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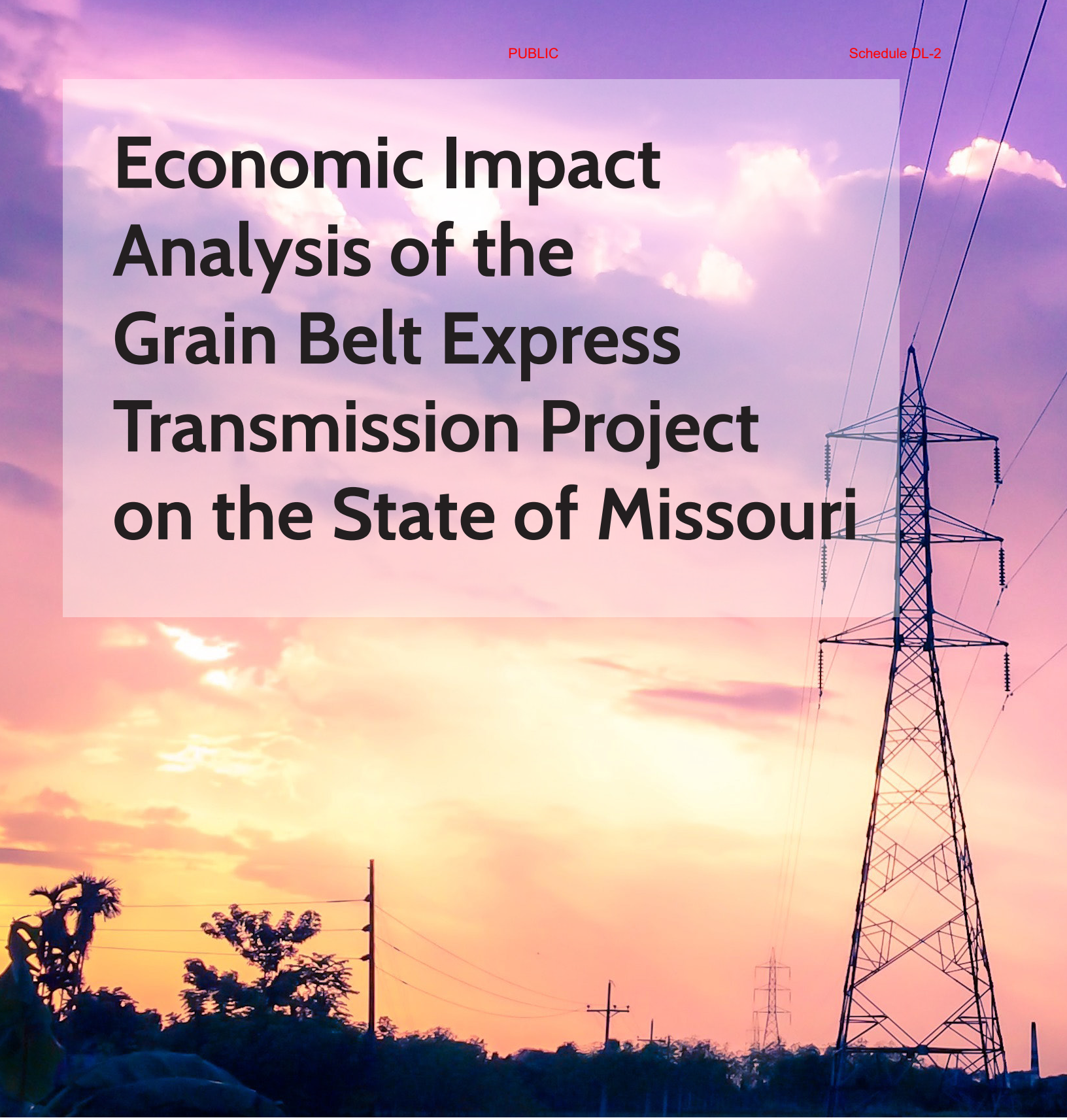
Economic Impact Analysis of the Grain Belt Express Transmission Project on the State of Missouri



August 2022

by Dr. David G. Loomis, Bryan Loomis, and Chris Thankan
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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.

