Appendix C – Economic Impact Analysis

Strategic Economic Research, LLC

ECONOMIC IMPACT ANALYSIS FOR THE SOUTH DEUEL WIND PROJECT

May 2024

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Dr. Loomis has published 40 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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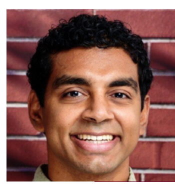
Bryan Loomis has been conducting economic impact, property tax, and land use analyses at Strategic Economic Research since 2019. He has performed or overseen over 100 wind and solar analyses, and has also provided expert testimony for permitting hearings and open houses in many states, including Colorado, Kansas, Indiana, Illinois, and Iowa. He improved the property tax analysis methodology at SER by researching various state taxing laws and implementing depreciation, taxing jurisdiction millage rates and other factors into the tax analysis tool. Before working with SER, Bryan ran a consulting agency, working with over 30 technology startups on growth and marketing. Bryan received his MBA from Belmont University in 2016.



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Christopher Thankan assists with the production of the economic impact studies including sourcing, analyzing, and graphing government data. He also performs economic and property tax analysis for wind, solar, and transmission projects. Chris has a Bachelor of Science degree in Sustainable & Renewable Energy and minored in Economics.

Strategic Economic Research, LLC (SER) provides economic consulting for renewable energy projects across the U.S. We have produced over 300 economic impact reports in 32 states. Research Associates who performed work on this project include Paige Afram, Amanda Battaglia, Zoë Calio, Patrick Chen, Drew Kagel, Kathryn Keithley, Clara Lewis, Ethan Loomis, Hannah Loomis, Nita Loomis, Mandi Mitchell, Russell Piontek, Laura Roberts, Tim Roberts, Morgan Stong, Rachel Swanson, Ashley Thompson, and Cedric Volkmer.

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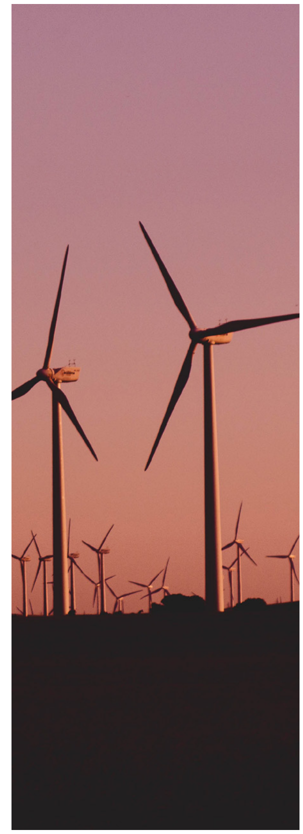

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I. Executive Summary

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

The South Deuel Wind Project will have a nameplate capacity of up to 260 MW, with the ability to deliver 250 MW to the point of interconnection. To err on the side of caution, a total nameplate capacity of 250 MW was assumed for the purposes of the economic impacts for this report, resulting in impact calculations that may underestimate the true impacts. The Project represents an investment of over $621 million in Deuel County. The total development is anticipated to result in the following:

Jobs

- 559 new jobs during construction for Deuel County
- 1,617 new jobs during construction for the State of South Dakota
- 15.9 new long-term jobs for Deuel County
- 27.5 new long-term jobs for the State of South Dakota

Earnings

- Over $33.0 million in new earnings during construction for Deuel County
- Over $113 million in new earnings during construction for the State of South Dakota
- Over $1.0 million in new long-term earnings for Deuel County annually
- Over $1.9 million in new long-term earnings for the State of South Dakota annually

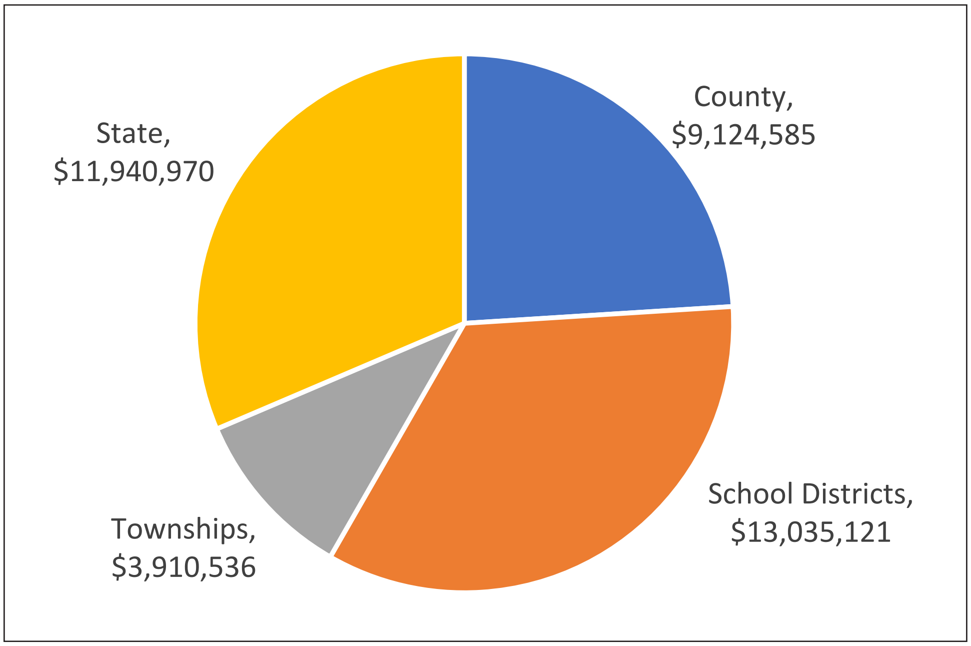
Output - the value of production in the state or local economy. It is an equivalent measure to the Gross Domestic Product.

- Over $91.6 million in new output during construction for Deuel County
- Over $298 million in new output during construction for the State of South Dakota
- Over $3.4 million in new long-term output for Deuel County annually
- Over $6.5 million in new long-term output for the State of South Dakota annually

Property Taxes

- Over $13.0 million in total school district revenue over the life of the Project
- Over $9.1 million in total county property taxes for Deuel County over the life of the Project
- Over $11.9 million in total state property taxes for the State of South Dakota over the life of the Project
- Over $38.0 million in property taxes in total for all taxing districts over the life of the Project

