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Filed Date: 02/28/2022
State Corporation Commission
of Kansas

BEFORE THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

In the Matter of the Application of NextEra Energy Transmission Southwest, LLC for a Limited Certificate of Public Convenience and Necessity to Transact the Business of Public Utility in the State of Kansas	)))))))	22-NETE-419-COC Docket No. 22-____-___-COC

DIRECT TESTIMONY OF DAVID G. LOOMIS, Ph.D.,
PRESIDENT, STRATEGIC ECONOMIC RESEARCH, LLC

ON BEHALF OF

NEXTERA ENERGY TRANSMISSION SOUTHWEST, LLC

Docket No. 22-____-___-COC

FEBRUARY 28, 2022

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I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS AND PRESENT POSITION.

A. My name is David G. Loomis. My business address is 2705 Kolby Court, Bloomington, IL 61704. I am President of Strategic Economic Research, LLC, Professor of Economics at Illinois State University, Executive Director of the Institute of Regulatory Policy Studies and Co-Founder of the Center for Renewable Energy.

Q. WHAT ARE THE DUTIES AND RESPONSIBILITIES OF YOUR POSITION?

A. As President of Strategic Economic Research, LLC, I oversee all of the operations of the company. I lead the economic analysis and personally train all employees on the technical dimensions of their job.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EMPLOYMENT EXPERIENCE.

A. I received a Bachelor of Arts degree in economics and mathematics and a Doctor of Philosophy degree in economics from Temple University. I achieved the rank of full Professor at Illinois State University in 2010.

As part of my duties as Professor of Economics at Illinois State University, I teach and oversee the course sequence in Electricity, Natural Gas and Telecommunications Economics within the Applied Economics Master's Degree Program. I have been teaching classes that cover transmission markets, cost allocation and pricing for over 26 years, including Economics of Regulation and Antitrust, Economics of Energy, and Industry Studies in Electricity, Natural Gas and Telecommunications Economics. I was part of the team of three faculty members that created a unique undergraduate degree program in renewable energy at Illinois State University. I have authored or co-authored 38 publications in peer-reviewed publications such as *Energy Policy, Energy Economics,*

Electricity Journal, and *Applied Energy*. I have received numerous professional awards including the 2016 Outstanding Cross-Disciplinary Team Research Award, the 2011 Midwestern Regional Wind Advocacy Award from the U.S. Department of Energy's Wind Powering America, the 2009 Economics Department Scott M. Elliott Faculty Excellence Award, the Illinois State University Million Dollar Club in 2009 (awarded to faculty who received over $1 million in grants), and the 2008 Outstanding State Wind Working Group Award. My full curriculum vitae is provided in Exhibit DL-1 to this testimony.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING TESTIMONY?

A. I am testifying on behalf of NextEra Energy Transmission Southwest, LLC ("NEET Southwest" or the "Applicant").

Q. WHAT AUTHORITY IS THE APPLICANT SEEKING TO OBTAIN IN THIS PROCEEDING?

A. The Applicant is seeking to obtain a limited Certificate of Convenience and Necessity ("CCN") to construct, own, operate, and maintain a single-circuit, 345 kV transmission line project that will connect the existing Wolf Creek Substation in Coffey County, Kansas to the existing Blackberry Substation in Jasper County, Missouri (the "Project"). The Kansas portion of the Project is approximately 85 miles, traversing through Coffey, Anderson, Allen, Bourbon, and Crawford Counties. The Missouri portion of the Project is approximately nine miles, for a total Project length of approximately 94 miles.

Q. HAVE YOU PREVIOUSLY PROVIDED TESTIMONY BEFORE THE KANSAS CORPORATION COMMISSION?

A. No. However, I conducted an economic impact analysis and co-authored a report attached to the Direct Testimony of David A. Berry on behalf of Grain Belt Express Clean Line LLC in Docket No. 13-GBEE-803-MIS.

Q. HAVE YOU PROVIDED TESTIMONY BEFORE OTHER PUBLIC UTILITY COMMISSIONS?

A. Yes, I have provided testimony before the Public Service Commission of Wisconsin, the Kentucky State Board on Electric Generation and Transmission Siting, the Ohio Power Siting Board, the Public Service Commission of West Virginia, the Iowa Utilities Board, the New Mexico Public Regulation Commission, the Missouri Public Service Commission, and the Illinois Commerce Commission. A list of my prior testimonies is provided in Exhibit DL-1.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I am testifying in support of NEET Southwest's request in this proceeding to be issued a CCN to construct, own, operate, and maintain the Project and to operate as a public utility in the State of Kansas. I will address the economic impact of the proposed Project on the Kansas economy and will testify that the Project will be beneficial on an overall basis to state and local communities in the area of the Project. I performed a study to estimate the economic impact of the Project, and a full report of the study that I performed is attached as Exhibit DL-2 to my Direct Testimony. In summary, within the State of Kansas, the Project is expected to support: 998 new jobs during construction and approximately six to 9.6 new long-term jobs; over $55.6 million in new worker earnings during construction and $498,000-$716,000 in long-term worker earnings; and over $145 million in new economic output during construction and $4.4-$5.1 million in new long-term economic output.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. Section I of my Direct Testimony provides my qualifications and an overview of my testimony. Section II provides a summary of my economic analysis, including the methodology I utilized to perform my study and the results.

II. OVERVIEW AND SUMMARY OF ECONOMIC ANALYSIS

Q. ARE YOU FAMILIAR WITH THE COMMISSION'S MERGER STANDARDS, AS THEY RELATE TO YOUR TESTIMONY?

A. Yes. While I am not an attorney, I am generally familiar with the Commission's Merger Standards, originally adopted in Docket Nos. 172,745-U and 174,155-U.[1] In particular, I am familiar with the Commission's requirement for an applicant for a CCN to demonstrate that the transaction will be beneficial to state and local economies and to communities served by the resulting public utility operations in the state.

Q. HAVE YOU EVALUATED WHETHER THE PROJECT WOULD MEET THIS STANDARD?

A. Yes. My study estimated the economic impacts of the Project, including the economic impact of the construction itself, as well as the economic impact of the Project's ongoing operations and maintenance ("O&M").

Q. PLEASE DESCRIBE HOW YOU CONDUCTED YOUR ECONOMIC ANALYSIS.

A. I estimated the impacts of construction and operation of the Project using the IMPLAN model. IMPLAN is one of the leading vendors of input-output modeling software that is used for this type of analysis. The specific impacts that were analyzed include direct, indirect, and induced effects on employment, labor income, and economic output for Kansas and Missouri.