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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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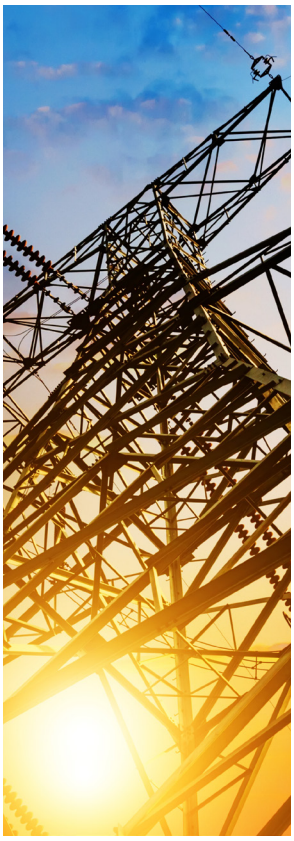

About Strategic Economic Research, LLC

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, Kate Kostrub, Kathryn Keithley, and Morgan Stong.

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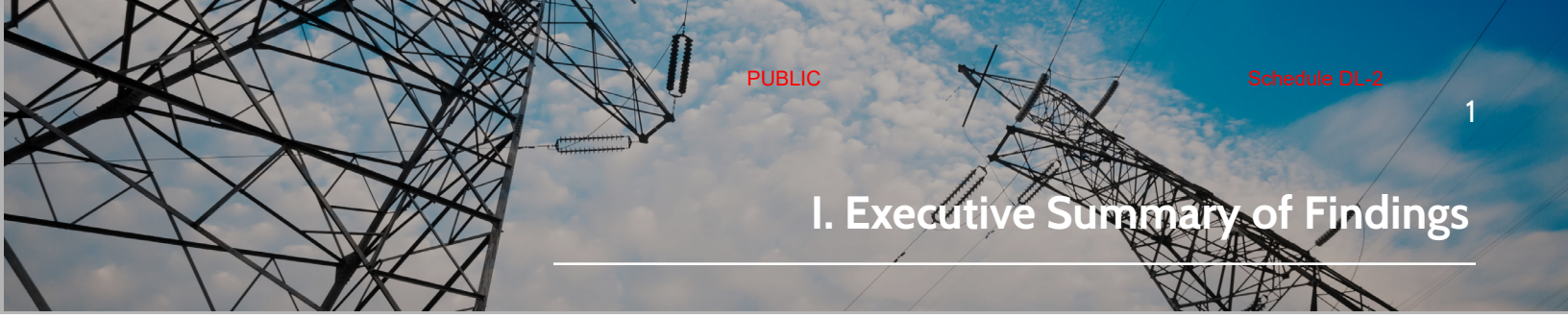


I. Executive Summary of Findings

The Grain Belt Express Transmission Project (the Project) is a high voltage direct current (HVDC) transmission line that with associated converter and substations will deliver electricity between Ford County, Kansas and Clark County, Illinois. Although the final route in Illinois has not been chosen, the line runs approximately 800 miles across the States of Kansas, Missouri, and Illinois and into Indiana.

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 Grain Belt Express Transmission Line represents a $7 billion investment by Invenergy Transmission. This analysis modeled economic impacts associated with the first 20 years of the project life. In that period, the total development is anticipated to result in the following:

Jobs[1]

- Over 5,747 jobs supported during construction for the State of Missouri
- Over 104.4 long-term jobs supported for the State of Missouri

Worker Earnings[2]

- Over $586 million in earnings supported during construction for the State of Missouri
- Over $8.1 million in long-term earnings supported for the State of Missouri annually

Economic Output[3]

- Over $986 million in output supported during construction for the State of Missouri
- Over $15.8 million for the State of Missouri in long-term output supported annually

Tax or Equivalent Government Revenue & Landowner Payments

- First full-year property taxes of $13.9 million and $183.2 million during the first 20 years of operation
- Landowner payments of over $39.9 million

[1] All jobs numbers are full-time equivalent jobs and include direct, indirect, and induced jobs. With a three-year construction period, the Project construction job figures would be divided by three for the number of jobs supported in any given year. Full-time equivalents are assumed to work 2,080 hours per year. All part-time jobs are converted to full-time equivalents in this report.

