Macoupin County	State of Illinois
Construction		
Direct Impacts: Project Development and Onsite Jobs	$34,852,610	$59,649,466
Indirect Impacts: Turbine and Supply Chain Impacts	$53,468,932	$192,082,723
Induced Impacts	$9,746,779	$79,332,008
New Local Output during Construction	*$98,068,321*	*$331,064,197*
Operations (Annual)		
Direct Impacts: Onsite Labor Impacts	$508,593	$508,593
Indirect Impacts: Local Revenue and Supply Chain Impacts	$4,663,223	$6,006,853
Induced Impacts	$799,321	*$2,815,049*
New Local Long-Term Output	*$5,971,137*	*$9,330,495*

Figure 17 – Total Output Impact for Lotus Wind Project





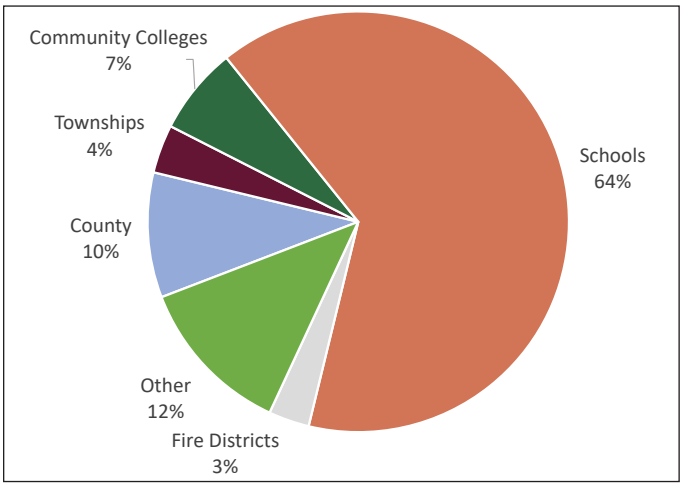
VI. Property Taxes

Wind power projects increase the property tax base of a county, creating a new revenue source for education and other local government services, such as fire protection, park districts, and road maintenance. According to state law (Public Act 095-0644), the fair cash value for a utility-scale wind turbine in Illinois is $360,000 per megawatt of capacity beginning in 2007 and is annually adjusted for inflation and depreciation. The inflation adjustment, also known as the Trending Factor, increases each year according to the Bureau of Labor Statistics' Consumer Price Index for all cities for all items. According to the Illinois Department of Revenue, "[t]he trending factor for assessment year 2023 is 1.47"(https://tax.illinois.gov/content/dam/soi/en/web/tax/localgovernments/property/documents/windenergydevicevaluation.pdf). Depreciation is allowed at 4% per year up to a maximum total depreciation of 70% of the trended real property cost basis (calculated by taking the fair cash value of the turbine and multiplying by the Trending Factor).

Tables 6-10 detail the tax implications of the Lotus Wind Project. There are several important assumptions built into the analysis in these tables.

- First, the analysis assumes that the valuation of the wind farm is the same as set forth in Public Act 095-0644.
- Second, the tables assume future inflation is constant at 2.8% and the depreciation is 4% until it reaches the maximum of 70%.
- Third, all tax rates are assumed to stay constant at their 2021 (2020 tax year) rates. For example, the Macoupin County tax rate is assumed to stay constant at 0.71201% through 2054.
- Fourth, the analysis assumes that the Project is placed in service on January 1, 2025 at a fair cash value of $108.9 million according to Public Act 095-0644.
- Fifth, it assumes that the Project is decommissioned in 30 years and pays no more taxes after that date.
- Sixth, the placement of the turbines is subject to change and the actual taxes paid could vary depending on the relative tax rates between districts. If less turbines are built in a taxing district than expected, that taxing district would receive less tax revenue.
- Seventh, no comprehensive tax payment was calculated, and these calculations are only to be used to illustrate the economic impact of the Project.

Figure 18 – Percentage of Property Taxes Paid to Taxing Jurisdictions



As shown in Table 6, a conservative estimate of the total property taxes paid by the Project starts out at over $2.6 million and declines due to depreciation (and offset by the trending factor) until it reaches the maximum depreciation in 2043. After that, the Project is fully depreciated, and the trending factor causes the taxable value and taxes to increase. The expected total property taxes paid over the 30-year lifetime of the Project are over $57.5 million, and the average annual property taxes paid will be over $1.9 million.