[1] Consolidated Docket Nos. 172,745-U and 174,155-U, Order at pp. 34-35 (Nov. 4, 1991); *see also*, Docket No.08-ITCE-936-COC *et al.*, Order at ¶ 52 (Dec. 18, 2008).

Q. WHAT DOES THE STUDY ESTIMATE WILL BE THE ECONOMIC IMPACT OF THE CONSTRUCTION OF THE PROJECT?

A. My study estimates that the construction of the Project and associated facilities will—when considering the production of inputs to the line such as labor, engineering, foundations, and real estate services—create a demand for approximately 998 jobs during the approximately 24-month construction period in Kansas. Labor income will increase by over $55.6 million in new worker earnings in Kansas during construction, and overall economic output will increase by over $145 million in Kansas during construction.

Q. WHAT DOES THE STUDY ESTIMATE WILL BE THE ECONOMIC IMPACT OF THE ONGOING OPERATIONS AND MAINTENANCE OF THE PROJECT?

A. My study estimates that the economic impact of the annual O&M costs of the Project, which will be incurred when the line is placed into service and operating, expected in January 2025, will be approximately six new long-term jobs in Kansas and over $498,000 in long-term worker earnings during the first ten years. Overall economic output in Kansas will increase by over $4.4 million annually during that period. After the property tax abatement expires in year 11, the long-term jobs in Kansas will increase to 9.6 with $716,000 in long-term earnings and $5.1 million in increased output.

III. <u>CONCLUSION</u>

Q. HOW WOULD YOU SUMMARIZE YOUR TESTIMONY?

A. In summary, the Project will be beneficial to the state and local economies in the Project area, resulting in new jobs both during construction and after the Project is placed into service, with concomitant increases in worker earnings in these periods. Finally, the Project will result in additional economic output during construction and long-term after the Project is placed into service.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

VERIFICATION

STATE OF ILLINOIS)
) ss.
COUNTY OF MCLEAN)

I, David G. Loomis, being duly sworn, on oath state that I am President of Strategic Economic Research, LLC, and that I have read the foregoing pleading and know the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge and belief.

By: _____
David G. Loomis

The foregoing pleading was subscribed and sworn to before me this 23rd day of February, 2022.

_____
Notary Public

My Commission Expires:
5-29-2024

OFFICIAL SEAL
JENNIFER E CLEINMARK
NOTARY PUBLIC - STATE OF ILLINOIS
My Commission Expires May 29, 2024

Exhibit DL-1

Public

David G. Loomis
Illinois State University
Department of Economics
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Normal, IL 61790-4200
(309) 438-7979
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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, Environmental Economics, 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

Experience (cont'd)

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.

1997-2002 International Communications Forecasting Conference
Chair

- Expanded Planning Committee with representatives from over 18 different international companies and delivered high quality conference attracting over 500 people over 4 years.

1985-1996 Bell Atlantic, Philadelphia, Pa.
Economist - Business Research

- Wrote and taught Applied Business Forecasting multimedia course.
- Developed and documented 25 econometric demand models that were used in regulatory filings.
- Provided statistical and analytic support to regulatory costing studies.
- Served as subject matter expert in switched and special access.
- Administered $4 million budget including $1.8 million consulting budget.

Professional Awards and Memberships

2016 Outstanding Cross-Disciplinary Team Research Award with Jin Jo and Matt Aldeman – recognizes exemplary collaborative research conducted by multiple investigators from different disciplines.

2011 Midwestern Regional Wind Advocacy Award from the U. S. Department of Energy's Wind Powering America presented at WindPower 2011

2009 Economics Department Scott M. Elliott Faculty Excellence Award – awarded to faculty who demonstrate excellence in teaching, research and service.

2009 Illinois State University Million Dollar Club – awarded to faculty who have over $1 million in grants through the university.

2008 Outstanding State Wind Working Group Award from the U. S. Department of Energy's Wind Power America presented at WindPower 2008.

1999 Illinois State University Teaching Initiative Award

Member of the American Economic Association, National Association of Business Economists, International Association for Energy Economics, Institute for Business Forecasters; Institute for International Forecasters, International Telecommunications Society.

Professional Publications

38. Ohler, A. **Loomis, D.G.,** Marquis, Y. (2022). The Household Appliance Stock, Income, and Electricity Demand Elasticity, *Energy Journal,* 43(1).

37. Ohler, A., **Loomis, D.G.,** Ilves, K. (2020). A study of electricity savings from energy star appliances using household survey data, *Energy Policy,* 144: 1-13.

36. Ohler, A., Mohammadi, H. and **Loomis, D.G.** (2020). Electricity restructuring and the relationship between fuel costs and electricity prices for industrial and residential customers, *Energy Policy,* 142: 1-8.

35. Aldeman, M. R., Jo, J. H., & **Loomis, D. G.** (2020). Wind energy production uncertainty associated with wind assessments of various intervals. *Wind Engineering*, Feb. 2020. Published online May 2019. https://doi.org/10.1177/0309524X19849865.

34. Aldeman, M.R., Jo, J.H., and **Loomis, D.G.** (2018). Quantification of Uncertainty Associated with Wind Assessments of Various Intervals, *Transactions of the Canadian Society for Mechanical Engineering*, 42(4): 350-358.

Professional Publications (cont'd)

33. Jo, J.H., Cross, J., Rose, Z., Daebel, E., Verderber, A., and **Loomis, D. G.** (2016)**.** Financing options and economic impact: distributed generation using solar photovoltaic systems in Normal, Illinois, *AIMS Energy,* 4(3): 504-516.

32. **Loomis, D.G.**, Hayden, J., Noll, S. and Payne, J.E. (2016). Economic Impact of Wind Energy Development in Illinois, *The Journal of Business Valuation and Economic Loss Analysis,* 11(1), 3-23.

31. **Loomis, D.G.**, Jo, J.H., and Aldeman, M.R., (2016). Economic Impact Potential of Solar Photovoltaics in Illinois, *Renewable Energy*, 87, 253-258.

30. Aldeman, M.R., Jo, J.H., and **Loomis, D.G.** (2015). The Technical Potential for Wind Energy in Illinois, *Energy*, 90(1), 1082-1090.

29. Tegen, S., Keyser, D., Flores-Espino, F., Miles, J., Zammit, D. and **Loomis, D**. (2015). Offshore Wind Jobs and Economic Development Impacts in the United States: Four Regional Scenarios, National Renewable Energy Laboratory Technical Report, NREL/TP-5000-61315, February.

28. **Loomis, D. G.** and Bowden, N. S. (2013). Nationwide Database of Electric Rates to Become Available, *Natural Gas & Electricity*, 30 (5), 20-25.