[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 generate significant payments to local governments. 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 Wolf Creek-Blackberry Transmission Project across Kansas and Missouri costing over $85.1 million (Loomis, Loomis and Thankan, 2022a and 2022b). They found that the line would result in 998 jobs, 55.6 million in labor income and $145 million in output for Kansas and 203.5 jobs, $11.1 million in labor income and $29.4 million in output for Missouri over a two-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 underground 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 Economics

3.1 State of Missouri

Missouri is located in the Midwestern part of the United States (see Figure 3.1). 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 2,786,621 housing units. The state has a population density of 88 (persons per square mile) compared to 87 for the United States.

Figure 3.1 – Location of Missouri

i. Economic and Demographic Statistics

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).

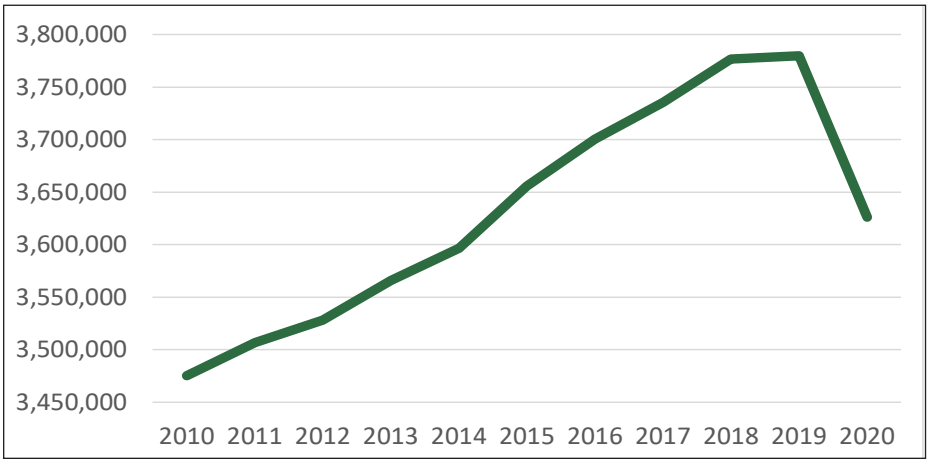
Table 3.1 – Employment by Industry in Missouri

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, 2020

Table 3.1 provides the most recent snapshot of total employment but does not examine the historical trends within the state. Figure 3.2 shows employment from 2010 to 2020. Total employment in Missouri was lowest at 3,475,301 in 2010 and its highest at 3,779,878 in 2019 (BEA, 2022).

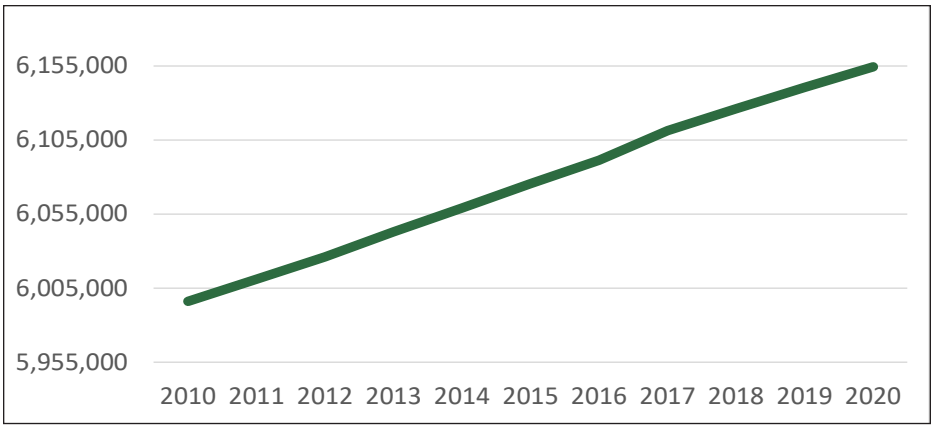
Figure 3.2 – Total Employment in Missouri from 2010 to 2020



Source: Bureau of Economic Analysis, Regional Data, GDP and Personal Income, 2010-2020

Opposite to the fluctuating trend of employment, the overall population in the state has increased steadily, as shown in Figure 3.3. Missouri population was 5,996,089 in 2010 and 6,154,481 in 2020, a gain of 158,392 (FRED, 2022). The average annual population increase over this time period was 15,839.