Figure 1 – Total Property Taxes Paid by the South Deuel Wind Project



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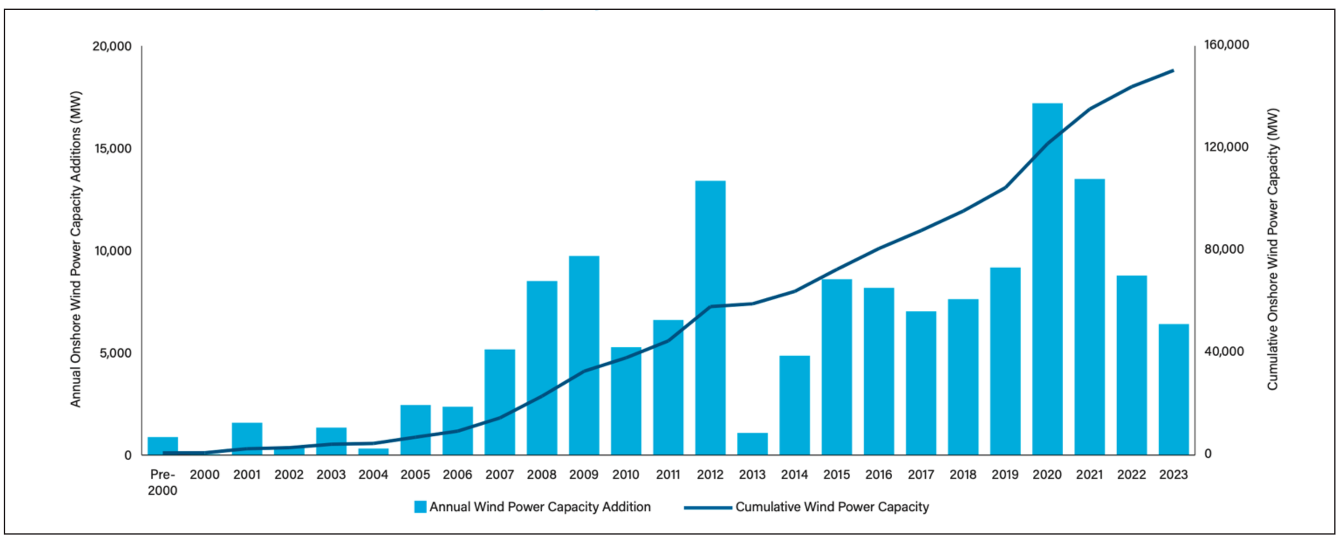
II. Wind Industry Growth and Economic Development

a. United States Wind Industry Growth

The United States wind industry grew at a rapid pace from 2006-2020, 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), 2021). The total wind capacity installed in 2021 was 13,400 MW (ACP, 2022). In 2022, there was a total capacity of 8,511 MW installed which is about equal to the 2015-2019 annual installation amounts (ACP, 2023).

The total amount of wind capacity in the U.S. by the end of 2023 was 150,455 MW (ACP, 2023). China is the global leader with 403,325 MW of installed capacity, with Germany in third place with 61,139 MW of installed capacity (2023 figures with the United States in second place) (GWEC, 2024). 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 2023.

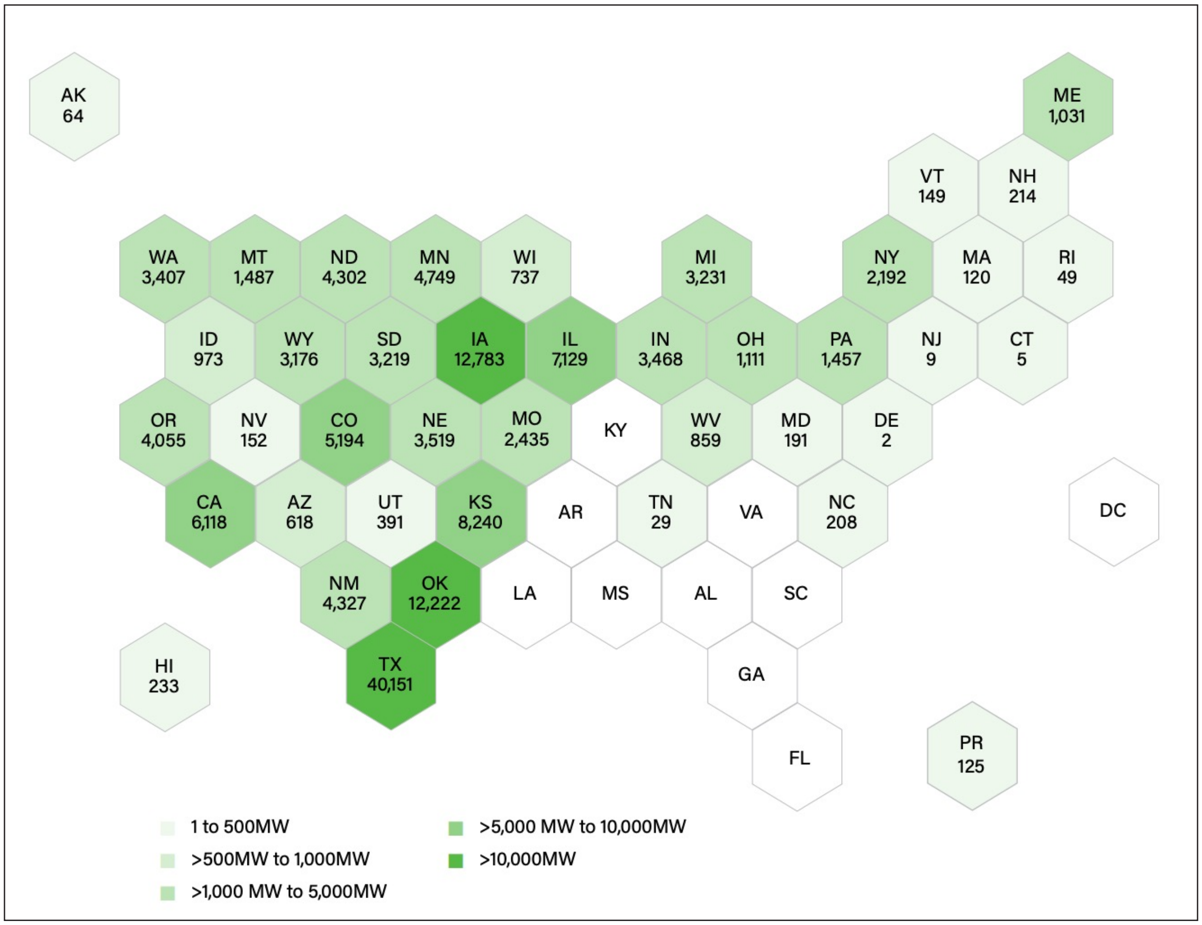
Figure 2 – United States Annual and Cumulative Wind Power Capacity Growth



Source: ACP, Clean Power Market Report 2023

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.