27. Jo, J. H., **Loomis, D. G.,** and Aldeman, M. R. (2013). Optimum penetration of utility-scale grid-connected solar photovoltaic systems in Illinois, *Renewable Energy*, 60, 20-26.

26. Malm, E., **Loomis, D. G.,** DeFranco, J. (2012). A Campus Technology Choice Model with Incorporated Network Effects: Choosing Between General Use and Campus Systems, *International Journal of Computer Trends and Technology,* 3(4), 622-629.

25. Chupp, B. A., Hickey, E.A. & **Loomis, D. G.** (2012). Optimal Wind Portfolios in Illinois, *Electricity Journal*, 25, 46-56.

24. Hickey, E., **Loomis, D. G.,** & Mohammadi, H. (2012). Forecasting hourly electricity prices using ARMAX-GARCH models: An application to MISO hubs, *Energy Economics,* 34, 307-315*.*

23. Theron, S., Winter, J.R, **Loomis, D. G.,** & Spaulding, A. D. (2011). Attitudes Concerning Wind Energy in Central Illinois. *Journal of the America Society of Farm Managers and Rural Appraisers*, 74, 120-128.

22. Payne, J. E., **Loomis, D. G.** & Wilson, R. (2011). Residential Natural Gas Demand in Illinois: Evidence from the ARDL Bounds Testing Approach. *Journal of Regional Analysis and Policy,* 41(2), 138.

Professional Publications (cont'd)

21**. Loomis, D. G.** & Ohler, A. O. (2010). Are Renewable Portfolio Standards A Policy Cure-all? A Case Study of Illinois's Experience. *Environmental Law and Policy Review*, *35,* 135-182.

20. Gil-Alana, L. A., **Loomis, D. G., &** Payne, J. E. (2010). Does energy consumption by the U.S. electric power sector exhibit long memory behavior? *Energy Policy,* 38, 7512-7518.

19. Carlson, J. L., Payne, J. E., & **Loomis, D. G**. (2010). An assessment of the Economic Impact of the Wind Turbine Supply Chain in Illinois. *Electricity Journal*, 13, 75-93.

18. Apergis, N., Payne, J. E., & **Loomis, D. G.** (2010). Are shocks to natural gas consumption transitory or permanent? *Energy Policy, 38*, 4734-4736.

17. Apergis, N., Payne, J. E., & **Loomis, D. G.** (2010). Are fluctuations in coal consumption transitory or permanent? Evidence from a panel of U.S. states. *Applied Energy, 87,* 2424-2426.

16. Hickey, E. A., Carlson, J. L., & **Loomis, D. G.** (2010). Issues in the determination of the optimal portfolio of electricity supply options. *Energy Policy*, *38*, 2198-2207.

15. Carlson, J. L., & **Loomis, D. G.** (2008). An assessment of the impact of deregulation on the relative price of electricity in Illinois. *Electricity Journal, 21*, 60-70.

14. Loomis, D. G., (2008). The telecommunications industry. In H. Bidgoli (Ed.), *The handbook of computer networks* (pp. 3-19). Hoboken, NJ: John Wiley & Sons.

13. Cox, J. E., Jr., & **Loomis, D. G.** (2007). A managerial approach to using error measures in the evaluation of forecasting methods. *International Journal of Business Research, 7,* 143-149.

12. Cox, J. E., Jr., & **Loomis, D. G.** (2006). Improving forecasting through textbooks – a 25 year review. *International Journal of Forecasting, 22*, 617-624.

11. Swann, C. M., & **Loomis, D. G**. (2005). Competition in local telecommunications – there's more than you think. *Business Economics*, *40,* 18-28.

10. Swann, C. M., & **Loomis, D. G.** (2005). Intermodal competition in local telecommunications markets. *Information Economics and Policy, 17, 97-113*.

Professional Publications (cont'd)

9. Swann, C. M., & **Loomis, D. G.** (2004) Telecommunications demand forecasting with intermodal competition – a multi-equation modeling approach. *Telektronikk*, *100*, 180-184.

8. Cox, J. E., Jr., & **Loomis, D. G.** (2003). Principles for teaching economic forecasting. *International Review of Economics Education,* 1, 69-79.

7. Taylor, L. D. & **Loomis, D. G.** (2002). *Forecasting the internet: understanding the explosive growth of data communications.* Boston: Kluwer Academic Publishers.

6. Wiedman, J. & **Loomis, D. G.** (2002). U.S. broadband pricing and alternatives for internet service providers. In D. G. Loomis & L. D. Taylor (Eds.) Boston: Kluwer Academic Publishers.

5. Cox, J. E., Jr. & **Loomis, D. G.** (2001). Diffusion of forecasting principles: an assessment of books relevant to forecasting. In J. S. Armstrong (Ed.), *Principles of Forecasting: A Handbook for Researchers and Practitioners* (pp. 633-650). Norwell, MA: Kluwer Academic Publishers.

4. Cox, J. E., Jr. & **Loomis, D. G.** (2000). A course in economic forecasting: rationale and content. *Journal of Economics Education*, 31, 349-357.

3. Malm, E. & **Loomis, D. G.** (1999). Active market share: measuring competitiveness in retail energy markets. *Utilities Policy, 8, 213-221.*

2. Loomis, D. G. (1999). Forecasting of new products and the impact of competition. In D. G. Loomis & L. D. Taylor (Eds.), *The future of the telecommunications industry: forecasting and demand analysis.* Boston: Kluwer Academic Publishers.

1. Loomis, D. G. (1997). Strategic substitutes and strategic complements with interdependent demands. *The Review of Industrial Organization,* 12, 781-791.

Expert Testimony

57. Iowa Utilities Board, Docket No. GCU-2021-0001 and GCU-2021-002, on behalf of Duane Arnold Solar, LLC (NextEra), Written Direct Testimony forthcoming.

56. Sangamon County (Illinois) Zoning Board of Appeals, on Behalf of Double Black Diamond Solar (Swift Current), Direct Oral Testimony, October 21, 2021.

Expert Testimony (cont'd)

55. Public Service Commission of Wisconsin, Docket No. 9811-CE-100, Application for Koshkonong Solar Energy Center, LLC to Construct a New Solar Electric Generation Facility located in Dane County, Wisconsin (Invenergy): Written Direct Testimony filed October 7, 2021; Written Rebuttal Testimony filed December 17, 2021; Hearing, January 19, 2022.

54. Kentucky State Board on Electric Generation and Transmission Siting, Case No. 2021-00029, Martin County Solar Project, LLC (Savion), September 28, 2021 Hearing.

53. Ohio Power Siting Board, Case No. 20-1405-EL-BGN, On Behalf of AEUG Union Solar, LLC (Acciona), Written Direct Testimony filed October 28, 2021, November 10, 2021.