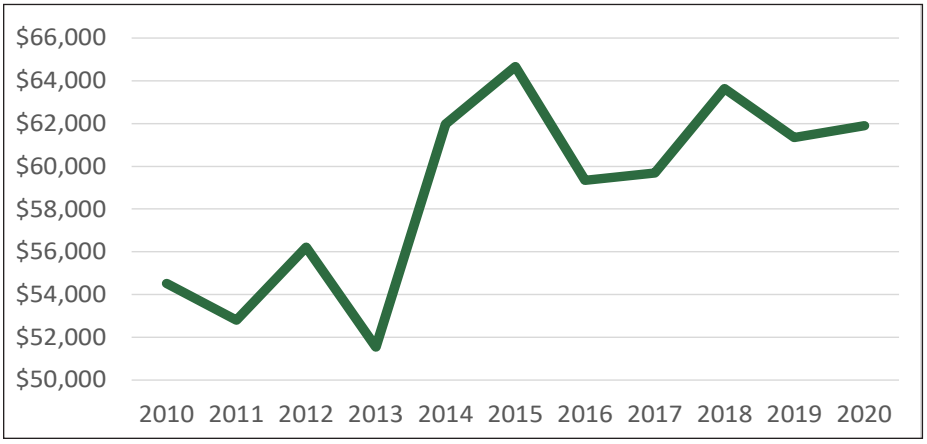
Figure 3.3 – Population in Missouri from 2010 to 2020



Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Population Estimates, 2010-2020

Unlike the population trend, household income has been fluctuating in Missouri. Figure 3.4 shows the median household income in Missouri from 2010 to 2020. Household income was at its lowest at $51,535 in 2013 and its highest at $64,676 in 2015 (FRED, 2022).

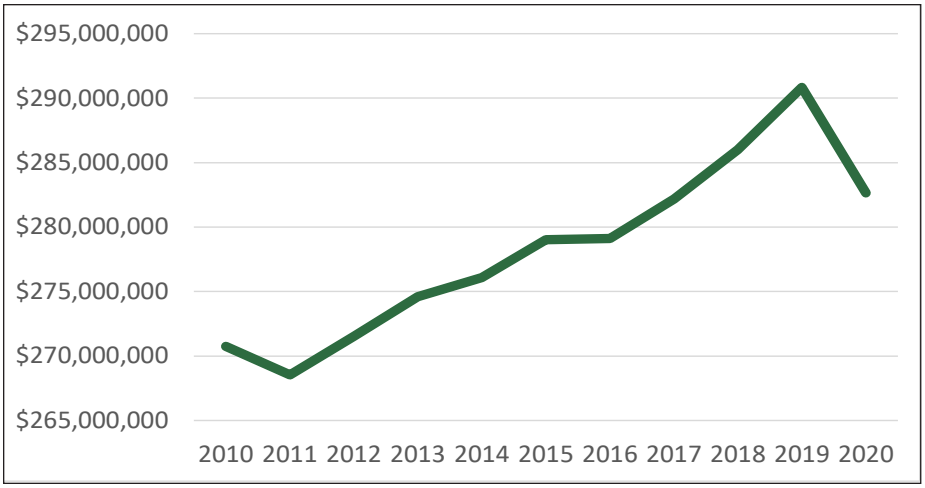
Figure 3.4 – Median Household Income in Missouri from 2010 to 2020



Source: FFederal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Estimate of Median Household Income, 2010-2020

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 decreasing since hitting a high in 2019, as shown in Figure 3.5 (BEA, 2022).

Figure 3.5 – Real Gross Domestic Product (GDP) in Missouri from 2010 to 2020



Source: Bureau of Economic Analysis, Regional Data, GDP and Personal Income, 2010-2020

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 Audrain County, Buchanan County, Caldwell County, Callaway County, Carroll County, Chariton County, Clinton County, Monroe County, Ralls County, Randolph County, and the State of 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 provided by the client. These budget categories are then translated into IMPLAN Sector Codes. The total Project costs modeled were $5.7 billion. All construction spending was assumed to be spread evenly over the three-year construction period.