Figure 3 – Total Wind Capacity by State



Source: ACP, Clean Power Annual Market Report 2022

b. South Dakota Wind Industry Growth

Table 1 - South Dakota Wind Projects

Wind Farm	Capacity (MW)	Year Online
Aurora County Wind	20.7	2018
Beethoven Wind, LLC	79.6	2015
Brule County Wind	20.7	2018
Buffalo Ridge Wind Power	260.4	2009
Campbell County	95.0	2015
Carthage Wind Turbine	0.1	2002
Cedar Creek (ID)	152.0	2024
Chamberlain Wind Project	2.6	2001
City of Howard Wind Turbines	0.2	2001
Coyote Ridge	96.7	2019
Crocker	209.4	2019
Crow Lake Wind	162.0	2010
Crowned Ridge Wind Project	400.7	2019
Dakota Range	457.6	2022
Day County Wind	105.6	2010
Deuel Harvest	301.1	2021
MinnDakota Wind Farm	150.0	2007
North Bend Wind	200.2	2023
Oak Tree	19.5	2014
Prevailing Wind	216.6	2020
South Dakota Wind	40.5	2003
Sweetland	198.8	2023
Tatanka Ridge	155.0	2021
Tatanka Wind	180.0	2008
Titan I	25.0	2009
Triple H	250.2	2020
Wessington Springs	51.0	2009
Willow Creek Wind Energy	106.4	2020

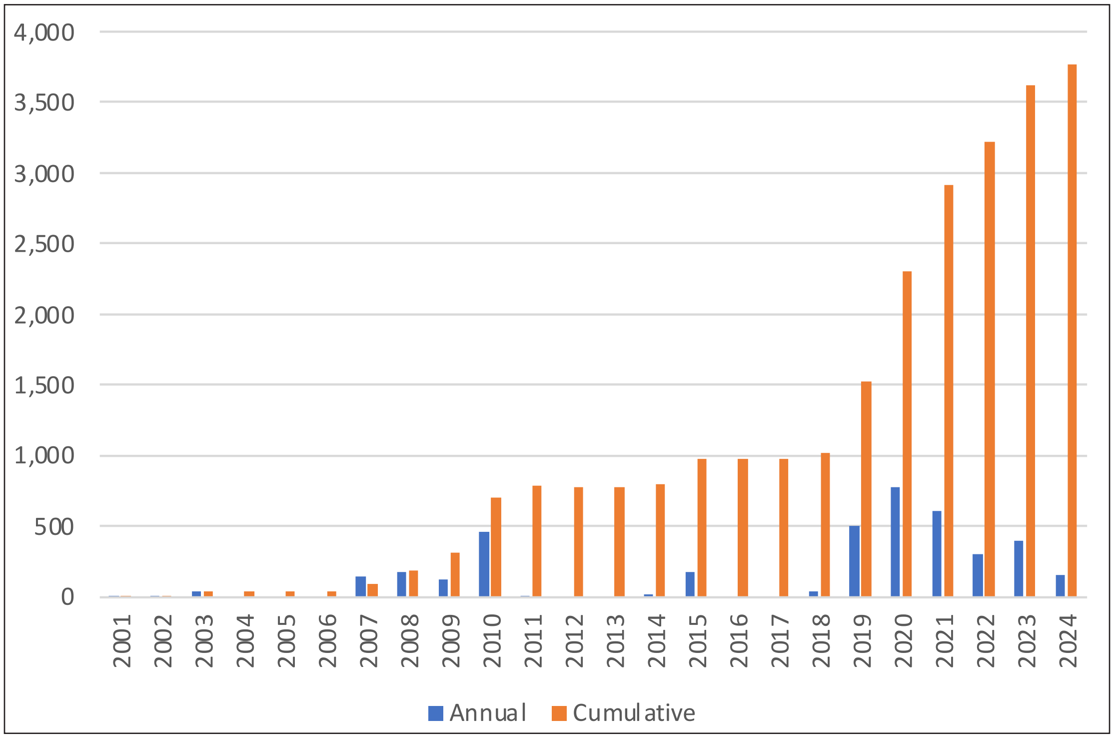
As of March 2024, South Dakota is ranked 20th in the United States in existing wind, solar, and energy storage capacity with over 3,828 MW (ACP, 2024).

Table 1 has a list of the operational wind farms in South Dakota through Q1 2024. The year-by-year and cumulative growth in South Dakota's wind energy capacity is shown in Figure 4. In 2019, South Dakota had three projects completed with an annual total installed capacity of 506.2 MW. Four projects were completed in 2020 with the largest total annual installed capacity of 773.8 MW. Another three projects were completed in 2021 with an annual total installed capacity of 609.7 MW.

The Energy Information Administration (EIA) calculated the number of megawatt-hours generated from different energy sources in 2023. As shown in Figure 5, the greatest percentage of electricity generated in South Dakota came from wind with 55.4%, followed by hydroelectric conventional with 21.0%, and natural gas with 13.9%.

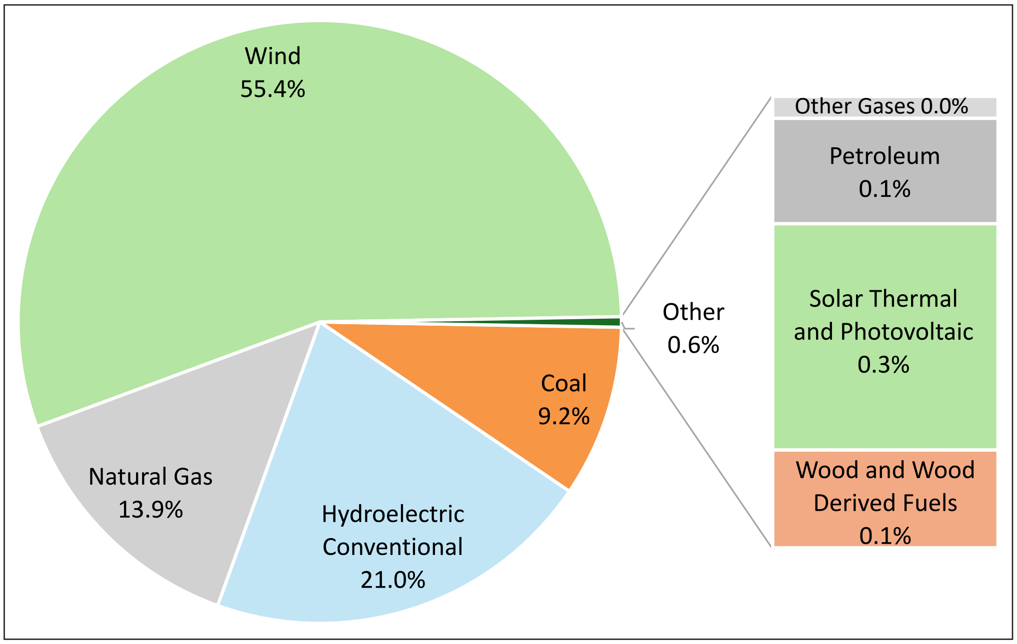
The U.S. Department of Energy sponsors the U.S. Energy and Employment Report each year. Electric Power Generation covers all utility and non-utility employment across electric generating technologies, including fossil fuels, nuclear, and renewable technologies. It also includes employees engaged in facility 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 South Dakota in the wind energy industry (1,852) is much larger than solar energy generation (678) and natural gas generation (195).