52. DeKalb County (Illinois) Zoning Board of Appeals, on Behalf of Red Maple Solar (Leeward Renewables), Direct Oral Testimony, August 26, 2021.

51. DeKalb County (Illinois) Zoning Board of Appeals, on Behalf of Owens Creek Solar (Leeward Renewables), Direct Oral Testimony, August 10, 2021.

50. Public Service Commission of West Virginia, Case No. 21-0566-E-SCS-PW, Application for a Solar Siting Certificate for a Facility in Hampshire County, on behalf of Capon Bridge Solar, LLC (Galehead Renewables), Written Direct Testimony filed July 16, 2021.

49. Edgar County (Illlinois) County Board, on behalf of Orsted, Direct Oral Testimony, June 9, 2021.

48. McLean County (Illinois) Zoning Board of Appeals, on behalf of Invenergy, Direct Oral Testimony, June 1, 8, 9 and 22, 2021.

47. Clark County (Kentucky) Board Meeting, on behalf of Swift Current, Direct Oral Testimony, May 25, 2021.

46. Public Service Commission of Wisconsin, Docket No. 9806-CE-100, Application for Darien Solar Energy Center, LLC to Construct a New Solar Electric Generation Facility located in Walworth County, Wisconsin (Invenergy): Written Direct Testimony filed February 5, 2021; April 22, 2021 Hearing.

45. Kentucky State Board on Electric Generation and Transmission Siting, Case No. 2020-00219, AEUG Madison Solar (Acciona), April 15, 2021 Hearing.

44. McLean County (Illinois) Zoning Board of Appeals, on behalf of Invenergy, Direct Oral Testimony, April 6-7, 2021.

Expert Testimony (cont'd)

43. Kentucky State Board on Electric Generation and Transmission Siting, Case No. 2020-00206, AEUG Fleming Solar (Acciona), April 1, 2021 Hearing.

42. Iowa Utilities Board, Docket No. E-22432, on behalf of Heartland Divide Wind II, LLC (NextEra), Written Direct Testimony filed February 2, 2021, March 18, 2021 Hearing.

41. Macon Township Zoning Board, on behalf of Invenergy, Direct Oral Testimony, January 6, 2021, January 20, 2021, February 24, 2021, March 17, 2021.

40. Public Service Commission of Wisconsin, Docket No. 9804-CE-100, Application for Grant County Solar, LLC to Construct a New Solar Electric Generation Facility located near Potosi and Harrison Townships, in Grant County, Wisconsin (NextEra): Written Direct Testimony filed November 3, 2020; Rebuttal Testimony filed January 5, 2021; February 10, 2021 Hearing.

39. Warren County (Missouri) Zoning Board, on behalf of Invenergy, Direct Oral Testimony, November 19, 30, December 17, 2020.

38. Grundy County (Illinois) Zoning Board of Appeals, on behalf of RES America, Direct Oral Testimony, November 17, 2020.

37. McLean County (Illinois) Zoning Board of Appeals, on behalf of Invenergy, Direct Oral Testimony, August 4, 2020.

36. Public Service Commission of Wisconsin, Docket No. 9801-CE-100, Application of Paris Solar Farm, LLC for a Certificate of Public Convenience and Necessity, on behalf of Paris Solar Farm, LLC (Invenergy): Written Direct Testimony filed July 2, 2020.

35. Christian County (Illinois) Zoning Board of Appeals, on behalf of Invenergy, Direct Oral Testimony, June 23, 24, 30, & July 6, 7, 21, 2020.

34. Piatt County (Illinois) Zoning Board of Appeals, on behalf of Apex Energy, Direct Oral Testimony, January 23, 2020.

33. Marshall County (Illinois) Zoning Board of Appeals, on behalf of Akuo Energy, Direct Oral Testimony, October 17, 2019.

32. Public Service Commission of Wisconsin, Docket No. 9800-CE-100, Application of Badger State Solar, LLC for a Certificate of Public Convenience and Necessity, on behalf of Badger State Solar, LLC (Ranger Power): Written Direct Testimony filed September 10, 2019.

Expert Testimony (cont'd)

31. Adams Township (Michigan) Planning Commission Hearing, on behalf of Invenergy, Direct Oral Testimony, August 27, 2019.

30. Christian County (Illinois) Zoning Board of Appeals, on behalf of Invenergy, Direct Oral Testimony, July 23, 2019.

29. Wheatland Township (Michigan) Planning Commission Hearing, on behalf of Invenergy, Direct Oral Testimony, July 18, 2019.

28. Christian County (Illinois) Board Meeting, on behalf of Invenergy and Tradewind Energy, Direct Oral Testimony, May 29, 2019.

27. DeWitt County (Illinois) Zoning Board of Appeals, on behalf of Tradewind Energy, Direct Oral Testimony, February 8, 2019.

26. Public Service Commission of Wisconsin, Docket No. 9697-CE-100, Application of Badger Hollow Solar Farm for a Certificate of Public Convenience and Necessity, on behalf of Badger Hollow Solar Farm LLC (Invenergy): Written Direct Testimony filed November 20, 2018; Written Rebuttal Testimony filed January 8, 2019; Surrebuttal Testimony filed January 14, 2019; Oral Cross-Examination, January 16, 2019.

25. Ohio Power Siting Board, Case No. 19-1880-EL-BGN, In the Matter of the Application of Atlanta Farms Solar Project, LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Pickaway County, Ohio, on behalf of Atlanta Farms Solar Project, LLC, Exhibit with Report filed October 18, 2019.

24. Ford County (Illinois) Zoning Board of Appeals, on behalf of Pattern Energy and Apex Clean Energy, Direct Oral Testimony, October 3, 2018.

23. DeKalb County (Illinois) County Board Hearing, on behalf of EDF Renewable Development, Inc., Direct Oral Testimony, September 24, 2018.

22. Ford County (Illinois) Planning Commission, on behalf of Pattern Energy, Direct Oral Testimony, September 5, 2018.

21. Ohio Power Siting Board, Case No. 18-1360-EL-BGN, In the matter of Hardin Solar Energy II LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Hardin County, Ohio, on behalf of Hardin Solar Energy II LLC, Exhibit with Report filed August 3, 2018.

Expert Testimony (cont'd)

20. Ohio Power Siting Board, Case No. 17-774-EL-BGN, In the Matter of the Application of Vinton Solar Energy LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Vinton County, Ohio. On behalf of Vinton Solar Energy LLC, Exhibit with Report filed July 27, 2018.

19. DeKalb County (Illinois) Zoning Board of Appeals, on behalf of EDF Renewable Development, Inc., Direct Oral Testimony, June 27, 2018.