Table 4.1 – Estimated Total Construction Cost Across All States including Imports ($M)

Budget Category	Total
HVDC Converter Stations, AC Switchyards and Interconnection Costs	$2,995.00
Transmission Line Cost	$2,312.30
Development Cost	$415.20
Grand Total	**$5,722.50**

Table 4.2 shows the annual construction costs broken out by IMPLAN sector that is expected to be spent per year for three years in Missouri. These costs only include the transmission line itself, Converter Station installation labor, and Development Costs. The land easements estimated here understate the total financial payments to landowners. In addition to the easement payments modeled here, the project will reimburse landowners for crop damages, and landowners will also have the option to elect for long-term annualized compensation for easements and structure payments.

Table 4.2 – Estimated Construction Cost by IMPLAN Category

IMPLAN Code	IMPLAN Description	Missouri Total Annual Spending
	Direct labor	$116,949,887
	Land easements	$15,700,544
29	Sand and gravel mining	$8,269,365
215	Iron and steel mills and ferroalloy manufacturing	$6,798,028
236	Fabricated structural metal manufacturing	$20,252,162
329	Power, distribution, and specialty transformer manufacturing	$19,843,229
336	Other communication and energy wire manufacturing	$32,625,222
339	All other miscellaneous electrical equipment and component manufacturing	$18,787,379
447	Other real estate	$3,943,350
455	Legal services	$1,257,587
457	Architectural, engineering, and related services	$22,238,530
463	Environmental and other technical consulting services	$1,202,795
465	Advertising, public relations, and related services	$1,664,319
	Property Taxes	$2,811,500
	Total Annual Spending	**$272,343,897**

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. Inputs at the county level were allocated according to the line-mileage in that county. Converter stations were allocated to the specific county in which they will be located. The converter stations themselves are assumed to be purchased from overseas but the labor to install them is assumed to be sourced locally. It is unknown exactly where the interconnection upgrades and switchyards will be located so these costs were not allocated to any county or state in the analysis. Thus, the current analysis represents a very conservative estimate of the true economic impact that the Project will provide in total.

Table 4.3 shows the operations and maintenance costs broken out by IMPLAN sector and state.

Table 4.3 – Estimated Annual Operations Cost by IMPLAN Category in Missouri - Phase One and Phase Two

IMPLAN Code	IMPLAN Description	Missouri Annual Spending
	Labor Totals - Converter Stations	$2,381,098
	Labor Totals - T-Line	$607,233
47	Electric power transmission and distribution	$530,666
15	Forestry, forest products, and timber tract production	$336,043
	Property Taxes	$9,171,765
	Total Annual Spending	**$13,026,804**

These expenses are also modeled in IMPLAN using ABP and allocated to the counties by line-mile except for the converter station labor.

The property tax estimates in Tables 4.2 and 4.3 do not include the AC portion of the project in Audrain, Callaway, and Monroe Counties. If the AC line is assessed at the same per-mile average as the HVDC line, an estimated $400 thousand in additional construction period revenue and $1.4 million in additional annual taxes during the O&M period is expected.

V. Economic Impact Results

The economic impact results were derived from detailed project cost estimates supplied by Invenergy Transmission and the assumptions detailed in the previous section. A separate IMPLAN model was run individually for each county and for the state as a whole using the cost estimates in Table 4.2 allocated by line mile. Tables 5.1 to 5.6 show the economic impact of the Project using the IMPLAN model. The tables report the employment, earnings and output results at the county level and at the state level during construction and operations. Because these results only look at the effects of the expenditures within the county, they do not add up to the state totals.

All jobs numbers in this report are full-time equivalent jobs. With a three-year construction period, the Project construction job figures would be divided by three for the annual number of jobs supported in any given year. Jobs during operations are long-term jobs existing annually for the life of the Project. Full-time equivalents are assumed to work 2,080 hours per year. All part-time jobs are converted to full-time equivalents in this report.