Figure 4 – Installed Capacity of South Dakota Wind Projects



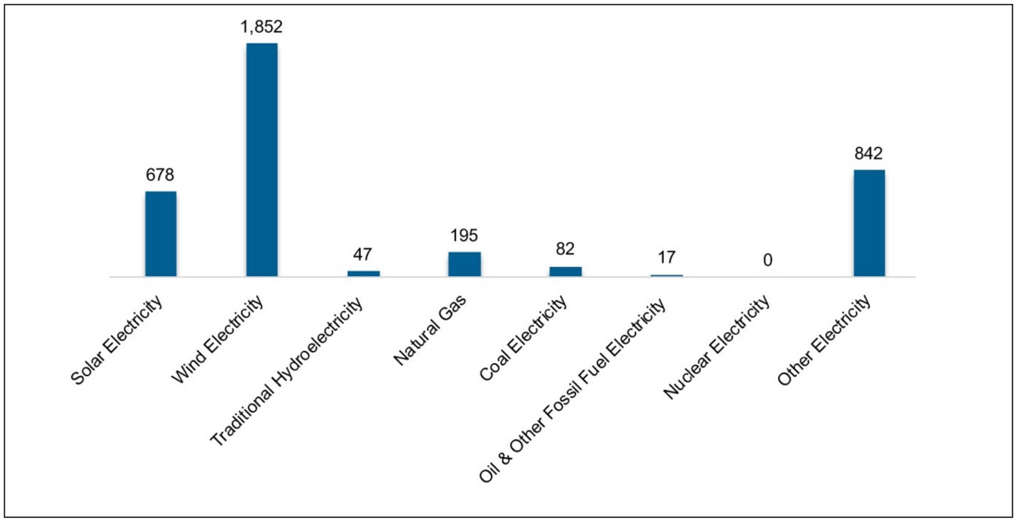
Source: American Clean Power, May 2024, South Dakota

Figure 5 – Electric Generation by Fuel Type for South Dakota in 2023



Source: U.S. Energy Information Association (EIA): South Dakota, 2023

Figure 6 - Electric Generation Employment by Technology



Source: U.S. Energy and Employment Report 2023: South Dakota

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 North Carolina (NREL, 2009), State of Pennsylvania (NREL, 2008g), State of South Dakota (NREL, 2008h), State of Utah (NREL 2008i), State of West Virginia (NREL, 2008j), and the State of Wisconsin (NREL, 2008k).

The Center for Renewable Energy at Illinois State University released a report examining the economic impact of Illinois' wind farms and the economic impact of the related wind turbine supply chain in Illinois. According to the Economic Impact: Wind Energy Development in Illinois (June 2016), "the 25 largest wind farms in Illinois:

- Created approximately 20,173 full-time equivalent jobs during construction periods
- Support approximately 869 permanent jobs in rural Illinois areas
- Support local economies by generating $30.4 million in annual property taxes
- Generate $13.8 million annually in extra income for Illinois landowners who lease their land to the wind farm developer
- Will generate a total economic benefit of $6.4 billion over the life of the projects."

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 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

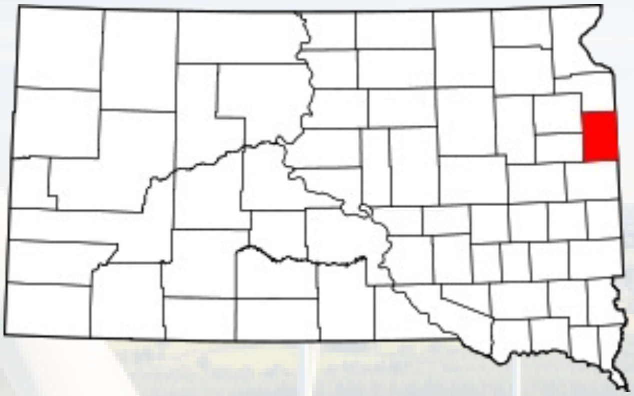
a. South Deuel Wind Project

Invenergy is developing the South Deuel Wind Project in Deuel County, South Dakota. The South Deuel Wind Project will have a nameplate capacity of up to 260 MW, with the ability to deliver 250 MW to the point of interconnection. To err on the side of caution, a total nameplate capacity of 250 MW was assumed for the purposes of this report, resulting in impact calculations that may underestimate the true impacts. The Project represents an investment of over $621 million.

b. Deuel County, South Dakota

Deuel County is located in the eastern part of South Dakota (see Figure 7). It has a total area of 637 square miles, and the U.S. Census estimates that the 2022 population was 4,352 with 2,146 housing units. The county has a population density of 6.7 (persons per square mile) compared to 11.7 for the State of South Dakota (2020). Median household income in the county was $70,808 (U.S. Census Bureau, 2021).

Figure 7 – Location of Deuel County, South Dakota



i. Economic and Demographic Statistics

As shown in Table 2, the largest industries in the county are “Agriculture, Forestry, Fishing and Hunting,” followed by “Manufacturing,” “Construction,” and “Administrative Government.” These data for Table 2 come from IMPLAN covering the year 2021 (the latest year available).

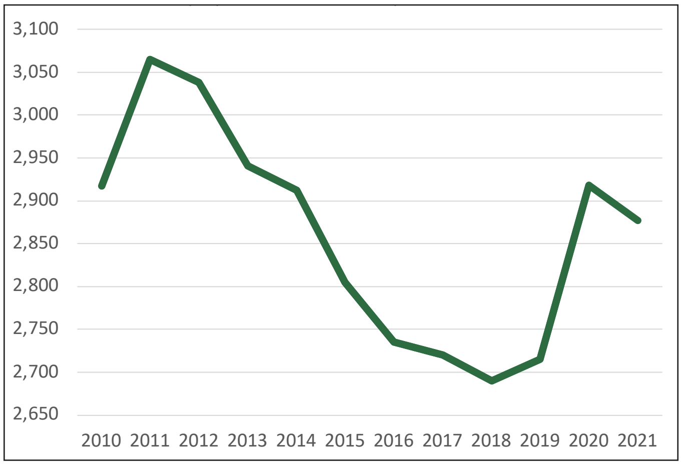
Table 2 provides the most recent snapshot of total employment but does not examine the historical trends within the county. Figure 8 shows employment from 2010 to 2021. Total employment in Deuel County was at its highest at 3,065 in 2011 and its lowest at 2,690 in 2018 (BEA, 2023).