18. Ford County (Illinois) Zoning Board, on behalf of Apex Clean Energy, Inc., Direct Oral Testimony, June 11, 2018.

17. McLean County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of Invenergy, LLC, Direct Oral Testimony, January 4, 2018.

16. New Mexico Public Regulation Commission, Case No. 17-00275-UT, Application of Sagamore Wind Energy LLC, on behalf of Invenergy, LLC: Direct Written Testimony filed November 6, 2017; Oral Cross-examination Testimony appeared before the Commission on March 13, 2018.

15. Ohio Power Siting Board, Case No. 17-773-EL-BGN, In the Matter of Hardin Solar Energy LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Hardin County, Ohio, on behalf of Invenergy, LLC, Exhibit with Report filed July 5, 2017.

14. Macon County (Illinois) Environmental, Education, Health and Welfare Committee, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of E.ON Energy, Direct Oral Testimony, August 20, 2015.

13. Macon County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of E.ON Energy, Direct Oral Testimony, August 11, 2015.

12. Kankakee County (Illinois) Planning, Zoning, and Agriculture Committee, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of EDF Renewables, Direct Oral Testimony, July 22, 2015.

11. Kankakee County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of EDF Renewables, Direct Oral Testimony, July 13, 2015.

10. Bureau County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of Berkshire Hathaway Energy/Geronimo Energy, Direct Oral Testimony, June 16, 2015.

Expert Testimony (cont'd)

9. Illinois Commerce Commission, Case No. 15-0277, on behalf of Grain Belt Express Clean Line LLC: Written Direct Testimony filed April 10, 2015; Written Rebuttal Testimony filed August 7, 2015; Oral Cross-examination Testimony, August 19, 2015.

8. Livingston County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of Invenergy, Oral Cross-Examination, December 8-9, 2014.

7. Livingston County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of Invenergy, Direct Oral Testimony, November 17-19, 2014.

6. Missouri Public Service Commission, Case No. EA-2014-0207, on behalf of Grain Belt Express Clean Line LLC: Written Direct Testimony filed March 26, 2014; Written Surrebuttal Testimony, filed October 14, 2014; Oral Cross-examination Testimony, November 21, 2014.

5. Boone County (Illinois) Board, Examination of Wind Energy Conversion System Ordinance, Direct Testimony and Cross-Examination, April 23, 2013.

4. Illinois Commerce Commission, Case No. 12-0560, on behalf of Rock Island Clean Line LLC: Written Direct Testimony filed October 10, 2012; Written Rebuttal Testimony filed August 20, 2013; Oral Cross-examination Testimony, December 11, 2013.

3. Whiteside County (Illinois) Board and Whiteside County Planning and Zoning Committee, Examination of Wind Energy Conversion System Ordinance, Direct Testimony and Cross-Examination, on behalf of the Center for Renewable Energy, April 12, 2012.

2. State of Illinois Senate Energy and Environment Committee, Direct Testimony and Cross-Examination, on behalf of the Center for Renewable Energy, October 28, 2010.

1. Livingston County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of the Center for Renewable Energy, Direct Testimony and Cross-Examination, July 28, 2010.

Selected Presentations

"Is Solar Energy a Good Use of Farmland?" presented on June 10, 2020 at CleanPower 2020 (webinar) with Jin Jo and Matt Aldeman.

"Renewable Energy in McLean County," presented December 13, 2018 at Bloomington-Normal Economic Development Council's BN By the Numbers, Normal, IL.

"Smart Cities and Micro Grids: Cost Recovery Issues," presented September 12,2017 at the National Association of Regulatory Utility Commissioners Staff Subcommittee on Accounting and Finance Meeting, Springfield, IL.

"Cloud Computing: Regulatory Principles and ICC NOI," presented September 11,2017 at the National Association of Regulatory Utility Commissioners Staff Subcommittee on Accounting and Finance Meeting, Springfield, IL.

"Illinois Wind, Illinois Solar and the Illinois Future Energy Jobs Act," presented July 25, 2017 at the Illinois County Assessors Meeting, Normal, IL.

"Illinois Wind, Illinois Solar and the Illinois Future Energy Jobs Act," presented April 21, 2017 at the Illinois Association of County Zoning Officers Meeting, Bloomington, IL.

"Energy Storage Economics and RTOs," presented October 30, 2016 at the Energy Storage Conference at Argonne National Laboratory.

"Wind Energy in Illinois," on October 6, 2016 at the B/N Daybreak Rotary Club, Bloomington, IL.

"Smart Grid for Schools," presented August 17, 2016 to the Ameren External Affairs Meeting, Decatur, IL.

"Solar Energy in Illinois," presented July 28, 2016 at the 3rd Annual K-12 Teachers Clean Energy Workshop, Richland Community College, Decatur, IL

"Wind Energy in Illinois," presented July 28, 2016 at the 3rd Annual K-12 Teachers Clean Energy Workshop, Richland Community College, Decatur, IL

"Smart Grid for Schools," presented June 21, 2016 at the ISEIF Grantee and Ameren Meeting, Decatur, IL.

"Costs and Benefits of Renewable Energy," presented November 4, 2015 at the Osher Lifelong Learning Institute at Bradley, University, Peoria, IL.

"Energy Sector Workforce Issues," presented September 17, 2015 at the Illinois Workforce Investment Board, Springfield, IL.

Presentations (cont'd)

"The Past, Present and Future of Wind Energy in Illinois," presented March 13, 2015 at the Peoria Rotary Club, Peoria, IL.

"Where Are All the Green Jobs?" presented January 28, 2015 at the 2015 Illinois Green Economy Network Sustainability Conference, Normal, IL.

"Teaching Next Generation Energy Concepts with Next Generation Science Standards: Addressing the Critical Need for a More Energy-Literate Workforce," presented September 30, 2014 at the Mathematics and Science Partnerships Program 2014 Conference in Washington, DC.

"National Utility Rate Database," presented October 23, 2013 at Solar Power International, Chicago, IL.

"Potential Economic Impact of Offshore Wind Energy in the Great Lakes," presented May 6, 2013 at WindPower 2013, Chicago, IL.

"Why Illinois? Windy City, Prairie Power," presented May 5, 2013 at WindPower 2013, Chicago, IL.

"National Utility Rate Database," presented January 29, 2013 at the EUEC Conference, Phoenix, AZ.

"Energy Learning Exchange and Green Jobs," presented December 13, 2012 at the TRICON Meeting of Peoria and Tazewell County Counselors, Peoria, IL.

"Potential Economic Impact of Offshore Wind Energy in the Great Lakes," presented November 12, 2012 at the Offshore Wind Jobs and Economic Development Impacts Webinar.