Table 7 shows an estimate of the likely taxes paid to Macoupin County, North Palmyra Township, North Otter Township, and Multi-Township Assessor #4.

According to Table 7, the total amounts paid are over $5.5 million for Macoupin County, over $1.2 million for North Palmyra Township, over $891 thousand for North Otter Township, and over $104 thousand for Multi-Township Assessor #4 over the life of the Project.

Table 6 – Total Tax Revenue from Lotus Wind Project

Year	Total Taxes Paid
2025	$2,687,514
2026	$2,652,254
2027	$2,612,912
2028	$2,569,288
2029	$2,521,172
2030	$2,468,348
2031	$2,410,588
2032	$2,347,659
2033	$2,279,316
2034	$2,205,305
2035	$2,125,363
2036	$2,039,215
2037	$1,946,576
2038	$1,847,151
2039	$1,740,632
2040	$1,626,700
2041	$1,505,023
2042	$1,375,256
2043	$1,325,403
2044	$1,362,515
2045	$1,400,665
2046	$1,439,884
2047	$1,480,200
2048	$1,521,646
2049	$1,564,252
2050	$1,608,051
2051	$1,653,077
2052	$1,699,363
2053	$1,746,945
2054	$1,795,859
TOTAL	**$57,558,133**
AVG ANNUAL	**$1,918,604**

Table 7 – Tax Revenue from Lotus Wind Project for the County and Townships[1]

Year	Macoupin County	North Palmyra Township	North Otter Township	Multi-Township Assessor #4
2025	$258,453	$58,436	$41,646	$4,860
2026	$255,062	$57,669	$41,100	$4,797
2027	$251,279	$56,814	$40,490	$4,726
2028	$247,084	$55,865	$39,814	$4,647
2029	$242,456	$54,819	$39,068	$4,560
2030	$237,376	$53,671	$38,250	$4,464
2031	$231,822	$52,415	$37,355	$4,360
2032	$225,770	$51,046	$36,380	$4,246
2033	$219,197	$49,560	$35,320	$4,122
2034	$212,080	$47,951	$34,174	$3,988
2035	$204,392	$46,213	$32,935	$3,844
2036	$196,107	$44,340	$31,600	$3,688
2037	$187,199	$42,325	$30,164	$3,520
2038	$177,637	$40,164	$28,624	$3,341
2039	$167,393	$37,848	$26,973	$3,148
2040	$156,437	$35,370	$25,207	$2,942
2041	$144,735	$32,725	$23,322	$2,722
2042	$132,256	$29,903	$21,311	$2,487
2043	$127,462	$28,819	$20,539	$2,397
2044	$131,030	$29,626	$21,114	$2,464
2045	$134,699	$30,455	$21,705	$2,533
2046	$138,471	$31,308	$22,313	$2,604
2047	$142,348	$32,185	$22,937	$2,677
2048	$146,334	$33,086	$23,580	$2,752
2049	$150,431	$34,012	$24,240	$2,829
2050	**$154,643**	**$34,965**	**$24,918**	**$2,908**
2051	**$158,973**	**$35,944**	**$25,616**	**$2,990**
2052	$163,424	$36,950	$26,333	$3,073
2053	$168,000	$37,985	$27,071	$3,159
2054	$172,704	$39,048	$27,829	$3,248
TOTAL	**$5,535,256**	**$1,251,518**	**$891,926**	**$104,096**
AVG ANNUAL	**$184,509**	**$41,717**	**$29,731**	**$3,470**

[1]The assumed tax rates are 0.71201% for Macoupin County, 0.32% for North Palmyra Township, 0.22946% for North Otter Township, and 0.01339% for Multi-Township Assessor #4.

Table 8 shows an estimate of the likely taxes paid to Scottville-Modesto Fire District, Virden Fire District, Girard Fire District, Northwestern Fire Protection District, and Lincoln Land Community College #526.

According to Table 8, the total amounts paid are over $825 thousand for Scottville-Modesto Fire District, over $566 thousand for Virden Fire District, over $290 thousand for Girard Fire District, over $117 thousand for Northwestern Fire Protection District, and over $3.8 million for Lincoln Land Community College #526 over the life of the Project.

Table 9 shows an estimate of the likely taxes paid to North Palmyra Road, Bridge, & Oil, North Otter Road, Bridge, & Oil, Grand Prairie of the West Library District, Prairieland Ambulance, University of Illinois Extension Office, and Veterans Assistance Commission.

