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****Public****

# Economic Impact Analysis of the Wolf Creek-Blackberry Transmission Project on the State of Missouri

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# About the Author

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Dr. David G. Loomis is Professor of Economics at Illinois State University and Co-Founder of the Center for Renewable Energy. He has over 20 years of experience in the renewable energy and transmission fields and has performed economic analyses at the county, region, state and national levels for utility-scale wind and solar generation and high voltage transmission lines. He has served as a consultant for 43 renewable energy development companies. He has testified on the economic impacts of energy projects before the Illinois Commerce Commission, Iowa Utilities Board, Missouri Public Service Commission, Illinois Senate Energy and Environment Committee, the Wisconsin Public Service Commission, Kentucky Public Service Commission, Ohio Public Siting Board, and numerous county boards. Dr. Loomis is a widely recognized expert and has been quoted in the Wall Street Journal, Forbes Magazine, Associated Press, and Chicago Tribune as well as appearing on CNN.

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.

## Bryan Loomis, MBA

Vice President of Strategic Economic Research, LLC

Bryan Loomis has three years of experience in economic impact, property tax, and land use analysis at Strategic Economic Research. He has performed over 50 wind and solar analyses in the last three years. He 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. Before working for SER, Bryan mentored and worked with over 30 startups to help them grow their businesses as CEO and Founder of his own marketing agency. Bryan received his MBA in Marketing 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, and performing economic and property tax analysis for wind, solar and transmission projects. Thankan has a Bachelor of Science degree in Sustainable & Renewable Energy, and minored in economics.

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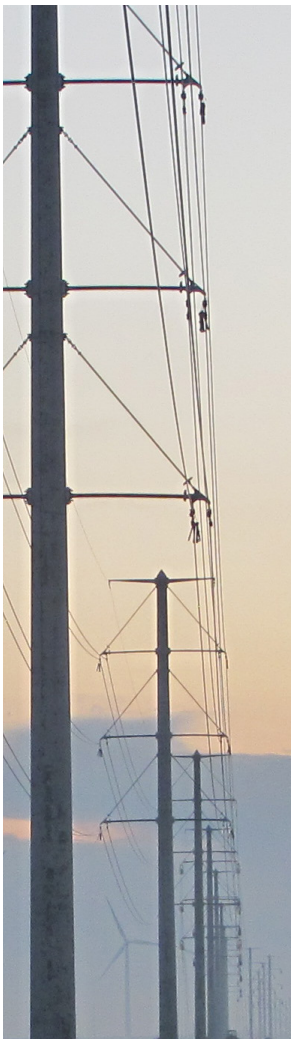

# About Strategic Economic Research, LLC

Strategic Economic Research, LLC (SER) provides economic consulting for renewable energy projects across the US. We have produced over 150 economic impact reports in 28 states. Authors include Dr. David G. Loomis, PhD, Bryan Loomis, MBA, and Chris Thankan. Research Associates who performed work on this project include Ethan Loomis, Madison Schneider, Zoe Calio, Patrick Chen, Kathryn Keithley, Morgan Stong, and David Whitworth.

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# I. Executive Summary of Findings

The Wolf Creek-Blackberry Transmission Project (the Project) is a high voltage (HV) 345-kilovolt transmission line that with associated substations will deliver electricity between Coffey County, KS and Jasper County, MO. Although the exact route has not been chosen, the line runs approximately 95 miles across Coffey, Anderson, Allen, Bourbon, and Crawford Counties in Kansas, and Barton and Jasper Counties in Missouri.

The purpose of this report is to aid decision makers in evaluating the economic impact of this Project on the State of Missouri. This analysis estimates the direct, indirect, and induced impacts on job creation, wages, and total economic output of the transmission line itself.

The Project represents an investment of over $85.1 million in total ($8.45 million estimated to be spent in Missouri) by NextEra Energy Transmission Southwest, LLC (NEET Southwest) and an additional approximately $7.5 million in substation upgrades in Missouri by others. The total development is anticipated to result in the following:

Jobs[1]

- Approximately 203.5 new jobs during construction for the State of Missouri
- Approximately 0.32 new long-term jobs for the State of Missouri

Worker Earnings[2]

- Over $11.1 million in new earnings during construction for the State of Missouri
- Over $17 thousand in long-term earnings for the State of Missouri

Economic Output[3]

- Over $29.4 million in new output during construction for the State of Missouri
- Over $56 thousand in new long-term output for the State of Missouri

[1] All jobs numbers are full-time equivalent jobs and include direct, indirect, and induced jobs. With a two-year construction period, the Project construction job figures would be divided in half for the number of jobs supported in any given year.

[2] Worker Earnings include the wages, salary and benefits associated with these jobs.

[3] Economic Output is the value of goods and services produced in the state or local economy. It is an equivalent measure to the Gross Domestic Product. Economic Output includes Worker Earnings.

# II. Economic Benefits to Transmission Lines

Most consumers of electricity do not give much thought to how their electricity gets delivered to their home or business. A vital piece of this delivery system is the electric transmission system. The transmission system connects large electric generators to the local distribution grid using HV transmission lines. Historically, public utilities built transmission lines to connect their own large-scale generators to their distribution system. Such transmission lines helped individual utilities to service their load but were not optimized to the modern realities of an interconnected grid that trades electricity across utility, state and even international borders. Today, transmission lines are necessary to ensure reliability allowing electricity to flow from one area to another to ensure that the supply is balanced with demand.

The total job growth from any infrastructure project, including transmission projects, can be divided into direct, indirect, and induced jobs:

- **Direct Jobs.** These are workers directly involved in the construction and maintenance of the project.
- **Indirect Jobs.** Numerous other jobs are supported through indirect supply chain purchases. For example, materials like wire, steel, and aggregate sourced within the state will support jobs for those suppliers.
- **Induced Jobs.** Higher spending by direct and indirect workers results in additional spending and jobs that are referred to as "induced" spending and jobs. As an example, grocery store workers, waiters and waitresses would be supported through spending from other workers.

In addition to job creation, transmission projects typically pay significant property taxes. As such, they strengthen the local tax base and help improve county services and local infrastructure, such as public roads.

Several studies have examined the economic impact of transmission line construction.