"Energy Learning Exchange," presented October 31, 2012 at the Utility Workforce Development Meeting, Chicago, IL.

"Wind Energy in McLean County," presented June 26, 2012 at BN By the Numbers, Normal, IL.

"Wind Energy," presented June 14, 2012 at the Wind for Schools Statewide Teacher Workshop, Normal, IL.

"Economic Impact of Wind Energy in Illinois," presented June 6, 2012 at AWEA's WINDPOWER 2012, Atlanta, GA.

"Trends in Illinois Wind Energy," presented March 6, 2012 at the AWEA Regional Wind Energy Summit – Midwest in Chicago, IL.

Presentations (cont'd)

"Challenges and New Growth Strategies in the Wind Energy Business," invited plenary session speaker at the Green Revolution Leaders Forum, November 18, 2011 in Seoul, South Korea.

"Overview of the Center for Renewable Energy," presented July 20, 2011 at the University-Industry Consortium Meeting at Illinois Institute of Technology, Chicago, IL.

"Building the Wind Turbine Supply Chain," presented May 11, 2011 at the Supply Chain Growth Conference, Chicago, IL

"Building a Regional Energy Policy for Economic Development," presented April 4, 2011 at the Midwestern Legislative Conference's Economic Development Committee Webinar.

"Wind Energy 101," presented February 7, 2011 at the Wind Power in Central Illinois - A Public Forum, CCNET Renewable Energy Group, Champaign, IL.

"Alternative Energy Strategies," presented with Matt Aldeman November 19,

2010 at the Innovation Talent STEM Education Forum, Chicago, IL.

"Siting and Zoning in Illinois," presented November 17, 2010 at the Wind Powering America Webinar.

"What Governor Quinn Should Do about Energy?" presented November 15, 2010 at the Illinois Chamber of Commerce Energy Forum Conference, Chicago, IL.

"Is Wind Energy Development Right for Illinois," presented with Matt Aldeman October 28, 2010 at the Illinois Association of Illinois County Zoning Officials Annual Seminar in Utica, IL.

"Economic Impact of Wind Energy in Illinois," presented July 22, 2010 at the AgriEnergy Conference in Champaign, IL.

"Renewable Energy Major at ISU," presented July 21, 2010 at Green Universities and Colleges Subcommittee Webinar.

"Economics of Wind Energy," presented May 19, 2010 at the U.S. Green Building Council meeting in Chicago, IL.

"Forecasting: A Primer for the Small Business Entrepreneur," presented with James E. Cox, Jr. April 14, 2010 at the Allied Academies' Spring International Conference in New Orleans, LA.

Presentations (cont'd)

"Are Renewable Portfolio Standards a Policy Cure-All? A Case Study of Illinois' Experience," presented January 30, 2010 at the 2010 William and Mary Environmental Law and Policy Review Symposium in Williamsburg, VA.

"Creating Partnerships between Universities and Industry," presented November 19, 2009, at New Ideas in Educating a Workforce in Renewable Energy and Energy Efficiency in Albany, NY.

"Educating Illinois in Renewable Energy, presented November 14, 2009 at the Illinois Science Teachers Association in Peoria, IL.

"Green Collar Jobs," invited presentation October 14, 2009 at the 2009 Workforce Forum in Peoria, IL.

"The Role of Wind Power in Illinois," presented March 4, 2009 at the Association of Illinois Electric Cooperatives Engineering Seminar in Springfield, IL.

"The Economic Benefits of Wind Farms," presented January 30, 2009 at the East Central Illinois Economic Development District Meeting in Champaign, IL.

"Green Collar Jobs in Illinois," presented January 6, 2009 at the Illinois Workforce Investment Board Meeting in Macomb, Illinois.

"Green Collar Jobs: What Lies Ahead for Illinois?" presented August 1, 2008 at the Illinois Employment and Training Association Conference.

"Mapping Broadband Access in Illinois," presented October 16, 2007 at the Rural Telecon '07 conference.

"A Managerial Approach to Using Error Measures to Evaluate Forecasting Methods," presented October 15, 2007 at the International Academy of Business and Economics.

"Dollars and Sense: The Pros and Cons of Renewable Fuel," presented October 18, 2006 at Illinois State University Faculty Lecture Series.

"Broadband Access in Illinois," presented July 28, 2006 at the Illinois Association of Regional Councils Annual Meeting.

"Broadband Access in Illinois," presented November 17, 2005 at the University of Illinois' Connecting the e to Rural Illinois.

"Improving Forecasting Through Textbooks – A 25 Year Review," with James E. Cox, Jr., presented June 14, 2005 at the 25th International Symposium on Forecasting.

Presentations (cont'd)

"Telecommunications Demand Forecasting with Intermodal Competition, with Christopher Swann, presented April 2, 2004 at the Telecommunications Systems Management Conference 2004.

"Intermodal Competition," with Christopher Swann, presented April 3, 2003 at the Telecommunications Systems Management Conference 2003.

"Intermodal Competition in Local Exchange Markets," with Christopher Swann, presented June 26, 2002 at the 20th Annual International Communications Forecasting Conference.

"Assessing Retail Competition," presented May 23, 2002 at the Institute for Regulatory Policy Studies' Illinois Energy Policy for the 21st Century workshop.

"The Devil in the Details: An Analysis of Default Service and Switching," with Eric Malm presented May 24, 2001 at the 20th Annual Advanced Workshop on Regulation and Competition.

"Forecasting Challenges for U.S. Telecommunications with Local Competition," presented June 28, 1999 at the 19th International Symposium on Forecasting.

"Acceptance of Forecasting Principles in Forecasting Textbooks," presented June 28, 1999 at the 19th International Symposium on Forecasting.

"Forecasting Challenges for Telecommunications With Local Competition," presented June 17, 1999 at the 17th Annual International Communications Forecasting Conference.

"Measures of Market Competitiveness in Deregulating Industries," with Eric Malm, presented May 28, 1999 at the 18th Annual Advanced Workshop on Regulation and Competition.

"Trends in Telecommunications Forecasting and the Impact of Deregulation," Proceedings of EPRI's 11th Forecasting Symposium, 1998.

"Forecasting in a Competitive Age: Utilizing Macroeconomic Forecasts to Accurately Predict the Demand for Services," invited speaker, Institute for International Research Conference, September 29, 1997.

"Regulatory Fairness and Local Competition Pricing," presented May 30, 1996 at the 15th Annual Advanced Workshop in Regulation and Public Utility Economics.

"Optimal Pricing For a Regulated Monopolist Facing New Competition: The Case of Bell Atlantic Special Access Demand," presented May 28, 1992 at the Rutgers Advanced Workshop in Regulation and Public Utility Economics.