According to Table 9, the total amounts paid are over $2.4 million for North Palmyra Road, Bridge, & Oil, over $2.5 million for North Otter Road, Bridge, & Oil, over $395 thousand for Grand Prairie of the West Library District, over $1.3 million for Prairieland Ambulance, over $84.0 thousand for University of Illinois Extension Office, and over $149 thousand for Veterans Assistance Commission.

Table 8 – Tax Revenue from Lotus Wind Project for Other Taxing Bodies[2]

Year	Scottville-Modesto Fire District	Virden Fire District	Girard Fire District	Northwestern Fire Protection District	Lincoln Land Community College #526
2025	$38,542	$26,433	$13,544	$5,474	$180,766
2026	$38,036	$26,086	$13,366	$5,402	$178,394
2027	$37,472	$25,699	$13,168	$5,322	$175,748
2028	$36,846	$25,270	$12,948	$5,233	$172,814
2029	$36,156	$24,797	$12,706	$5,135	$169,577
2030	$35,399	$24,277	$12,440	$5,027	$166,024
2031	$34,570	$23,709	$12,148	$4,910	$162,139
2032	$33,668	$23,090	$11,831	$4,782	$157,907
2033	$32,688	$22,418	$11,487	$4,642	$153,310
2034	$31,626	$21,690	$11,114	$4,492	$148,332
2035	$30,480	$20,904	$10,711	$4,329	$142,955
2036	$29,244	$20,056	$10,277	$4,153	$137,160
2037	$27,916	$19,145	$9,810	$3,965	$130,929
2038	$26,490	$18,167	$9,309	$3,762	$124,242
2039	$24,962	$17,120	$8,772	$3,545	$117,077
2040	$23,328	$15,999	$8,198	$3,313	$109,414
2041	$21,584	$14,802	$7,585	$3,065	$101,230
2042	$19,723	$13,526	$6,931	$2,801	$92,502
2043	$19,008	$13,036	$6,680	$2,699	$89,148
2044	$19,540	$13,401	$6,867	$2,775	$91,645
2045	$20,087	$13,776	$7,059	$2,853	$94,211
2046	$20,649	$14,162	$7,256	$2,933	$96,849
2047	$21,228	$14,558	$7,460	$3,015	$99,560
2048	$21,822	$14,966	$7,669	$3,099	$102,348
2049	$22,433	$15,385	$7,883	$3,186	$105,214
2050	$23,061	$15,816	$8,104	$3,275	$108,160
2051	$23,707	$16,259	$8,331	$3,367	$111,188
2052	$24,371	$16,714	$8,564	$3,461	$114,301
2053	$25,053	$17,182	$8,804	$3,558	$117,502
2054	$25,754	$17,663	$9,050	$3,658	$120,792
TOTAL	**$825,440**	**$566,106**	**$290,072**	**$117,231**	**$3,871,437**
AVG ANNUAL	**$27,515**	**$18,870**	**$9,669**	**$3,908**	**$129,048**

[2]The assumed tax rates are 0.22085% for Scottville-Modesto Fire District, 0.18933% for Virden Fire District, 0.38805% for Girard Fire District, 0.39207% for Northwestern Fire Protection District, and 0.49799% for Lincoln Land Community College #526.

Table 9 – Tax Revenue from Lotus Wind Project for Other Taxing Bodies (Cont.)[3]