- The author studied the economic impact of the proposed Rock Island Clean Line transmission line across Iowa and Illinois costing $1.5 billion (Carlson, Loomis, and Solow, 2011). They found that the line would result in 1,451 jobs, $86.8 million in labor income and $256 million in output for Illinois and 2,718 jobs, $120 million in labor income and $394.2 million in output for Iowa annually over a three-year construction period.
- NREL found that four HV transmission lines designed to export electricity from Wyoming would result in an average of 4,000-5,000 jobs per year for 10 years. (Lantz & Tegen, 2011)
- Strategic Economics Group (2013) examined the economic impacts of ITC Midwest Transmission Multi Value Projects (MVP) #3 and #4, both 345 kV transmission lines totaling 198.25 miles across Minnesota and Iowa. They were expected to cost $255.5 million for MVP 3 and $305.3 million for MVP 4. The combined impact of the projects was estimated to be 4,275 job-years resulting in $207.8 million in labor income and $723.2 million in output.
- The author also studied the economic impact of the proposed 700-mile, $2.2 billion Grain Belt Express Clean Line Project going from Western Kansas to Western Indiana (Carlson and Loomis, 2013). They found that the line would result in 1,450 jobs, $100.8 million in labor income and $251.1 million in output for Illinois; 2,340 jobs, $131.5 million in labor income and $371 million in output for Kansas; and 1,315 jobs, $77 million in labor income and $206 million in output for Missouri annually over a three-year construction period.
- MISO studied the economic impact of in-service transmission projects from 2002 to 2015 totaling $9.4 billion and found that 16,700 to 25,800 total jobs were created or supported in peak year 2014 with $5 to $8 billion in labor income and $6.7 to $11.3 billion of value-added impacts. (MISO, 2015)
- Iowa State University calculated direct and indirect estimates of job creation over a 30-year time frame due to construction and operation of a large-scale transmission expansion. The expansion increased employment for generation of energy from renewables from 650,000 to 950,000. (Swenson, 2018)
- The author studied the economic impact of the proposed SOO Green HVDC Link Transmission Project that is to run from Mason City, Iowa to Plano, Illinois and is expected to cost almost $2.5 billion. This project is expected to support 6,799 jobs during construction in Iowa and an additional 5,614 jobs during construction in Illinois over a three-year period. (Loomis, 2020a; Loomis, 2020b)

# III. State and County Economics

## 3.1 State of Missouri

Missouri is located in the Central part of the United States. It has a total area of 69,715 square miles and the U.S. Census estimates that the 2020 population was 6,154,913 with 2,819,383 housing units. The state has a population density of 88 (persons per square mile) compared to 87 for the United States. Median household income in the state was $55,461 in 2019.

### Table 3.1 – Employment by Industry in Missouri

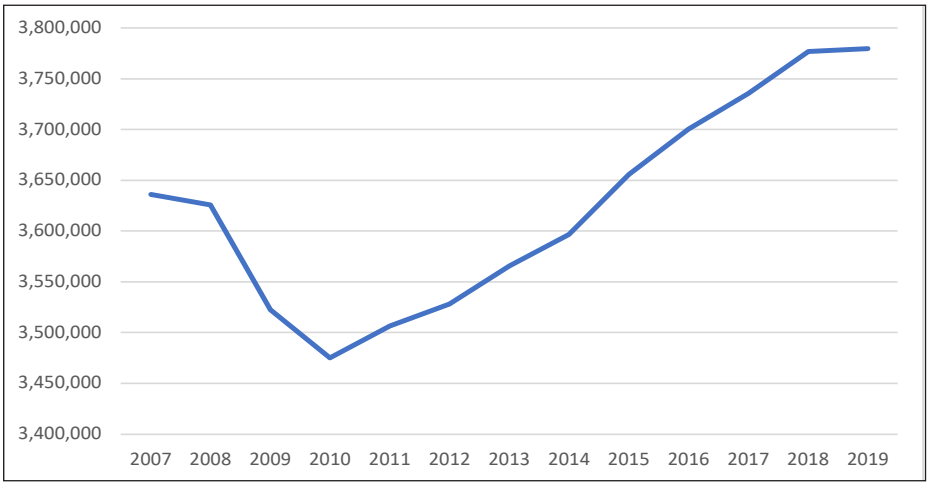
| Industry | Number | Percent |
|---|---|---|
| Health Care and Social Assistance | 447,926 | 12.2% |
| Administrative Government | 398,755 | 10.8% |
| Retail Trade | 324,135 | 8.8% |
| Manufacturing | 279,975 | 7.6% |
| Accommodation and Food Services | 273,937 | 7.4% |
| Professional, Scientific, and Technical Services | 267,609 | 7.3% |
| Other Services (except Public Administration) | 238,834 | 6.5% |
| Construction | 209,773 | 5.7% |
| Finance and Insurance | 204,609 | 5.6% |
| Administrative and Support and Waste Management and Remediation Services | 193,105 | 5.2% |
| Real Estate and Rental and Leasing | 171,717 | 4.7% |
| Transportation and Warehousing | 151,318 | 4.1% |
| Wholesale Trade | 127,543 | 3.5% |
| Agriculture, Forestry, Fishing and Hunting | 107,893 | 2.9% |
| Management of Companies and Enterprises | 65,495 | 1.8% |
| Arts, Entertainment, and Recreation | 60,605 | 1.6% |
| Educational Services | 58,133 | 1.6% |
| Information | 51,442 | 1.4% |
| Government Enterprises | 34,105 | 0.9% |
| Utilities | 12,136 | 0.3% |
| Mining, Quarrying, and Oil and Gas Extraction | 6,622 | 0.2% |

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

As shown in Table 3.1, the largest industry is "Health Care and Social Assistance" followed by "Administrative Government," "Retail Trade" and "Manufacturing." These data for Table 3.1 come from IMPLAN covering the year 2020 (the latest year available).

Table 3.1 provides the most recent snapshot of total employment but does not examine the historical trends within the state. Figure 3.1 shows employment from 2007 to 2019. Total employment in Missouri was at its lowest at 3,475,301 in 2010 and its highest at 3,779,878 in 2019.