Grants

"RUI: Developing a multi-dimensional assessment framework to evaluate the sustainability of utility scale solar photovoltaic (PV) systems," with Jin Jo, Matt Aldeman, Eric Godoy, and Liang Cheng Yang, National Science Foundation, June 2021, $449,994 (pending).

"Developing a Multi-dimensional Assessment Framework to Support the Sustainability of Utility Scale Renewable Energy Systems," with Matt Aldeman, Frank Beck, Eric Godoy, Jin Jo, and Liang Cheng Yang, Scott Elliott Cross-Disciplinary Grant Program, February 2020, $15,000.

"SmartGrid for Schools 2018 and Energy Challenge," with William Hunter, Illinois Science and Energy Innovation Foundation, RSP Award # A15-0092-002 - extended, January 2018, $300,000.

"Energy Learning Exchange - Implementing Nationally Recognized Energy Curriculum and Credentials in Illinois," Northern Illinois University, RSP Award # A17-0098, February, 2017, $13,000.

"SmartGrid for Schools 2017 and Energy Challenge," with William Hunter, Illinois Science and Energy Innovation Foundation, RSP Award # A15-0092-002 - extended, January 2017, $350,000.

"Illinois Jobs Project," University of California Berkeley, RSP Award # A16-0148, August, 2016, $10,000.

"Energy Workforce Ready Through Building Performance Analysis," Illinois Department of Commerce and Economic Opportunity through the Department of Labor, RSP # A16-0139, June, 2016, $328,000 (grant was de-obligated before completion).

"SmartGrid for Schools 2016 and Smart Appliance Challenge," with William Hunter, Brad Christenson and Jeritt Williams, Illinois Science and Energy Innovation Foundation, RSP Award # A15-0092-002, January 2016, $450,000.

"SmartGrid for Schools 2015," with William Hunter and Matt Aldeman, Illinois Science and Energy Innovation Foundation, RSP Award # A15-0092-001, February 2015, $400,000.

"Economic Impact of Nuclear Plant Closings: A Response to HR 1146," Illinois Department of Economic Opportunity, RSP Award # 14-025001 amended, January, 2015, $22,000.

"Partnership with Midwest Renewable Energy Association for Solar Market Pathways" with Missy Nergard and Jin Jo, U.S. Department of Energy Award Number DE-EE0006910, October, 2014, $109,469 (ISU Award amount).

Grants (cont'd)

"Renewable Energy for Schools," with Matt Aldeman and Jin Jo, Illinois Department of Commerce and Economic Opportunity, Award Number 14-025001, June, 2014, $130,001.

"SmartGrid for Schools 2014," with William Hunter and Matt Aldeman, Illinois Science and Energy Innovation Foundation, RSP # 14B116, March 2014, $451,701.

"WINDPOWER 2014 Conference Exhibit," Illinois Department of Commerce and Economic Opportunity, RSP #14C167, March, 2014, $95,000.

"Lake Michigan Offshore Wind Energy Buoy," with Matt Aldeman, Illinois Clean Energy Community Foundation, Request ID 6435, November, 2013, $90,000.

"Teaching Next Generation Energy Concepts with Next Generation Science Standards," with William Hunter, Matt Aldeman and Amy Bloom, Illinois State Board of Education, RSP # 13B170A, October, 2013, second year, $159,954; amended to $223,914.

"Solar for Schools," with Matt Aldeman, Illinois Green Economy Network, RSP # 13C280, August, 2013, $66,072.

"Energy Learning Exchange Implementation Grant," with William Hunter and Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 13-052003, June, 2013, $350,000.

"Teaching Next Generation Energy Concepts with Next Generation Science Standards," with William Hunter, Matt Aldeman and Amy Bloom, Illinois State Board of Education, RSP # 13B170, April, 2013, $159,901.

"Illinois Sustainability Education SEP," Illinois Department of Commerce and Economic Opportunity, Award Number 08-431006, March, 2013, $225,000.

"Illinois Pathways Energy Learning Exchange Planning Grant," with William Hunter and Matt Aldeman, Illinois State Board of Education (Source: U.S. Department of Education), RSP # 13A007, December, 2012, $50,000.

"Illinois Sustainability Education SEP," Illinois Department of Commerce and Economic Opportunity, Award Number 08-431005, June 2011, amended March, 2012, $98,911.

"Wind for Schools Education and Outreach," with Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 11-025001, amended February, 2012, $111,752.

Grants (cont'd)

"A Proposal to Support Solar Energy Potential and Job Creation for the State of Illinois Focused on Large Scale Photovoltaic System," with Jin Jo (lead PI), Illinois Department of Commerce and Economic Opportunity, Award Number 12-025001, January 2012, $135,000.

"National Database of Utility Rates and Rate Structure," U.S. Department of Energy, Award Number DE-EE0005350TDD, 2011-2014, $850,000.

"Illinois Sustainability Education SEP," Illinois Department of Commerce and Economic Opportunity, Award Number 08-431005, June 2011, $75,000.

"Wind for Schools Education and Outreach," with Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 11-025001, March 2011, $190,818.

"Using Informal Science Education to Increase Public Knowledge of Wind Energy in Illinois," with Amy Bloom and Matt Aldeman, Scott Elliott Cross-Disciplinary Grant Program, February 2011, $13,713.

"Wind Turbine Market Research," with Matt Aldeman, Illinois Manufacturers Extension Center, May, 2010, $4,000.

"Petco Resource Assessment," with Matt Aldeman, Petco Petroleum Co., April, 2010 amended August 2010 $34,000; original amount $18,000.

"Wind for Schools Education and Outreach," with Anthony Lornbach and Matt Aldeman, Scott Elliott Cross-Disciplinary Grant Program, February, 2010, $13,635.

"IGA IFA/ISU Wind Due Diligence," Illinois Finance Authority, November, 2009, $8,580 amended December 2009; original amount $2,860.

"Green Industry Business Development Program, with the Shaw Group and Illinois Manufacturers Extension Center, Illinois Department of Commerce and Economic Opportunity, Award Number 09-021007, August 2009, $245,000.

"Wind Turbine Workshop Support," Illinois Department of Commerce and Economic Opportunity, June 2009, $14,900.

"Illinois Wind Workers Group," with Randy Winter, U.S. Department of Energy, Award Number DE-EE0000507, 2009-2011, $107,941.

"Wind Turbine Supply Chain Study," with J. Lon Carlson and James E. Payne, Illinois Department of Commerce and Economic Opportunity, Award Number 09-021003, April 2009, $125,000.