Year	North Palmyra Road, Bridge, & Oil	North Otter Road, Bridge & Oil	Grand Prairie of the West Library District	Prairieland Ambulance	University of Illinois Extension Office	Veterans Assistance Commission
2025	$112,616	$118,901	$18,478	$63,523	$3,924	$6,962
2026	$111,139	$117,341	$18,235	$62,690	$3,872	$6,871
2027	$109,490	$115,601	$17,965	$61,760	$3,815	$6,769
2028	$107,662	$113,671	$17,665	$60,729	$3,751	$6,656
2029	$105,646	$111,542	$17,334	$59,592	$3,681	$6,531
2030	$103,432	$109,205	$16,971	$58,343	$3,604	$6,394
2031	$101,012	$106,649	$16,574	$56,978	$3,520	$6,245
2032	$98,375	$103,865	$16,141	$55,490	$3,428	$6,082
2033	$95,511	$100,842	$15,671	$53,875	$3,328	$5,905
2034	$92,410	$97,567	$15,163	$52,126	$3,220	$5,713
2035	$89,060	$94,031	$14,613	$50,236	$3,103	$5,506
2036	$85,450	$90,219	$14,021	$48,200	$2,977	$5,283
2037	$81,568	$86,121	$13,384	$46,010	$2,842	$5,043
2038	$77,402	$81,722	$12,700	$43,660	$2,697	$4,785
2039	$72,938	$77,009	$11,968	$41,142	$2,541	$4,509
2040	$68,164	$71,969	$11,184	$38,449	$2,375	$4,214
2041	$63,066	$66,585	$10,348	$35,573	$2,197	$3,899
2042	$57,628	$60,844	$9,456	$32,506	$2,008	$3,563
2043	$55,539	$58,639	$9,113	$31,328	$1,935	$3,434
2044	$57,094	$60,281	$9,368	$32,205	$1,989	$3,530
2045	$58,693	$61,968	$9,630	$33,107	$2,045	$3,629
2046	$60,336	$63,703	$9,900	$34,034	$2,102	$3,730
2047	$62,025	$65,487	$10,177	$34,987	$2,161	$3,835
2048	$63,762	$67,321	$10,462	$35,966	$2,222	$3,942
2049	$65,548	$69,206	$10,755	$36,973	$2,284	$4,052
2050	$67,383	$71,144	$11,056	$38,009	$2,348	$4,166
2051	$69,270	$73,136	$11,366	$39,073	$2,414	$4,282
2052	$71,209	$75,183	$11,684	$40,167	$2,481	$4,402
2053	$73,203	$77,289	$12,011	$41,292	$2,551	$4,526
2054	$75,253	$79,453	$12,347	$42,448	$2,622	$4,652
TOTAL	**$2,411,884**	**$2,546,493**	**$395,739**	**$1,360,472**	**$84,038**	**$149,108**
AVG ANNUAL	**$80,396**	**$84,883**	**$13,191**	**$45,349**	**$2,801**	**$4,970**

[3]The assumed tax rates are 0.62049% for North Palmyra Road, Bridge, & Oil, 0.65512% for North Otter Road, Bridge, & Oil, 0.16544% for Grand Prairie of the West Library District, 0.35% for Prairieland Ambulance, 0.01081% for University of Illinois Extension Office, and 0.01918% for Veterans Assistance Commission.

The largest taxing jurisdictions for property taxes are local school districts. However, the tax implications for school districts are more complicated than for other taxing bodies. School districts receive state aid based on the assessed value of the taxable property within its district. As assessed value increases, the state aid to the school district is decreased. The Center for Renewable Energy at Illinois State University did a report titled Wind Farm Implications for School District Revenue which details how a wind farm affects the local school district's revenue. Although the school district collects increased local property tax revenue from the wind farm, it receives less in state aid because of the increases in Equalized Assessed Value (EAV) due to the wind farm. However, the reduction in state aid is much smaller than the increased tax revenue.

Although the exact amount of the reduction in state aid to the school districts is uncertain, local project tax revenue is superior to relying on state aid for the following reasons: (1) the wind turbines can't relocate – it is a permanent structure that will be within the school district's footprint for the life of the Project; (2) the school district can raise the tax rate and increase its revenues as needed; (3) the school district does not have to deal with the year-to-year uncertainty of state aid amounts; (4) the school district does not have to wait for months (or even into the next Fiscal Year!) for payment; (5) the Project does not increase the overall cost of education in the way that a new residential development would.

Table 10 shows the direct property tax revenue coming from the Project to Northwestern Unit School District #2, Waverly Unit School District #6, and North Mac Unit School District #34. This tax revenue uses the assumptions outlined earlier to calculate the other tax revenue and assumes that 40% of the turbines are in the Northwestern Unit School District #2, 14% in the Waverly Unit School District #6, and 46% in the North Mac Unit School District #34. Over the 30-year life of the Project, the school districts are expected to receive over $37.1 million in tax revenue.