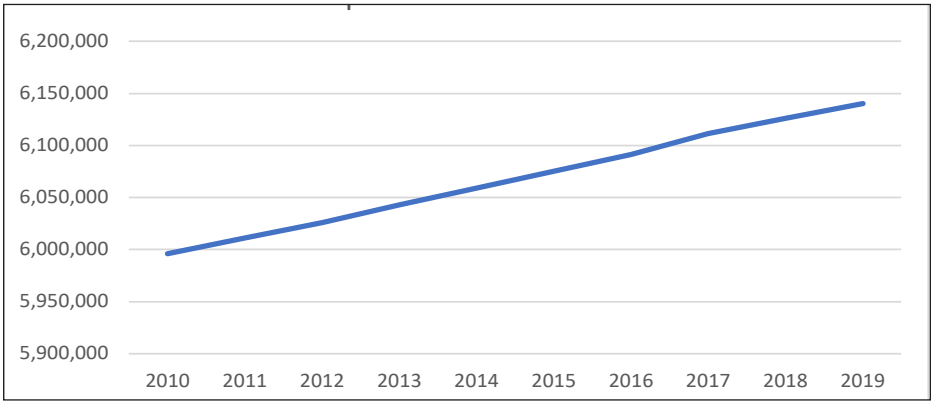
Figure 3.1 – Total Employment in Missouri from 2007 to 2019




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

Like the upward trend of employment, the overall population in the state has been increasing steadily, as shown in Figure 3.2. Missouri population was 5,996,089 in 2010 and 6,140,475 in 2019, a gain of 144,386. The average annual population increase over this time period was 16,043.

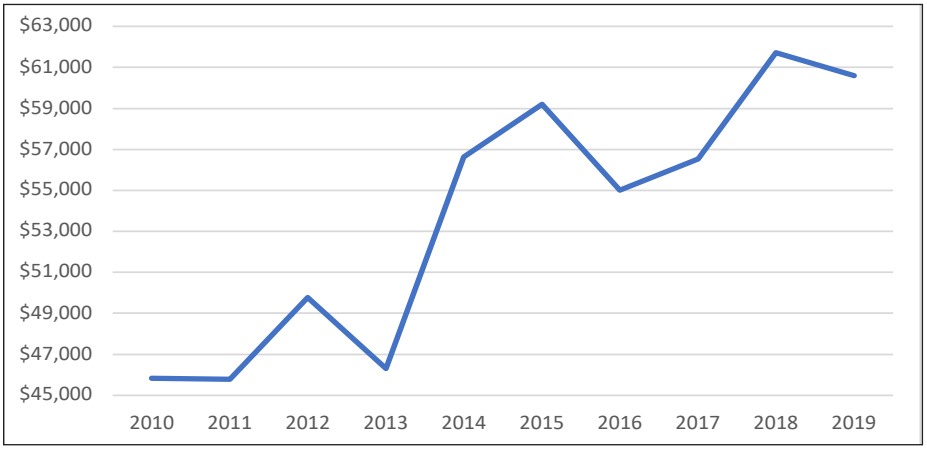
Figure 3.2 – Population in Missouri 2010 to 2019




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

Similar to the population trend, household income has been trending upward in Missouri. Figure 3.3 shows the median household income in Missouri from 2010 to 2019. Household income was at its lowest at $45,774 in 2011 and its highest at $61,726 in 2018.

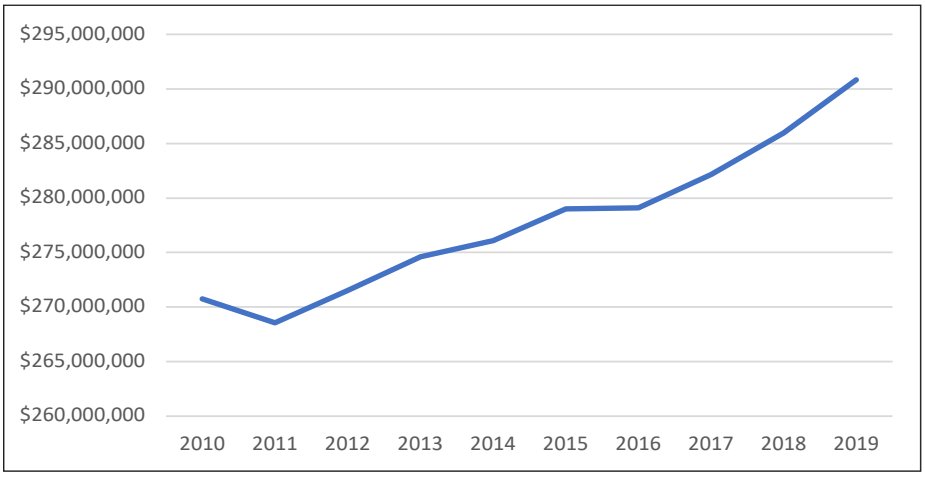
Figure 3.3 – Median Household Income in Missouri from 2010 to 2019




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

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 Missouri has been increasing since hitting a low in 2011, as shown in Figure 3.4.

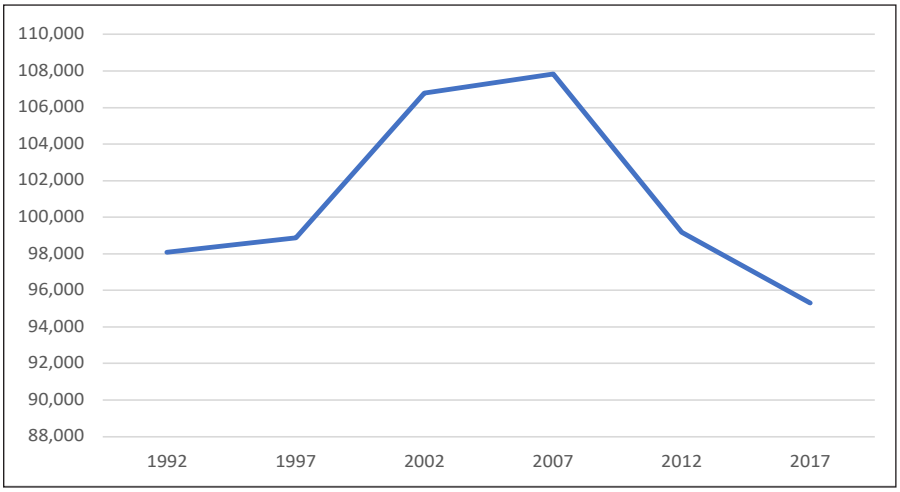
Figure 3.4 – Real Gross Domestic Product (GDP) in Missouri from 2010 to 2019




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

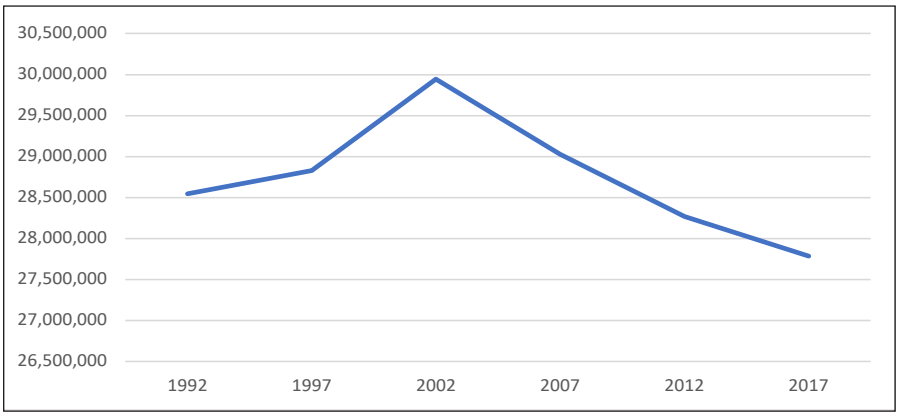
The farming industry has fluctuated in Missouri. As shown in Figure 3.5, the number of farms has decreased from 98,082 in 1992 to 95,320 in 2017. The amount of land in farms has fluctuated greatly. The state farmland hit a high of 29,946,035 acres in 2002 and a low of 27,781,883 acres in 2017 according to Figure 3.6.