Table 2 - Employment by Industry in Deuel County

Industry	Number	Percent
Agriculture, Forestry, Fishing and Hunting	745	27.2%
Manufacturing	252	9.2%
Construction	228	8.3%
Administrative Government	226	8.2%
Health Care and Social Assistance	207	7.6%
Retail Trade	177	6.5%
Other Services (except Public Administration)	143	5.2%
Transportation and Warehousing	131	4.8%
Professional, Scientific, and Technical Services	106	3.9%
Accommodation and Food Services	105	3.8%
Finance and Insurance	75	2.7%
Wholesale Trade	72	2.6%
Real Estate and Rental and Leasing	48	1.7%
Utilities	39	1.4%
Administrative and Support and Waste Management and Remediation Services	36	1.3%
Information	35	1.3%
Government Enterprises	31	1.1%
Arts, Entertainment, and Recreation	31	1.1%
Educational Services	25	0.9%
Management of Companies and Enterprises	21	0.8%
Mining, Quarrying, and Oil and Gas Extraction	6	0.2%

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

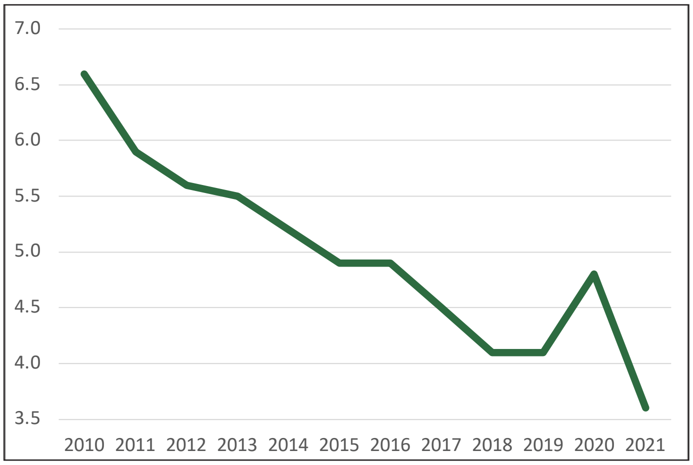
Figure 8 – Total Employment in Deuel County from 2010 to 2021



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

The unemployment rate signifies the percentage of the labor force without employment in the county. Figure 9 shows the unemployment rates from 2010 to 2021. Unemployment in Deuel County was at its highest at 6.6% in 2010 and at its lowest at 3.6% in 2021 (FRED, 2023).

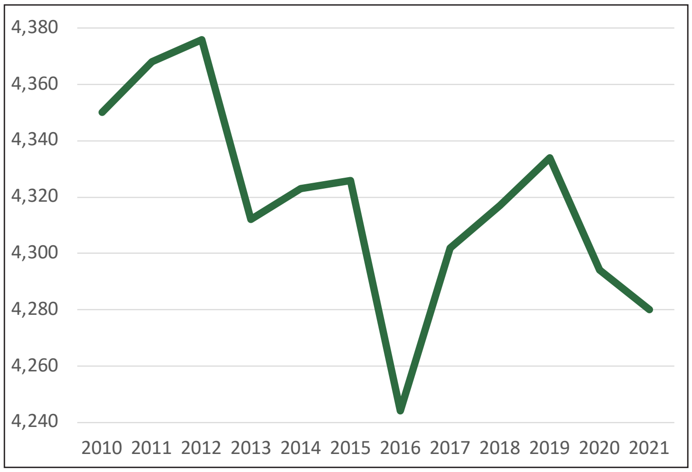
Figure 9 - Unemployment Rate in Deuel County from 2010 to 2021



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

The overall population in the county has fluctuated significantly, as shown in Figure 10. Deuel County's population hit a high of 4,376 in 2012 and low of 4,244 in 2016, a decrease of 132 people in 5 years (FRED, 2023). The population increased to 4,334 in 2019 but has decreased since.

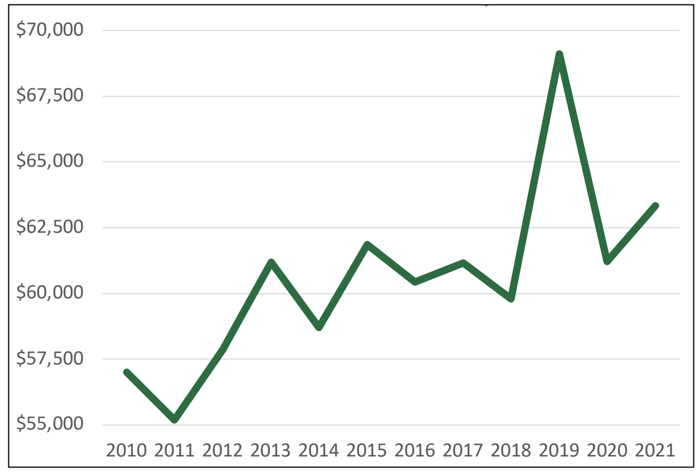
Figure 10 - Population in Deuel County from 2010 to 2021



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

The household income has fluctuated in the county since hitting a low in 2011. Figure 11 shows the real median household income in Deuel 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 $55,172 in 2011 and its highest at $69,114 in 2019 (FRED, 2023).

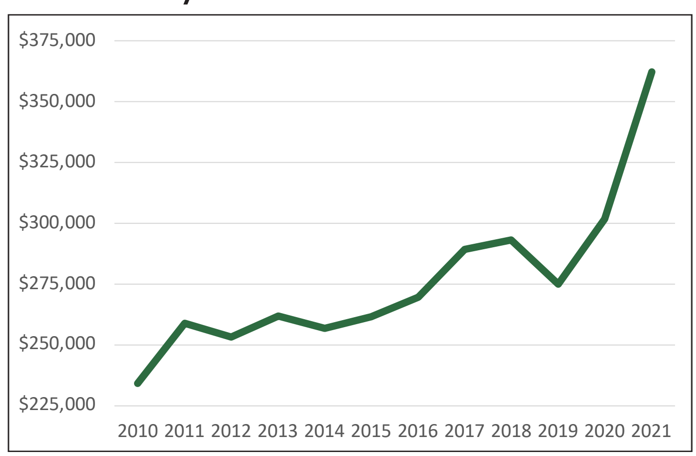
Figure 11 - Real Median Household Income in Deuel County from 2010 to 2021



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 Deuel County has increased since hitting a low in 2010, as shown in Figure 12 (BEA, 2023).

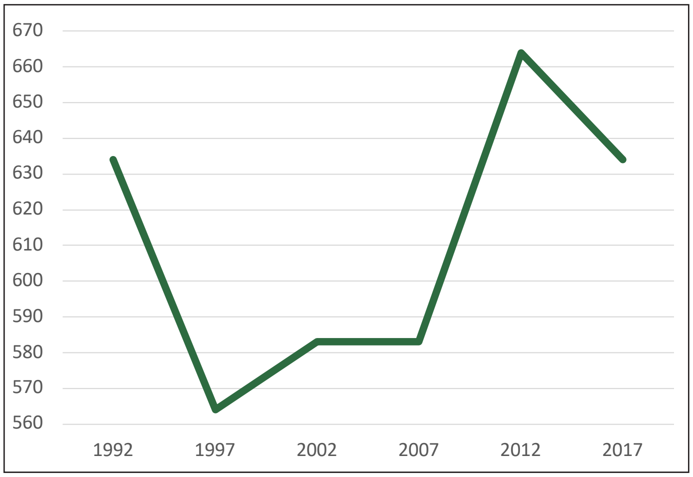
Figure 12 - Real Gross Domestic Product (GDP) in Deuel County from 2010 to 2021



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

The farming industry has fluctuated significantly in Deuel County. As shown in Figure 13, the number of farms hit a low of 564 in 1997 and a high of 664 in 2012.