Table 10 – Tax Revenue from Lotus Wind Project for the School Districts[4]

Year	Northwestern Unit School District #2	Waverly Unit School District #6	North Mac Unit School District #34
2025	$552,893	$237,974	$944,089
2026	$545,639	$234,852	$931,702
2027	$537,545	$231,368	$917,882
2028	$528,570	$227,506	$902,558
2029	$518,672	$223,245	$885,655
2030	$507,804	$218,568	$867,099
2031	$495,922	$213,453	$846,808
2032	$482,975	$207,881	$824,702
2033	$468,915	$201,829	$800,694
2034	$453,689	$195,276	$774,695
2035	$437,243	$188,197	$746,613
2036	$419,520	$180,569	$716,350
2037	$400,462	$172,366	$683,807
2038	$380,008	$163,562	$648,880
2039	$358,094	$154,130	$611,462
2040	$334,655	$144,041	$571,439
2041	$309,623	$133,267	$528,695
2042	$282,927	$121,776	$483,110
2043	$272,670	$117,362	$465,597
2044	$280,305	$120,648	$478,634
2045	$288,154	$124,026	$492,036
2046	$296,222	$127,499	$505,813
2047	$304,516	$131,069	$519,975
2048	$313,043	$134,739	$534,535
2049	$321,808	$138,512	$549,502
2050	$330,819	$142,390	$564,888
2051	$340,081	$146,377	$580,704
2052	$349,604	$150,475	$596,964
2053	$359,393	$154,689	$613,679
2054	$369,456	$159,020	$630,862
TOTAL	**$11,841,226**	**$5,096,664**	**$20,219,428**
AVG ANNUAL	**$394,708**	**$169,889**	**$673,981**

[3]The assumed tax rates are 3.77163% for Northwestern Unit School District #2, 4.87012% for Waverly Unit School District #6, and 5.6352% for North Mac Unit School District #34.

Having considered all these benefits, it is still important to determine the net impact of the wind energy project after taking into account the reduction in school funding from the State of Illinois. Determining the reduction in state aid is complicated by the fact that there is a new law for distributing state funds to education.

On August 31, 2017, Governor Rauner signed into law PA 100-0465 that fundamentally changes the way that the state distributes state aid to school districts. The funding consists of two parts – a Base Funding Minimum and a Tier Funding. The Base Funding Minimum in FY18 is based on what the district received in FY 17 under the old funding formula. Some call this the "Hold Harmless" provision and ensures that there are no "losing" districts in the transition to the new funding formula. The Tier Funding is additional money and goes in higher portion to the districts that demonstrate a higher need under the new formula. Because of the "Hold Harmless" provision, no school district will see a reduction in their GSA from what they received in the year before the wind farm was installed. However, the higher EAV caused by the wind farm will reduce its eligibility for new money allocated in the state budget.

There are several sources of uncertainty with the new school funding formula concerning this new money. First, the total amount of new funding to be distributed over the next ten years is unknown at this point. It will be determined year-by-year in the state budget passed by the legislature and signed by the governor. For FY21, no new money was allocated for the school funding formula though the FY22 does have new money in the budget. Second, data for the formula funding changes each year based on the school's student population and its "need" and it is difficult to forecast its school's student population over time. Third, each school district is competing with all other school districts for this new funding and so the EAV and student population for all other school districts in the state will impact what a single school district receives. Fourth, the school district's EAV could also change due to other property changes in the district.

In order to determine the net impact of the Project on a school district's eligibility for new state aid money, we can make the following assumptions: (1) that the State of Illinois continues to provide $350 million in NEW state aid to education ANNUALLY. For reference, the new law passed in 2017 provided $350 million and the FY19 state budget has $350 million. The state budget has failed to include this increase in FY20 and FY21; (2) that the school districts will forfeit ALL of the new Tier funding for schools. It seems more likely that the school districts will switch tiers rather than lose all funding; (3) that the school districts would be entitled to the same tiered funding annually for the 10 years covered by the new school funding law without the wind farm; (4) that other school districts in the State of Illinois have a constant EAV and Evidence Based Funding needs.

For FY23, Northwestern Unit School District #2 had 69.5% adequacy and was assigned Tier 1 status and will receive $85,045 in "new money," North Mac Unit School District #34 had 76.3% adequacy and was assigned Tier 2 status and will receive $88,718 in "new money," and Waverly Unit School District #6 had 81.1% adequacy and was assigned Tier 2 status and will receive $11,763 in "new money," As outlined in Table 8, there is no year in which the school districts receive less than these "new money" amounts. If new money is allocated in the future, it is unlikely that these districts will lose all of the "new money" and their EBF funding cannot go down from the previous year. Thus, the school districts will receive a net positive flow of funds because of the wind project if "new money" remains the same.