Figure 3.5 – Number of Farms in Missouri from 1992 to 2017




Source: Census of Agriculture, 1992-2017

Figure 3.6 – Land in Farms in Missouri from 1992 to 2017




Source: Census of Agriculture, 1992-2017

## 3.2 County Economics

The economic and demographic statistics of the Missouri counties are contained in this section. As listed in Table 3.2, the population and population density for Jasper County is much higher than Barton County. Because it is so different, Jasper County's employment, population, and GDP data is graphed separately from Barton County. Figure 3.7 shows the location of each of the counties across the State of Missouri.

Table 3.2 – Demographic Statistics for County Locations of the Wolf Creek-Blackberry Transmission Line

| County | Total Area (square miles) | 2020 Census Population | 2019 Census housing units | Population Density | Median Household Income |
|---|---|---|---|---|---|
| Barton County | 597 | 11,637 | 5,589 | 19 | $44,125 |
| Jasper County | 641 | 122,761 | 52,262 | 192.3 | $48.357 |

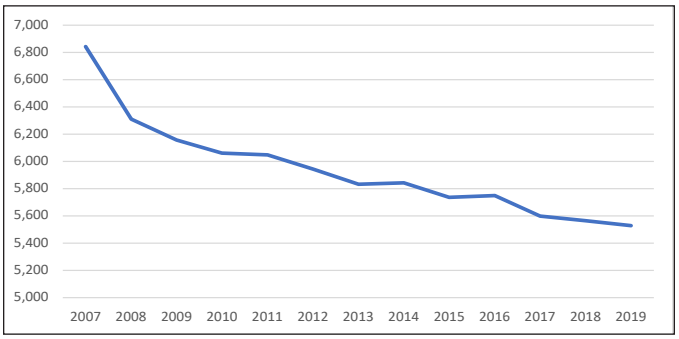
Figure 3.7 – Location of Counties in Missouri

## Table 3.3 – Employment by Industry for County Locations

| | Barton County | | Jasper County | |
|---|---|---|---|---|
| **Industry** | **Number** | **Percent** | **Number** | **Percent** |
| Agriculture, Forestry, Fishing and Hunting | 982 | 17.6% | 1,417 | 2.0% |
| Health Care and Social Assistance | 574 | 10.3% | 7,388 | 10.5% |
| Administrative Government | 538 | 9.6% | 6,399 | 9.1% |
| Retail Trade | 535 | 9.6% | 7,516 | 10.7% |
| Accommodation and Food Services | 491 | 8.8% | 5,153 | 7.3% |
| Construction | 455 | 8.2% | 3,696 | 5.3% |
| Transportation and Warehousing | 323 | 5.8% | 4,626 | 6.6% |
| Administrative and Support and Waste Management and Remediation Services | 309 | 5.5% | 4,085 | 5.8% |
| Manufacturing | 304 | 5.5% | 11,693 | 16.7% |
| Professional, Scientific, and Technical Services | 212 | 3.8% | 2,828 | 4.0% |
| Other Services (except Public Administration) | 209 | 3.7% | 4,878 | 7.0% |
| Finance and Insurance | 189 | 3.4% | 2,064 | 2.9% |
| Wholesale Trade | 129 | 2.3% | 2,404 | 3.4% |
| Real Estate and Rental and Leasing | 116 | 2.1% | 2,405 | 3.4% |
| Government Enterprises | 84 | 1.5% | 415 | 0.6% |
| Information | 68 | 1.2% | 566 | 0.8% |
| Utilities | 32 | 0.6% | 293 | 0.4% |
| Arts, Entertainment, and Recreation | 18 | 0.3% | 578 | 0.8% |
| Educational Services | 7 | 0.1% | 444 | 0.6% |
| Mining, Quarrying, and Oil and Gas Extraction | 1 | 0.0% | 111 | 0.2% |
| Management of Companies and Enterprises | 0 | 0.0% | 1,193 | 1.7% |

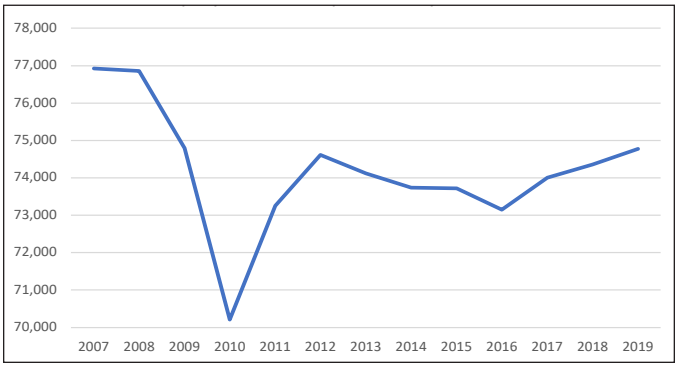
Figures 3.8 and 3.9 show the historical trends of employment from 2007 to 2019 within the counties. Total employment in Barton County was at its highest at 6,844 in 2007 and its lowest at 5,527 in 2019. Total employment in Jasper County was at its highest at 76,925 in 2007 and its lowest at 70,207 in 2010. Since 2010, employment in the county has been increasing.