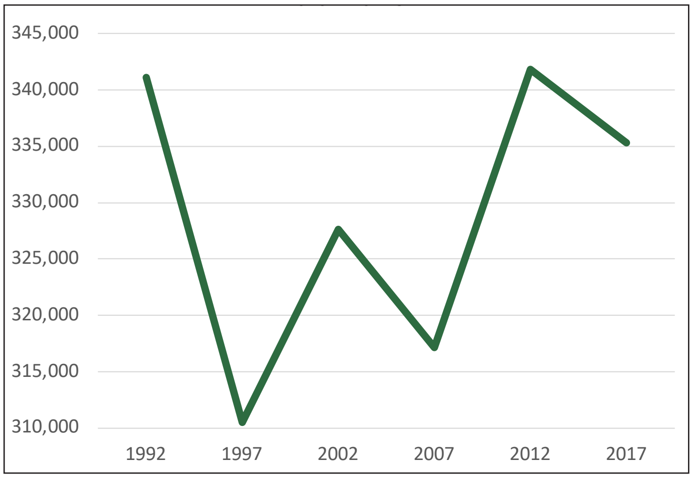
Figure 13 - Number of Farms in Deuel County from 1992 to 2017



Source: USDA National Agricultural Statistics Service, Census of Agriculture, 1992-2017

The amount of land in farms has also fluctuated. The county farmland hit a low of 310,529 acres in 1997 and a high of 341,853 acres in 2012, according to Figure 14.

Figure 14 - Land in Farms in Deuel County from 1992 to 2017



Source: USDA National Agricultural Statistics Service, 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, 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, 2023). 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, 2023). 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.

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. Included in this is local spending by employees working directly or indirectly on the wind farm project who receive their paychecks and then spend money in the community. 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, 2023).

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, 2023).

This methodology has been validated by a paper in 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 Invenergy. In addition, Invenergy helped estimate the percentages of project materials and labor that will be coming from within Deuel County and the State of South Dakota.

Two separate JEDI models were run to show the economic impact of the Project. The first JEDI model used the 2021 Deuel County multipliers from IMPLAN. The second JEDI model used the 2021 State of South Dakota 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 Deuel County obviously comes from the State of South Dakota as well. Similarly, the State of South Dakota multipliers will generally be larger than Deuel County multipliers, but some individual sectors of the economy could be stronger.

The output from these models is shown in Tables 3 to 5. Table 3 lists the total employment impact from the Project for Deuel County and the State of South Dakota. 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 25-40 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.

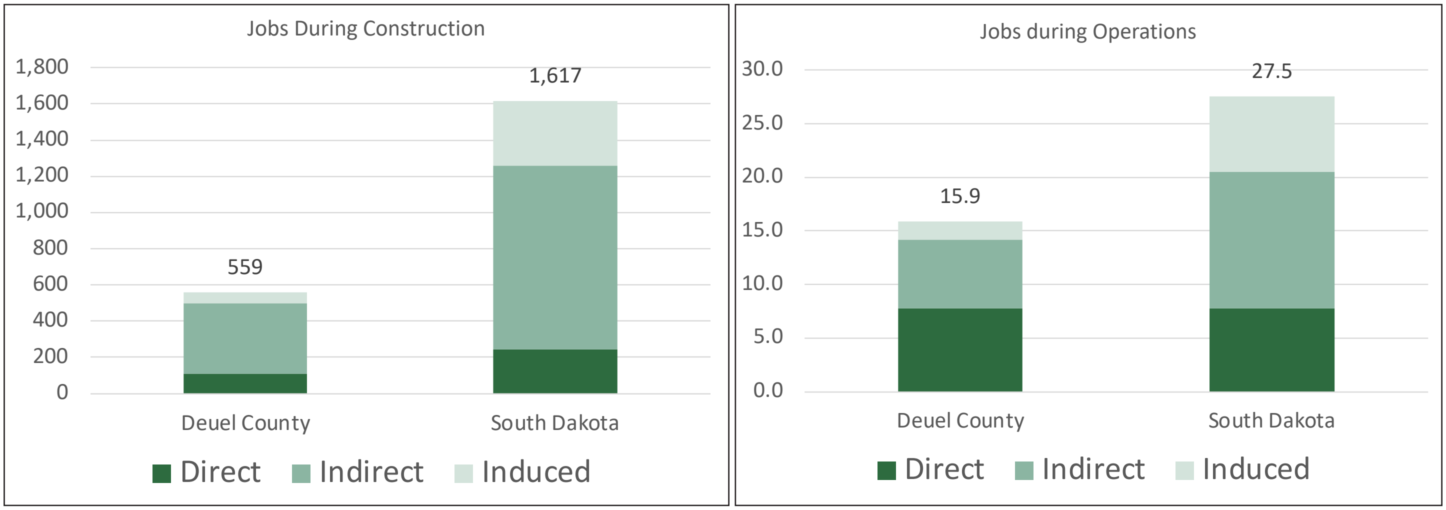
Table 3 – Total Employment Impact from the South Deuel Wind Project

	Deuel County Jobs	State of South Dakota Jobs
Construction		
Project Development and Onsite Labor Impacts	109	243
Turbine and Supply Chain Impacts	388	1,016
Induced Impacts	62	358
New Local Jobs during Construction	559	1,617
Operations		
Onsite Labor Impacts	7.7	7.7
Local Revenue and Supply Chain Impacts	6.5	12.7
Induced Impacts	1.7	7.1
New Local Long-Term Jobs	15.9	27.5

The results from the JEDI model show significant employment impacts from the South Deuel 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 109 new onsite jobs during construction in Deuel County, though the construction of the Project could actually involve hiring closer to 218 workers for 6 months.

As shown in Table 3, new local jobs created or retained during construction total 559 for Deuel County and 1,617 for the State of South Dakota. New local long-term jobs created from the Project total 15.9 for Deuel County and 27.5 for the State of South Dakota.