VII. Glossary

Bb

Battery Energy Storage Systems (BESS)

An array of hundreds or thousands of small batteries that enable energy from renewables, like solar and wind, to be stored and released at a later time.

Cc

Consumer Price Index (CPI)

An index of the changes in the cost of goods and services to a typical consumer, based on the costs of the same goods and services at a base period.

Dd

Direct impacts

During the construction period: the changes that occur in the onsite construction industries in which the direct final demand change is made.

During operating years: the final demand changes that occur in the onsite spending for the solar operations and maintenance workers.

Ee

Equalized Assessed Value (EAV)

The product of the assessed value of property and the state equalization factor. This is typically used as the basis for the value of property in a property tax calculation.

Ff

Farming profit

The difference between total revenue (price multiplied by yield) and total cost regarding farmland.

Full-time equivalent (FTE)

A unit that indicates the workload of an employed person. One FTE is equivalent to one worker working 2,080 hours in a year. One half FTE is equivalent to a half-time worker or someone working 1,040 hours in a year.

Hh

HV line extension

High-voltage electric power transmission links used to connect generators to the electric transmission grid.

Ii

IMPLAN (IMpact analysis for PLANning)

A business who is the leading provider of economic impact data and analytic applications. IMPLAN data is collected at the federal, state, and local levels and used to create state-specific and county-specific industry multipliers.

Indirect impacts

Impacts that occur in industries that make up the supply chain for that industry.

During the construction period: the changes in inter- industry purchases resulting from the direct final demand changes, including construction spending on materials and wind farm equipment and other purchases of good and offsite services.

During operating years: the changes in inter-industry purchases resulting from the direct final demand changes.

Induced impacts

The changes that occur in household spending as household income increases or decreases as a result of the direct and indirect effects of final demand changes.

Inflation

A persistent rise in the general level of prices related to an increase in the volume of money and resulting in the loss of value of currency. Inflation is typically measured by the CPI.

Mm

Median Household Income (MHI)

The income amount that divides a population into two equal groups, half having an income above that amount, and half having an income below that amount.

Millage rate

The tax rate, as for property, assessed in mills per dollar.

Multiplier

A factor of proportionality that measures how much a variable changes in response to a change in another variable.

MW

A unit of power, equal to one million watts or one thousand kilowatts.

MWac (megawatt alternating current)

The power capacity of a utility-scale solar PV system after its direct current output has been fed through an inverter to create an alternating current (AC). A solar system's rated MWac will always be lower than its rated MWdc due to inverter losses. AC is the form in which electric energy is delivered to businesses and residences and that consumers typically use when plugging electric appliances into a wall socket.

MWdc (megawatt direct current)

The power capacity of a utility-scale solar PV system before its direct current output has been fed through an inverter to create an alternating current. A solar system's rated MWdc will always be higher than its rated MWac.

Nn

Net economic impact

Total change in economic activity in a specific region, caused by a specific economic event.

Net Present Value (NPV)

Cash flow determined by calculating the costs and benefits for each period of investment.

NREL's Jobs and Economic Development Impacts (JEDI) Model

An input-output model that measures the spending patterns and location-specific economic structures that reflect expenditures supporting varying levels of employment, income, and output.

Oo

Output

Economic output measures the value of goods and services produced in a given area. Gross Domestic Product is the economic output of the United States as a whole.

Rr

Real Gross Domestic Product (GDP)

A measure of the value of goods and services produced in an area and adjusted for inflation over time.

Real-options analysis

A model used to look at the critical factors affecting the decision to lease agricultural land to a company installing a solar powered electric generating facility.

Ss

Stochastic

To have some randomness.

Tt

Tax rate

The percentage (or millage) of the value of a property to be paid as a tax.

Total economic output

The quantity of goods or services produced in a given time period by a firm, industry, county, or country.

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IX. Curriculum Vitae (Abbreviated)

David G. Loomis
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Education

Doctor of Philosophy, Economics, Temple University, Philadelphia, Pennsylvania, May 1995.

Bachelor of Arts, Mathematics and Honors Economics, Temple University, Magna Cum Laude, May 1985.

Experience

1996-present Illinois State University, Normal, IL
Full Professor – Department of Economics (2010-present)
Associate Professor - Department of Economics (2002-2009)
Assistant Professor - Department of Economics (1996-2002)

- Taught Regulatory Economics, Telecommunications Economics and Public Policy, Industrial Organization and Pricing, Individual and Social Choice, Economics of Energy and Public Policy and a Graduate Seminar Course in Electricity, Natural Gas and Telecommunications Issues.
- Supervised as many as 5 graduate students in research projects each semester.
- Served on numerous departmental committees.