### Figure 3.8 – Total Employment in Barton County from 2007 to 2019




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

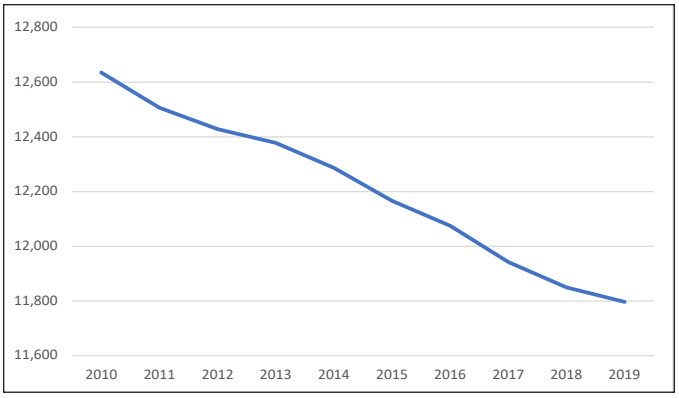
### Figure 3.9 – Total Employment in Jasper County from 2007 to 2019




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

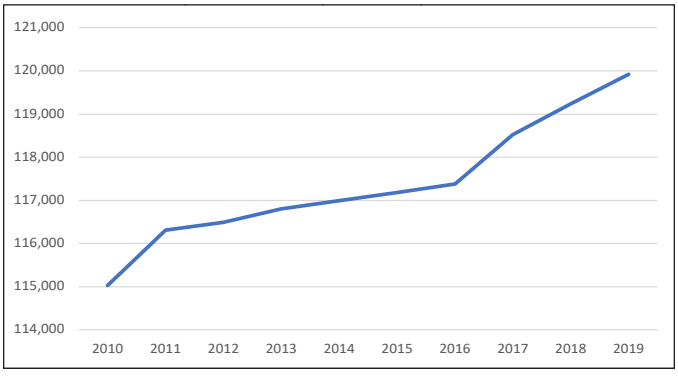
Figures 3.10 and 3.11 show the historical trends of population from 2010 to 2019 within the counties. Barton County population was 12,634 in 2010 and 11,797 in 2019, a loss of 837. Jasper County population was 115,029 in 2010 and 119,920 in 2019, a gain of 4,891.

### Figure 3.10 – Population in Barton County 2010 to 2019




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

### Figure 3.11 – Population in Jasper County 2010 to 2019

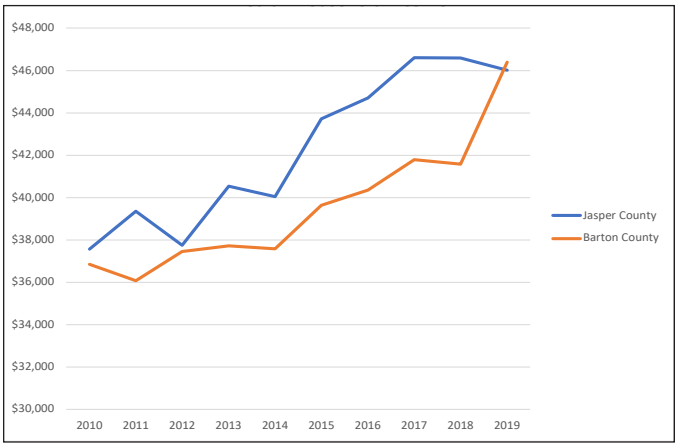



Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Population Estimates

Figure 3.12 shows the median household income in the counties from 2010 to 2019. Household income has been increasing for both counties.

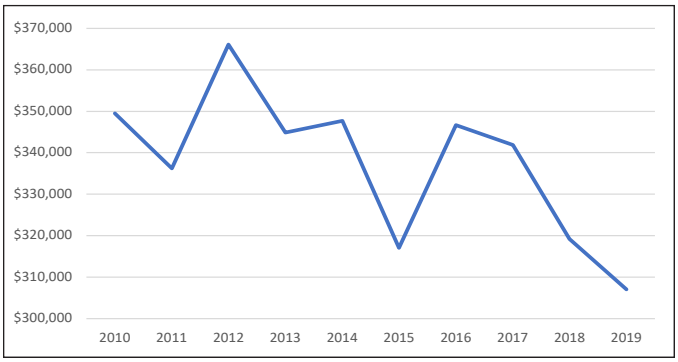
Real Gross Domestic Product (GDP) is a measure of the value of goods and services produced in an area and adjusted for inflation over time. The Real GDP has decreased in Barton County and increased in Jasper County over the last decade, as shown in Figures 3.13 and 3.14.

Figure 3.12 – Median Household Income in Barton and Jasper Counties from 2010 to 2019



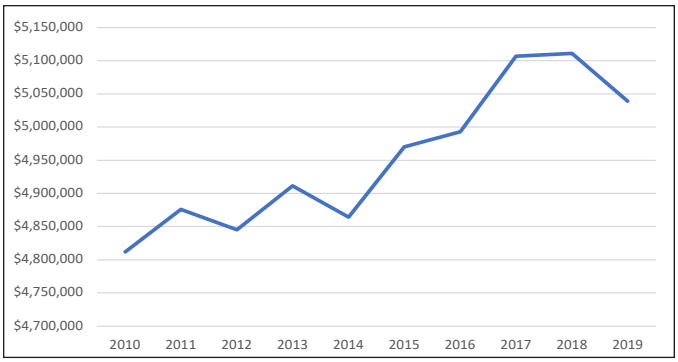

Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Population Estimates

Figure 3.13 – Real Gross Domestic Product (GDP) in Barton County from 2010 to 2019




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

Figure 3.14 – Real Gross Domestic Product (GDP) in Jasper County from 2010 to 2019



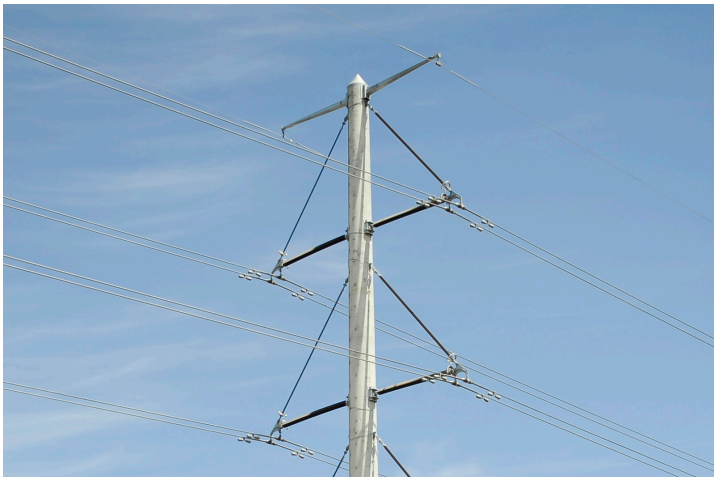

Source: Bureau of Economic Analysis, Regional Data, GDP and Personal Income

# IV. Economic Impact Methodology

The impacts of construction and operation of the transmission line were estimated using the IMPLAN model. The specific impacts analyzed include direct, indirect, and induced effects on employment, labor income, and output for Missouri.