Figure 15 – Total Employment Impact from the South Deuel Wind Project



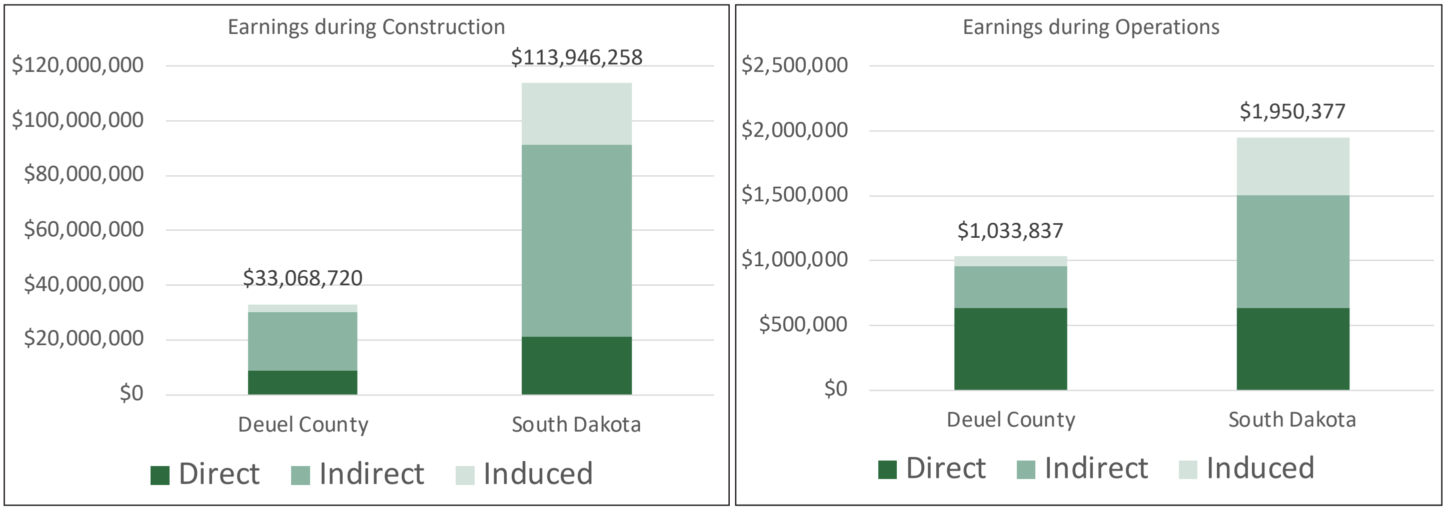
Direct jobs created during the operational phase last the life of the wind farm, typically 25-40 years. Direct construction jobs and operations and maintenance jobs both require highly-skilled workers in the fields of construction, management, and engineering. These well-paid professionals boost economic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

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 $33.0 million for Deuel County and over $113 million for the State of South Dakota. The new local long-term earnings total over $1.0 million for Deuel County and over $1.9 million for the State of South Dakota.

Table 4 – Total Earnings Impact from the South Deuel Wind Project

	Deuel County	State of South Dakota
Construction		
Project Development and Onsite Earnings Impacts	$8,725,006	$21,101,445
Turbine and Supply Chain Impacts	$21,451,387	$70,221,592
Induced Impacts	$2,892,327	$22,623,221
New Local Earnings during Construction	$33,068,720	$113,946,258
Operations (Annual)		
Onsite Labor Impacts	$634,886	$634,886
Local Revenue and Supply Chain Impacts	$320,756	$869,006
Induced Impacts	$78,195	$446,485
New Local Long-Term Earnings	$1,033,837	$1,950,377

Figure 16 – Total Earnings Impact from the South Deuel Wind Project



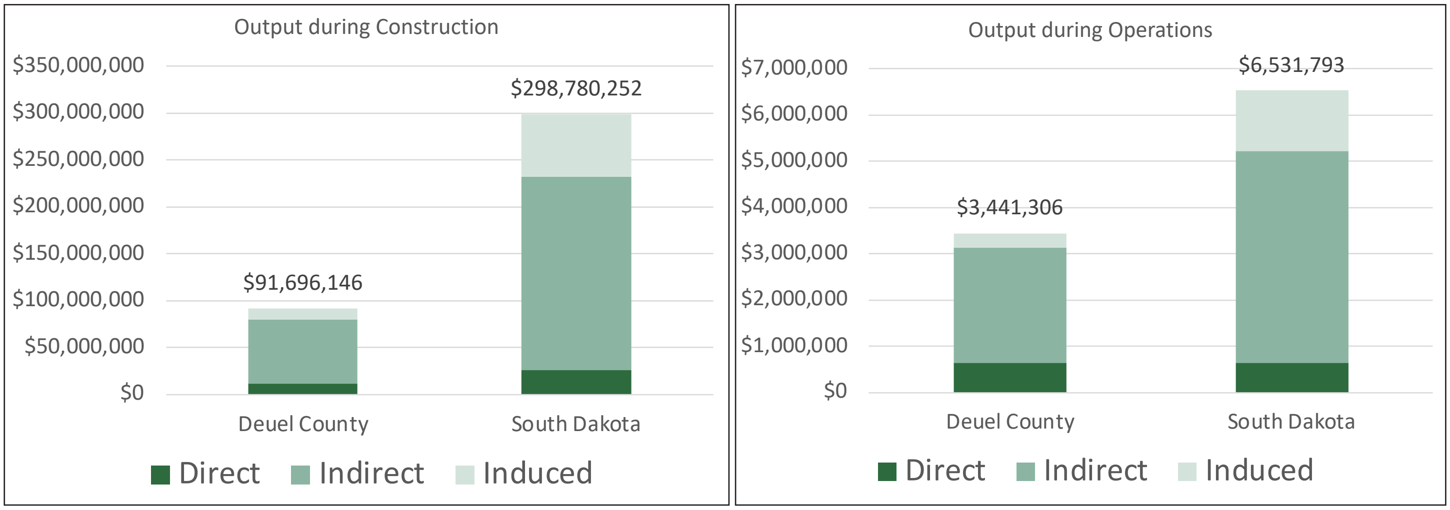
Output refers to economic activity or the value of production in the state or local economy. Economic output includes the earnings reported in Table 4 but also measures other factors such as landowner payments, property taxes, and other economic activity that is not earnings and benefits from employment. 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 $91.6 million for Deuel County and over $298 million for the State of South Dakota. The new local long-term output totals over $3.4 million for Deuel County and over $6.5 million for the State of South Dakota.

Table 5 – Total Output Impact from the South Deuel Wind Project

	Deuel County	State of South Dakota
Construction		
Project Development and Onsite Jobs Impacts on Output	$11,124,587	$25,527,594
Turbine and Supply Chain Impacts	$69,026,108	$206,521,828
Induced Impacts	$11,545,451	$66,730,830
New Local Output during Construction	$91,696,146	$298,780,252
Operations (Annual)		
Onsite Labor Impacts	$634,886	$634,886
Local Revenue and Supply Chain Impacts	$2,494,370	$4,580,219
Induced Impacts	$312,050	$1,316,688
New Local Long-Term Output	$3,441,306	$6,531,793

Figure 17 – Total Output Impact from the South Deuel Wind Project



VI. Property Taxes

Renewable energy 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, parks, health and safety. In South Dakota, renewable energy projects pay an alternative tax annually based on the nameplate capacity of the project, as well as the KWh generated by the project in that year.[1] That alternative tax revenue then gets distributed to the county, school districts, townships, and state.