1997-present Institute for Regulatory Policy Studies, Normal, IL
Executive Director (2005-present)
Co-Director (1997-2005)

- Grew contributing membership from 5 companies to 16 organizations.
- Doubled the number of workshop/training events annually.
- Supervised 2 Directors, Administrative Staff and internship program.
- Developed and implemented state-level workshops concerning regulatory issues related to the electric, natural gas, and telecommunications industries.

2006-2018 Illinois Wind Working Group, Normal, IL
Director

- Founded the organization and grew the organizing committee to over 200 key wind stakeholders
- Organized annual wind energy conference with over 400 attendees
- Organized strategic conferences to address critical wind energy issues
- Initiated monthly conference calls to stakeholders
- Devised organizational structure and bylaws

2007-2018 Center for Renewable Energy, Normal, IL
Director

- Created founding document approved by the Illinois State University Board of Trustees and Illinois Board of Higher Education.
- Secured over $150,000 in funding from private companies.
- Hired and supervised 4 professional staff members and supervised 3 faculty members as Associate Directors.
- Reviewed renewable energy manufacturing grant applications for Illinois Department of Commerce and Economic Opportunity for a $30 million program.
- Created technical "Due Diligence" documents for the Illinois Finance Authority loan program for wind farm projects in Illinois.

2011-present Strategic Economic Research, LLC
President

- Performed economic impact analyses on policy initiatives and energy projects such as wind energy, solar energy, natural gas plants and transmission lines at the county and state level.
- Provided expert testimony before state legislative bodies, state public utility commissions, and county boards.
- Wrote telecommunications policy impact report comparing Illinois to other Midwestern states.
- Published 38 articles in leading journals such as AIMS Energy, Renewable Energy, National Renewable Energy Laboratory Technical Report, Electricity Journal, Energy Economics, Energy Policy, and many others
- Testified over 57 times in formal proceedings regarding wind, solar and transmission projects
- Raised over $7.7 million in grants
- Raised over $2.7 million in external funding

Bryan A. Loomis
Strategic Economic Research, LLC
Vice President

Education

Master of Business Administration (M.B.A.), Marketing and Healthcare, Belmont University, Nashville, Tennessee, 2017.

Experience

2019-present Strategic Economic Research, LLC, Bloomington, IL
Vice President
(2021-present)
Property Tax Analysis and Land Use Director
(2019-2021)

- Directed the property tax analysis by training other associates on the methodology and overseeing the process for over twenty states
- Improved the property tax analysis methodology by researching various state taxing laws and implementing depreciation, taxing jurisdiction millage rates, and other factors into the tax analysis tool
- Executed land use analyses by running Monte Carlo simulations of expected future profits from farming and comparing that to the solar lease
- Performed economic impact modeling using JEDI and IMPLAN tools
- Improved workflow processes by capturing all tasks associated with economic modeling and report-writing, and created automated templates in Asana workplace management software

2019-2021 Viral Healthcare Founders LLC, Nashville, TN
CEO and Founder

- Founded and directed marketing agency for healthcare startups
- Managed three employees
- Mentored and worked with over 30 startups to help them grow their businesses
- Grew an email list to more than 2,000 and LinkedIn following to 3,500
- Created a Slack community and grew to 450 members
- Created weekly video content for distribution on Slack, LinkedIn and Email

Christopher Thankan
Strategic Economic Research, LLC
Economic Analyst

Education

Bachelor of Science in Sustainable & Renewable Energy (B.A.), Minor in Economics, Illinois State University, Normal, IL, 2021

Experience

2021-present Strategic Economic Research, LLC, Bloomington, IL
Economic Analyst

- Create economic impact results on numerous renewable energy projects Feb 2021-Present
- Utilize IMPLAN multipliers along with NREL's JEDI model for analyses
- Review project cost Excel sheets
- Conduct property tax analysis for different US states
- Research taxation in states outside research portfolio
- Complete ad hoc research requests given by the president
- Hosted a webinar on how to run successful permitting hearings
- Research school funding and the impact of renewable energy on state aid to school districts
- Quality check coworkers JEDI models
- Started more accurate methodology for determining property taxes that became the main process used

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