Tables 5.1 and 5.2 show the total employment impacts from the transmission line on the counties in Missouri during construction and operations. The new local jobs created or retained during construction total 247 for Audrain County, 318 for Buchanan County, 243 for Caldwell County, 66 for Callaway County, 303 for Carroll County, 362 for Chariton County, 226 for Clinton County, 804 for Monroe County, 356 for Ralls County, 284 for Randolph County, and 5,747 for the State of Missouri. New local long-term jobs created from the Project total 10.6 for Audrain County, 3.8 for Buchanan County, 1.9 for Caldwell County, 0.3 for Callaway County, 3.2 for Carroll County, 4.1 for Chariton County, 1.4 for Clinton County, 16.2 for Monroe County, 2 for Ralls County, 2.6 for Randolph County, and 104.4 for the State of Missouri.

Table 5.1 – Total Employment Impact from the Grain Belt Express Transmission Line for Missouri Counties

	Audrain County	Buchanan County	Caldwell County	Callaway County	Carroll County	Chariton County
Construction						
Direct	100	110	122	29	131	165
Indirect	78	97	61	18	74	102
Induced	69	111	60	19	98	95
Total	**247**	**318**	**243**	**66**	**303**	**362**
Operations						
Direct	0.3	0.2	0.2	0.1	0.3	0.3
Indirect	9.8	2.9	1.5	0.2	2.4	3.4
Induced	0.5	0.7	0.2	0.0	0.5	0.4
Total	**10.6**	**3.8**	**1.9**	**0.3**	**3.2**	**4.1**

Table 5.2 – Total Employment Impact from the Grain Belt Express Transmission Line for Missouri Counties (Cont.)

	Clinton County	Monroe County	Ralls County	Randolph County	State of Missouri
Construction					
Direct	109	489	169	108	1,533
Indirect	59	168	131	89	1,736
Induced	58	147	56	87	2,477
Total	**226**	**804**	**356**	**284**	**5,747**
Operations					
Direct	0.2	11.4	0.5	0.2	13.7
Indirect	1.0	1.8	1.4	2.0	60.7
Induced	0.2	3.0	0.1	0.4	30.0
Total	**1.4**	**16.2**	**2.0**	**2.6**	**104.4**

Tables 5.3 and 5.4 show the total earnings impacts from the transmission line for the counties in Missouri during construction and operations. The new local earnings during construction total over $27.5 million for Audrain County, over $34.6 million for Buchanan County, over $31.6 million for Caldwell County, over $8.1 million for Callaway County, over $35.7 million for Carroll County, over $43.8 million for Chariton County, over $28 million for Clinton County, over $119 million for Monroe County, over $42.6 million for Ralls County, over $32.3 million for Randolph County, and over $586 million for the State of Missouri. The new local long-term earnings total over $267 thousand for Audrain County, over $275 thousand for Buchanan County, over $116 thousand for Caldwell County, over $18.8 thousand for Callaway County, over $231 thousand for Carroll County, over $227 thousand for Chariton County, over $82.1 thousand for Clinton County, over $2.6 million for Monroe County, over $111 thousand for Ralls County, over $193 thousand for Randolph County, and over $8.1 million for the State of Missouri.

Table 5.3 – Total Earnings Impact from the Grain Belt Express Transmission Line for Missouri Counties

	Audrain County	Buchanan County	Caldwell County	Callaway County	Carroll County	Chariton County
Construction						
Direct	$22,793,545	$25,214,753	$27,978,014	$6,741,327	$29,935,323	$37,764,562
Indirect	$2,425,923	$4,249,541	$1,885,515	$686,152	$2,469,661	$3,399,852
Induced	$2,337,702	$5,230,143	$1,759,230	$675,574	$3,354,117	$2,642,256
Total	**$27,557,170**	**$34,694,437**	**$31,622,759**	**$8,103,052**	**$35,759,101**	**$43,806,670**
Operations (Annual)						
Direct	$56,464	$49,200	$54,592	$16,700	$58,411	$73,688
Indirect	$193,820	$192,833	$57,139	$1,086	$155,523	$143,333
Induced	$17,188	$33,905	$5,053	$1,050	$17,473	$10,730
Total	**$267,472**	**$275,938**	**$116,784**	**$18,836**	**$231,407**	**$227,751**

Table 5.4 – Total Earnings Impact from the Grain Belt Express Transmission Line for Missouri Counties (Cont.)