## 4.1 IMPLAN

The economic impacts of the manufacture of the required components, construction of the line, and operation and maintenance expenses were estimated using the IMPLAN model and 2020 data for Missouri and the individual counties. Stated briefly, the model is used to estimate the total impacts of an increase in spending in a particular industry. IMPLAN is an on-line program that allows construction of regional input-output models for areas ranging in size from a single zip code region to the entire United States. The model allows aggregation of individual regional - e.g., county - databases for multi-region analysis.



Total impacts are calculated as the sum of direct, indirect, and induced effects. Direct effects are production changes associated with the immediate effects of final demand changes, such as an increase in spending for the manufacture of new structures that will be used to support a new transmission line. Indirect effects are production changes in backward-linked industries caused by the changing input needs of the directly affected industry, e.g., additional purchases to produce additional output such as the steel used in the construction of the new transmission structures. Induced effects are the changes in regional household spending patterns caused by changes in household income generated from the direct and indirect effects. An example of the latter is the increased spending of incomes earned by newly hired steel workers.

The analysis summarized here focuses on the impacts of increased manufacturing of the different components of the transmission line, as well as construction of the line, on employment, employee compensation, and total expenditures (output). Employment includes total wage and salary employees as well as self-employed jobs in the region of interest. All of the employment figures reported here are full-time equivalents[4] (FTE). Employee compensation represents income, including benefits, paid to workers by employers, as well as income earned by sole proprietors. Total output represents sales (including additions to inventory), i.e., it is a measure of the value of output produced. Impacts are estimated on a state-wide basis for Missouri and for individual counties.



[4] IMPLAN jobs include all full-time, part time, and temporary positions. When employment is counted as full and part-time, one cannot tell from the data the number of hours worked or the proportion that is full or part-time. A full-time-employed (FTE) worker is assumed to work 2,080 hours (= 52 weeks x 40 hours/week) in a standard year. Employment impacts have been rescaled to reflect the change in the number of FTEs.

## 4.2 Project Cost and Transmission Modeling Assumptions

To estimate the economic impact of Project construction, we estimated construction costs by budget category and the geographic location where those costs will be incurred. Table 4.1 shows the estimated costs and geographic location provided by the client. These budget categories are then translated into IMPLAN Sector Codes and allocated into the appropriate geographic boundaries. The total Project costs modeled were $85.2 million. All construction spending was assumed to be spread evenly over the two-year construction period from 2023 to 2024. In addition, $7.5 million will be spent by the interconnecting utilities to upgrade the Wolf Creek and Blackberry substations. The economic impact of the substation upgrades is modeled separately and then added together with the construction cost of the transmission line itself.

Table 4.1 – Estimated Total Transmission Construction Cost ($M)[5]

| Budget Category | Total |
|---|---|
| Project Labor | $42.6 |
| Right-of-Way | $9.5 |
| Foundations & Towers | $12.3 |
| Wires | $7.4 |
| Assemblies | $6.4 |
| Security | $0.4 |
| Development Costs | $6.6 |
| **Grand Total** | **$85.2** |

[5] Materials for Towers totaling $12.1 million and materials for wires totaling $7.4 million are expected to be direct sourced from firms outside of Kansas or Missouri. Legal Services and Engineering (part of Development Costs) are expected to be sourced from Kansas City, Missouri.

Table 4.2 shows the annual construction costs broken out by IMPLAN sector that is expected to be spent per year for two years starting in 2023 and where the costs are expected to be spent.

Table 4.2 – Estimated Construction Cost by IMPLAN Category and State

| IMPLAN Code | IMPLAN Description | Missouri | Kansas |
|---|---|---|---|
| | Direct Labor | $2,148,200 | $19,141,187 |
| | Household spending from land easements | $100,905 | $899,095 |
| 29 | Sand and gravel mining | $12,268 | $109,310 |
| 339 | All other miscellaneous electrical equipment and component manufacturing | $324,712 | $2,893,291 |
| 447 | Other real estate | $50,452 | $449,548 |
| 455 | Legal services | $24,669 | $0 |
| 457 | Architectural, engineering, and related services | $998,059 | $0 |
| 463 | Environmental and other technical consulting services | $40,362 | $359,638 |
| 465 | Advertising, public relations, and related services | $21,611 | $192,558 |
| 469 | Management of Companies and Enterprises | $485,299 | $4,324,179 |
| 475 | Investigation and Security Services | $18,474 | $164,612 |
| **TOTAL** | | **$4,225,011** | **$28,533,419** |

Table 4.3 shows the annual construction costs broken out by IMPLAN sector and county. The costs were generally allocated to the counties proportional to the number of miles estimated to be in that county. Substations and other costs that are known to be at the Wolf Creek Substation endpoint are allocated to Jasper County.

Table 4.3 – Estimated Construction Cost by IMPLAN Category and County

| IMPLAN Code | IMPLAN Description | Barton County | Jasper County |
|---|---|---|---|
| | Direct Labor | $1,654,205 | $493,995 |
| | Household Spending from land easements | $77,701 | $23,204 |
| 29 | Sand and gravel mining | $9,447 | $2,821 |
| 339 | All other miscellaneous electrical equipment and component manufacturing | $250,042 | $74,670 |
| 447 | Other real estate | $38,850 | $11,602 |
| 463 | Environmental and other technical consulting services | $31,080 | $9,282 |
| 465 | Advertising, public relations, and related services | $16,641 | $4,970 |
| 469 | Management of Companies and Enterprises | $373,701 | $111,598 |
| 475 | Investigation and Security Services | $14,226 | $4,248 |
| | | | |
| **TOTAL** | | **$2,465,893** | **$736,390** |

These inputs are modeled using Analysis By Parts (ABP). Under this method, direct jobs, earnings and output are calculated outside of IMPLAN. Direct labor income and household spending (by income level within the state) are input into IMPLAN to show the induced impacts that would result from these expenditures.

Table 4.4 shows the operations and maintenance costs broken out by IMPLAN sector and state.

Table 4.4 – Estimated Annual Operations Cost by IMPLAN Category and State and County

| IMPLAN Code | IMPLAN Description | Missouri | Barton County | Jasper County |
|---|---|---|---|---|
| | Direct Labor [6] | $0 | $0 | $0 |
| | Property Tax [7] | $47,091 | $36,262 | $10,829 |
| **TOTAL** | | **$47,091** | **$36,262** | **$10,829** |

These expenses are also modeled in IMPLAN using ABP and assumed to start in 2025.