Below are our property tax projections for the South Deuel Wind Project. Our analysis contains a number of assumptions, as follows:

- The analysis assumes that ordinary real and personal property taxes for the Project, including its collector system, will be fully abated in favor of alternative annual taxes.
- The analysis assumes that the alternative annual taxes include a nameplate capacity tax of $3,000/MW and a generation tax of $0.00045 per KWh.
- The analysis assumes a nameplate capacity of 256.5 MW.
- The analysis assumes that the Project is placed in service on January 1st, 2027 with a KWh generated of 1,105,645,366 annually.
- The analysis assumes that 80% of the generation tax goes to the state general fund. The remaining 20% of the generation tax and 100% of the nameplate capacity tax goes to the county treasurer.
- The analysis assumes that the county treasurer will distribute the funds in the following manner: 50% to the relevant school districts, 35% to the county, and 15% to the relevant organized townships.
- The analysis assumes that the Project is decommissioned in 30 years and pays no more property taxes after decommissioning.
- The comprehensiveness and accuracy of the analysis below is dependent upon the assumptions listed above and used to calculate the property tax results. The analysis is to serve as a projection of property tax benefits to the local community and is not a guarantee of property tax revenue.
- If the inputs received from Invenergy, the laws surrounding renewable energy taxation in South Dakota, or the millage rates in Deuel County change in a material way after the completion of this report, this analysis may no longer accurately reflect the property taxes to be paid by the South Deuel Wind Project.
- No comprehensive tax payment was calculated, and these calculations are only to be used to illustrate the economic impact of the Project.

[1] See the South Dakota Code statute 10-35-16 through 10-35-21, starting at https://sdlegislature.gov/Statutes/10-35-16

Figure 18 - Percentages of Property Taxes Paid to Taxing Jurisdictions

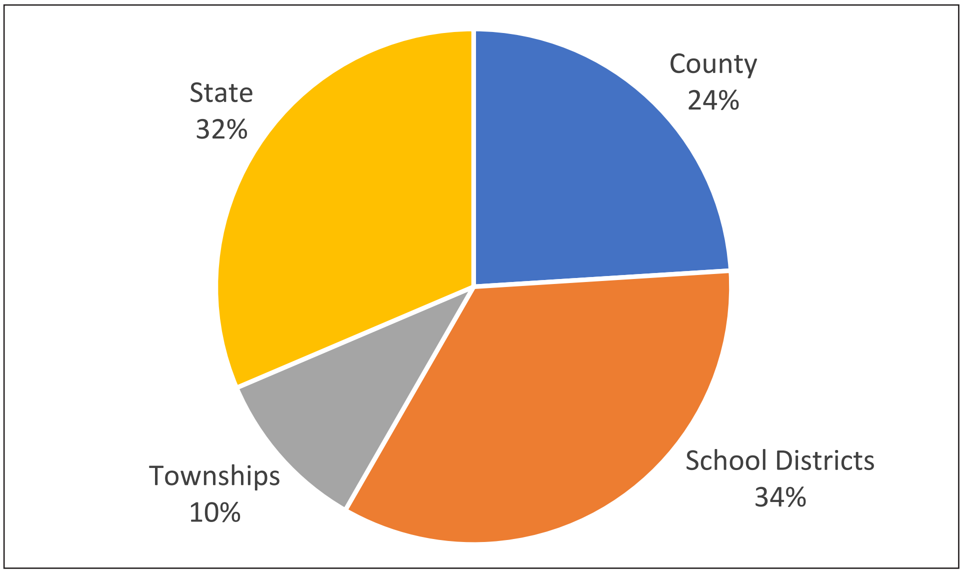


Table 6 – Total Property Taxes Paid by the South Deuel Wind Project

Year	Total Taxes Paid
2027	$1,267,040
…	$1,267,040
2056	$1,267,040
TOTAL	$38,011,212
AVG ANNUAL	$1,267,040

As shown in Table 6, a conservative estimate of the total property taxes paid by the Project will be over $1.2 annually. The expected total property taxes paid over the 30-year lifetime of the Project are over $38.0 million.

Table 7 shows an estimate of the likely taxes paid to the State General Fund, Deuel County General Fund, Brandt Township, Norden Township, and Scandinavia Township. This table assumes that 35% of the turbines are in Brandt Township, 39% in Norden Township, and 26% in Scandinavia Township.

According to Table 7, the total amounts paid are over $11.9 million for the State General Fund, over $9.1 million for the Deuel County General Fund, over $1.3 million for Brandt Township, over $1.5 million for Norden Township, and over $1.0 million for Scandinavia Township over the life of the Project.

Table 7 – Tax Revenue from the South Deuel Wind Project for the State, County, and Townships

Year	State General Fund	Deuel County General Fund	Brandt Township	Norden Township	Scandinavia Township
2027	$398,032	$304,153	$45,340	$51,007	$34,005
…	$398,032	$304,153	$45,340	$51,007	$34,005
2056	$398,032	$304,153	$45,340	$51,007	$34,005
TOTAL	$11,940,970	$9,124,585	$1,360,187	$1,530,210	$1,020,140
AVG ANNUAL	$398,032	$304,153	$45,340	$51,007	$34,005

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 calculated estimates below are representative of the total amount of tax benefits expected to be given to the school districts from the construction and operation of the Project. This amount will be apportioned according to state tax code by tax authorities, and schools will receive the overall net benefit in accordance with state law.

Table 8 shows the direct property tax revenue coming from the Project to Deuel School District 19-4 and Deubrook Area Schools 5-6. This tax revenue uses the assumptions outlined earlier to calculate the other tax revenue and assumes that 73% of the turbines are in Deuel School District 19-4 and 27% are in Deubrook Area Schools 5-6. Over the 30-year life of the Project, the school districts are expected to receive over $13.0 million in tax revenue.

Table 8 – Tax Revenue from the South Deuel Wind Project for the School Districts

Year	Deuel School District 19-4	Deubrook Area Schools 5-6
2027	$316,567	$117,937
…	$316,567	$117,937
2056	$316,567	$117,937
TOTAL	$9,497,017	$3,538,104
AVG ANNUAL	$316,567	$117,937

VII. Glossary

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.

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

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

1996-2023 Illinois State University, Normal, IL
Professor Emeritus – Department of Economics (2023 - present)
Full Professor – Department of Economics (2010-2023)
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

1997-2023 Institute for Regulatory Policy Studies, Normal, IL
Executive Director (2005-2023)
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

<u>**2006-2018**</u> 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

<u>**2007-2018**</u> 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

- Published 40 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 80 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.S.), 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

Strategic Economic Research, LLC

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