	Clinton County	Monroe County	Ralls County	Randolph County	State of Missouri
Construction					
Direct	$24,984,481	$111,986,819	$38,696,627	$24,754,210	$350,849,662
Indirect	$1,113,694	$3,495,267	$2,484,076	$3,992,506	$107,040,679
Induced	$1,967,614	$3,760,682	$1,465,278	$3,647,735	$128,227,991
Total	**$28,065,789**	**$119,242,768**	**$42,645,981**	**$32,394,451**	**$586,118,331**
Operations (Annual)					
Direct	$48,751	$2,479,995	$102,227	$48,302	$2,988,331
Indirect	$29,136	$132,679	$6,803	$128,060	$3,572,642
Induced	$4,214	$76,540	$2,813	$17,540	$1,552,104
Total	**$82,101**	**$2,689,214**	**$111,843**	**$193,902**	**$8,113,077**

Tables 5.5 and 5.6 show the total output impacts from the transmission line for the counties in Missouri during construction and operations. The new local output during construction total over $40 million for Audrain County, over $51.8 million for Buchanan County, over $42.1 million for Caldwell County, over $11.3 million for Callaway County, over $50.2 million for Carroll County, over $59.9 million for Chariton County, over $38.1 million for Clinton County, over $145 million for Monroe County, over $57.3 million for Ralls County, over $47.4 million for Randolph County, and over $986 million for the State of Missouri. The new local long-term earnings total over $678 thousand for Audrain County, over $817 thousand for Buchanan County, over $372 thousand for Caldwell County, over $24.6 thousand for Callaway County, over $751 thousand for Carroll County, over $797 thousand for Chariton County, over $190 thousand for Clinton County, over $3.5 million for Monroe County, over $151 thousand for Ralls County, over $655 thousand for Randolph County, and over $15.8 million for the State of Missouri.

Table 5.5 – Total Output Impact from the Grain Belt Express Transmission Line for Missouri Counties

	Audrain County	Buchanan County	Caldwell County	Callaway County	Carroll County	Chariton County
Construction						
Direct	$22,793,545	$25,214,753	$27,978,014	$6,741,327	$29,935,323	$37,764,562
Indirect	$7,894,031	$10,874,592	$5,383,544	$1,989,210	$6,885,205	$8,877,384
Induced	$9,331,039	$15,807,582	$8,744,792	$2,605,061	$13,449,657	$13,320,113
Total	**$40,018,615**	**$51,896,927**	**$42,106,350**	**$11,335,598**	**$50,270,185**	**$59,962,059**
Operations (Annual)						
Direct	$56,464	$49,200	$54,592	$16,700	$58,411	$73,688
Indirect	$553,374	$665,685	$292,539	$3,906	$622,183	$669,033
Induced	$68,803	$102,340	$25,340	$4,069	$70,444	$54,497
Total	**$678,641**	**$817,225**	**$372,471**	**$24,675**	**$751,038**	**$797,218**

Table 5.6 – Total Output Impact from the Grain Belt Express Transmission Line for Missouri Counties (Cont.)

	Clinton County	Monroe County	Ralls County	Randolph County	State of Missouri
Construction					
Direct	$24,984,481	$111,986,819	$38,696,627	$24,754,210	$350,849,662
Indirect	$5,205,951	$13,709,921	$10,666,318	$10,456,640	$244,914,640
Induced	$7,980,662	$19,512,421	$7,997,777	$12,231,510	$390,350,915
Total	**$38,171,094**	**$145,209,160**	**$57,360,722**	**$47,442,360**	**$986,115,216**
Operations (Annual)					
Direct	$48,751	$2,479,995	$102,227	$48,302	$2,988,331
Indirect	$125,059	$633,258	$33,877	$548,678	$8,119,938
Induced	$17,161	$397,259	$15,438	$58,876	$4,717,146
Total	**$190,971**	**$3,510,512**	**$151,542**	**$655,856**	**$15,825,415**

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VII. Curriculum Vitae (Abbreviated)

David G. Loomis
Illinois State University
Department of Economics
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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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