[6] Operations personnel are expected to be located in Crawford County, Kansas.

[7] Property Taxes entered into the model is the 40-year annual average of the yearly amounts shown in Section VI.

# V. Economic Impact Results

The economic impact results were derived from detailed project cost estimates supplied by NEET Southwest and the assumptions detailed in the previous section. Tables 5.1 to 5.9 show the economic impact of the Project using the IMPLAN model.

## 5.1 Transmission Line Impacts

As shown in Table 5.1, the results from the IMPLAN model show significant employment impacts from the Project during construction. All of the results in Table 5.1 have been converted into 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 for part of a year would constitute only a fraction of a job. The transmission line is expected to take two years to build so the number of workers supported at any time during this two-year period would be approximately half of the number shown in Table 5.1.

The Project is expected to create or support a total of 122 jobs during its two-year construction period. The direct impacts, which include on-site construction workers and direct purchases of material and equipment, are 73 jobs. The indirect impacts, which include supply chain jobs as a result of the increased demand in these industries, are an additional 21 jobs. The induced impacts, which accounts for household purchases like groceries and eating out as a result of this new income, are an additional 28.

As shown in Table 5.1, new local jobs created or retained during construction total over 68 for Barton County, over 22 for Jasper County and over 122 for the State of Missouri. New local long-term jobs created from the Project total over 0.12 for Barton County, over 0.05 for Jasper County, and over 0.32 for the State of Missouri. The State of Missouri impacts are larger than the Barton County and Jasper County impacts because the state impacts capture all of the activity that happens elsewhere in the state.

Table 5.1 – Total Employment Impact from the Wolf Creek-Blackberry Transmission Line Only

| | Barton County | Jasper County | State of Missouri |
|---|---|---|---|
| **Construction** | | | |
| Direct | 56 | 17 | 73 |
| Indirect | 4 | 2 | 21 |
| Induced | 8 | 3 | 28 |
| *Total* | 68 | 22 | 122 |
| | | | |
| **Operations (Annual)** | | | |
| Direct | 0 | 0 | 0 |
| Indirect | 0.11 | 0.04 | 0.25 |
| Induced | 0.01 | 0.01 | 0.07 |
| *Total* | 0.12 | 0.05 | 0.32 |

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 often 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. Table 5.2 shows the earnings impacts from the transmission line, which are categorized by construction impacts and operations impacts. The new local earnings during construction total over $3.6 million for Barton County, over $1.2 million for Jasper County, and over $7.0 million for the State of Missouri. The new long-term earnings total over $4.3 thousand for Barton County, over $2.2 thousand for Jasper County, and over $17 thousand for the State of Missouri.

Output refers to economic activity or the value of production in the state or local economy. It is an equivalent measure to the Gross Domestic Product, which measures output on a national basis. According to Table 5.3 the new local output during construction totals over $7.8 million for Barton County, over $2.6 million for Jasper County, and over $17.4 million for the State of Missouri. The new long-term output totals over $17 thousand for Barton County, over $8.5 thousand for Jasper County, and over $56 thousand for the State of Missouri.

Table 5.2 – Total Earnings Impact from the Wolf Creek-Blackberry Transmission Line Only

| | Barton County | Jasper County | State of Missouri |
|---|---|---|---|
| **Construction** | | | |
| Direct | $3,308,409 | $987,991 | $4,296,400 |
| Indirect | $118,062 | $77,455 | $1,309,496 |
| Induced | $262,258 | $144,469 | $1,447,576 |
| *Total* | $3,688,729 | $1,209,915 | $7,053,472 |
| | | | |
| **Operations (Annual)** | | | |
| Direct | $0 | $0 | $0 |
| Indirect | $3,989 | $2,025 | $13,782 |
| Induced | $312 | $274 | $3,480 |
| *Total* | $4,301 | $2,299 | $17,262 |

Table 5.3 – Total Output Impact from the Wolf Creek-Blackberry Transmission Line Only

| | Barton County | Jasper County | State of Missouri |
|---|---|---|---|
| **Construction** | | | |
| Direct | $6,283,154 | $1,966,945 | $9,527,354 |
| Indirect | $475,513 | $263,080 | $3,501,385 |
| Induced | $1,101,759 | $450,763 | $4,402,000 |
| *Total* | $7,860,426 | $2,680,788 | $17,430,739 |
| | | | |
| **Operations (Annual)** | | | |
| Direct | $0 | $0 | $0 |
| Indirect | $16,561 | $7,735 | $46,055 |
| Induced | $1,320 | $853 | $10,576 |
| *Total* | $17,881 | $8,588 | $56,631 |

## 5.2 Substation Upgrade Impacts

Tables 5.4-5.6 show the impacts from the substations on the State of Missouri. Although these costs will be incurred by another company, they are still part of the overall economic impact of the project as a whole. Because these costs are not incurred by NEET Southwest, we do not have the detail needed to model these impacts using the same analysis-by-parts method. Rather, we model these impacts by the industry output effect using sector 52, Construction of New Power and Communications Structures.

The substation is expected to create or support a total of over 75.4 jobs for Jasper County and 81.4 jobs for the State of Missouri during its two-year construction period. The direct impacts, which include on-site construction workers and direct purchases of material and equipment, are 52.4 jobs. The indirect impacts, which include supply chain jobs as a result of the increased demand in these industries, are an additional 14 jobs. The induced impacts, which accounts for household purchases like groceries and eating out as a result of this new income, are an additional 15.

Table 5.4 – Total Employment Impact from the Substation Upgrades

| | Jasper County | State of Missouri |
|---|---|---|
| **Construction** | | |
| Direct | 52.4 | 52.4 |
| Indirect | 12.3 | 14.0 |
| Induced | 10.7 | 15.0 |
| *Total* | 75.4 | 81.4 |

Table 5.5 shows the earnings impacts from the substation construction, which are categorized by construction impacts. The new local earnings during construction total over $3.7 million for Jasper County and over $4.1 million for the State of Missouri.

Table 5.5 – Total Earnings Impact from the Substation Upgrades

| | Jasper County | State of Missouri |
|---|---|---|
| **Construction** | | |
| Direct | $2,618,131 | $2,618,131 |
| Indirect | $687,602 | $816,541 |
| Induced | $460,977 | $686,246 |
| *Total* | $3,766,710 | $4,120,918 |

According to Table 5.6 the new local output during construction totals over $10.9 million for Jasper County and over $12.0 million for the State of Missouri.

Table 5.6 – Total Output Impact from the Substation Upgrades

| | Jasper County | State of Missouri |
|---|---|---|
| **Construction** | | |
| Direct | $7,389,304 | $7,389,304 |
| Indirect | $2,115,003 | $2,510,203 |
| Induced | $1,437,592 | $2,124,738 |
| *Total* | $10,941,899 | $12,024,245 |

## 5.3 Combined Transmission Line and Substation Upgrade Impacts

Tables 5.7-5.9 report the employment, earning and output results at the county level during construction and during operations. Because these results only look at the effects of the expenditures within the county, they do not add up to the state totals in the previous section.

Table 5.7 shows the employment impacts from the transmission line, which are categorized by construction impacts and operations impacts. The new local jobs created or retained during construction total 68 for Barton County, 97.1 for Jasper County, and 203.5 for the State of Missouri. The new local long-term jobs created from the Project total 0.12 for Barton County, 0.05 for Jasper County and 0.32 for the State of Missouri.

Table 5.7 – Total Employment Impact from the Wolf Creek-Blackberry Transmission Line and Substation

| | Barton County | Jasper County | State of Missouri |
|---|---|---|---|
| **Construction** | | | |
| Direct | 56 | 69.2 | 125.7 |
| Indirect | 4 | 13.9 | 34.9 |
| Induced | 8 | 14.0 | 42.9 |
| *Total* | 68 | 97.1 | 203.5 |
| | | | |
| **Operations (Annual)** | | | |
| Direct | 0 | 0 | 0 |
| Indirect | 0.11 | 0.04 | 0.25 |
| Induced | 0.01 | 0.01 | 0.07 |
| *Total* | 0.12 | 0.05 | 0.32 |

Table 5.8 shows the earnings impacts from the transmission line, which are categorized by construction impacts and operations impacts. The new local earnings during construction total over $3.6 million for Barton County, over $4.9 million for Jasper County, and over $11.1 million for the State of Missouri. The new long-term earnings total over $4.3 thousand for Barton County, over $2.2 thousand for Jasper County, and over $17 thousand for the State of Missouri.

According to Table 5.9 the new local output during construction totals over $7.8 million for Barton County, over $13.6 million for Jasper County, and over $29.4 million for the State of Missouri. The new long-term output totals over $17 thousand for Barton County, over $8.5 thousand for Jasper County, and over $56 thousand for the State of Missouri.

Table 5.8 – Total Earnings Impact from the Wolf Creek-Blackberry Transmission Line and Substation

| | Barton County | Jasper County | State of Missouri |
|---|---|---|---|
| **Construction** | | | |
| Direct | $3,308,409 | $3,606,122 | $6,914,531 |
| Indirect | $118,062 | $765,056 | $2,126,037 |
| Induced | $262,258 | $605,446 | $2,133,822 |
| *Total* | $3,688,729 | $4,976,624 | $11,174,390 |
| | | | |
| **Operations (Annual)** | | | |
| Direct | $0 | $0 | $0 |
| Indirect | $3,989 | $2,025 | $13,782 |
| Induced | $312 | $274 | $3,480 |
| *Total* | $4,301 | $2,299 | $17,262 |

Table 5.9 – Total Output Impact from the Wolf Creek-Blackberry Transmission Line and Substation

| | Barton County | Jasper County | State of Missouri |
|---|---|---|---|
| **Construction** | | | |
| Direct | $6,283,154 | $9,356,249 | $16,916,658 |
| Indirect | $475,513 | $2,378,083 | $6,011,589 |
| Induced | $1,101,759 | $1,888,355 | $6,526,738 |
| *Total* | $7,860,426 | $13,622,687 | $29,454,985 |
| | | | |
| **Operations (Annual)** | | | |
| Direct | $0 | $0 | $0 |
| Indirect | $16,561 | $7,735 | $46,055 |
| Induced | $1,320 | $853 | $10,576 |
| *Total* | $17,881 | $8,588 | $56,631 |

# VI. Property Taxes

Table 6.1 – Total Tax Revenue for the State of Missouri

| Year | State of Missouri |
|---|---|
| 2025 | $130,791 |
| 2026 | $125,887 |
| 2027 | $116,444 |
| 2028 | $107,707 |
| 2029 | $99,637 |
| 2030 | $92,156 |
| 2031 | $85,250 |
| 2032 | $78,854 |
| 2033 | $72,942 |
| 2034 | $67,109 |
| 2035 | $57,589 |
| 2036 | $51,528 |
| 2037 | $45,468 |
| 2038 | $39,407 |
| 2039 | $33,347 |
| 2040 | $27,286 |
| 2041 | $27,177 |
| 2042 | $27,177 |
| 2043 | $27,177 |
| 2044 | $27,177 |
| 2045 | $27,177 |
| 2046 | $27,177 |
| 2047 | $27,177 |
| 2048 | $27,177 |
| 2049 | $27,177 |
| 2050 | $27,177 |
| 2051 | $27,177 |
| 2052 | $27,177 |
| 2053 | $27,177 |
| 2054 | $27,177 |
| 2055 | $27,177 |
| 2056 | $27,177 |
| 2057 | $27,177 |
| 2058 | $27,177 |
| 2059 | $27,177 |
| 2060 | $27,177 |
| 2061 | $27,177 |
| 2062 | $27,177 |
| 2063 | $27,177 |
| 2064 | $27,177 |
| **40 Year TOTAL** | $1,883,660 |
| **Annual Average** | $47,091 |

Property taxes are an important funding source for education and other local government services, such as fire protection, park districts, and road maintenance. In most jurisdictions, local school districts receive about half of all property taxes to support K-12 education. The property taxes that the Wolf Creek-Blackberry Transmission Line will pay are calculated differently for the State of Kansas versus the State of Missouri.

There are several important assumptions built into our property tax calculations. Those assumptions are as follows:

- First, the analysis assumes a 26-year depreciation schedule for the State of Missouri and that the assessed value cannot go below 20% of the original value.
- Second, the analysis assumes a 4.08% property tax rate.
- Third, all tax rates are assumed to stay constant at their 2020 (2019 tax year) rates.
- Fourth, no comprehensive tax payment was calculated, and these calculations are only to be used to illustrate the economic impact of the Project.

Table 6.1 shows the total property tax revenue that is expected to be provided by Wolf Creek-Blackberry Transmission Line to the State of Missouri. A conservative estimate of the total property taxes paid by the Project starts out at over $130 thousand the first year and declines due to depreciation until it hits the bottom in 2041. The expected total property taxes paid over the 40-year lifetime of the Project is over $1.8 million, and the average annual property taxes paid will be over $47 thousand.

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# VIII. Curriculum Vitae (Abbreviated)

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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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