Grants (cont'd)

"Renewable Energy Team Travel to American Wind Energy Association WindPower 2009 Conference, Center for Mathematics, Science and Technology, February 2009, $3,005.

"Renewable Energy Educational Lab Equipment," with Randy Winter and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), February, 2008, $232,600.

"Proposal for New Certificate Program in Electricity, Natural Gas and Telecommunications Economics," with James E. Payne, Extended Learning Program Grant, April, 2007, $29,600.

"Illinois Broadband Mapping Study," with J. Lon Carlson and Rajeev Goel, Illinois Department of Commerce and Economic Opportunity, Award Number 06-205008, 2006-2007, $75,000.

"Illinois Wind Energy Education and Outreach Project," with David Kennell and Randy Winter, U.S. Department of Energy, Award Number DE-FG36-06GO86091, 2006-2010, $990,000.

"Wind Turbine Installation at Illinois State University Farm," with Doug Kingman and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), May, 2004, $500,000.

"Illinois State University Wind Measurement Project," Doug Kingman and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), with August, 2003, $40,000.

"Illinois State University Wind Measurement Project," with Doug Kingman and David Kennell, NEG Micon matching contribution, August, 2003, $65,000.

"Distance Learning Technology Program," Illinois State University Faculty Technology Support Services, Summer 2002, $3,000.

"Providing an Understanding of Telecommunications Technology By Incorporating Multimedia into Economics 235," Instructional Technology Development Grant (peer-reviewed), January 15, 2001, $1,400.

"Using Real Presenter to create a virtual tour of GTE's Central Office," with Jack Chizmar, Instructional Technology Literacy Mentoring Project Grant (peer-reviewed), January 15, 2001, $1,000.

"An Empirical Study of Telecommunications Industry Forecasting Practices," with James E. Cox, College of Business University Research Grant (peer-reviewed), Summer, 1999, $6,000.

Grants (cont'd)

"Ownership Form and the Efficiency of Electric Utilities: A Meta-Analytic Review" with L. Dean Hiebert, *Institute for Regulatory Policy Studies* research grant (peer-reviewed), August 1998, $6,000.

Total Grants: $7,755,953

External Funding

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Aqua Illinois ($7,500); Commonwealth Edison ($7,500); Exelon ($7,500); Illinois American Water ($7,500); Illinois Competitive Energy Association ($3,750); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2021, $63,900 total.

Workshop Surplus for Institute for Regulatory Policy Studies, Fiscal Year 2021, $1,960.

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Aqua Illinois ($7,500); Commonwealth Edison ($7,500); Exelon ($7,500); Illinois American Water ($7,500); Illinois Competitive Energy Association ($3,750); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2020, $71,250 total.

Workshop Surplus for Institute for Regulatory Policy Studies, Fiscal Year 2020, $11,125.

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Aqua Illinois ($7,500); Commonwealth Edison ($7,500); Exelon ($7,500); Illinois American Water ($7,500); Illinois Competitive Energy Association ($3,750); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2019, $71,250 total.

Workshop Surplus for Institute for Regulatory Policy Studies, Fiscal Year 2019, $2,901.

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Aqua Illinois ($7,500); Commonwealth Edison ($7,500); Exelon ($7,500); Illinois American Water ($7,500); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2018, $67,500 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2018, $11,553.

External Funding (cont'd)

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Aqua Illinois ($7,500); Commonwealth Edison ($7,500); Exelon ($7,500); Illinois American Water ($7,500); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2017, $67,500 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Adrienne Ohler, Fiscal Year 2017, $18,342.

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Aqua Illinois ($7,500); Commonwealth Edison ($7,500); Exelon ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2017, $75,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Adrienne Ohler, Fiscal Year 2016, $19,667.

Corporate Funding for *Energy Learning Exchange*, Calendar Year 2016, $53,000.

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Aqua Illinois ($7,500); Commonwealth Edison ($7,500); Exelon/Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Utilities, Inc. ($7,500) Fiscal Year 2016, $82,500 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Adrienne Ohler, Fiscal Year 2015, $15,897.

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Exelon/Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2015, $90,000 total.

Corporate Funding for *Energy Learning Exchange*, Calendar Year 2014, $55,000.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Adrienne Ohler, Fiscal Year 2014, $12,381.

External Funding (cont'd)

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midwest Energy Efficiency Alliance ($4,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2014, $102,000 total.

Corporate Funding for *Energy Learning Exchange*, Calendar Year 2013, $53,000.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Adrienne Ohler, Fiscal Year 2013, $17,097.

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren ($7,500), Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2013, $97,500 total.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2012, $29,325.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Adrienne Ohler, Fiscal Year 2012, $16,060.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2012, $90,000 total.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2011, $57,005.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Adrienne Ohler, Fiscal Year 2011, $13,562.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2011, $90,000 total.

External Funding (cont'd)

Corporate Funding for *Center for Renewable Energy,* Calendar Year 2010, $50,000.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2010, $49,000.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2010, $17,759.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline ($7,500); Ameren ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); ITC Holdings ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2010, $82,500 total.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2009, $57,140.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2009, $21,988.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline ($7,500); Ameren ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); MidAmerican Energy ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2009, $82,500 total.

Corporate Funding for *Center for Renewable Energy,* Calendar Year 2008, $157,500.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2008, $38,500.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2008, $28,489.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline ($5,000); Ameren ($5,000); AT&T ($5,000);Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); MidWest ISO ($5,000); NICOR Energy ($5,000); Peabody Energy ($5,000), People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); Fiscal Year 2008, $60,000 total.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2007, $16,250.

External Funding (cont'd)

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2007, $19,403.

Corporate Funding for *Institute for Regulatory Policy Studies*, AARP ($3,000), Alliance Pipeline ($5,000), Ameren ($5,000); Citizens Utility Board ($5,000); Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); MidWest ISO ($5,000); NICOR Energy ($5,000); Peabody Energy ($5,000), People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); SBC ($5,000); Verizon ($5,000); Fiscal Year 2007, $73,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2006, $13,360.

Corporate Funding for *Institute for Regulatory Policy Studies*, AARP ($1,500), Alliance Pipeline ($2,500), Ameren ($5,000); Citizens Utility Board ($5,000); Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); DTE Energy ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); MidWest ISO ($5,000); NICOR Energy ($5,000); Peabody Energy ($2,500), People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); SBC ($5,000); Verizon ($5,000); Fiscal Year 2006, $71,500 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Fiscal Year 2005, $12,916.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS ($5,000); Citizens Utility Board ($5,000); Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); MidWest ISO ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); SBC ($2,500); Verizon ($2,500); Fiscal Year 2005, $60,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Fiscal Year 2004, $17,515.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS ($5,000); Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); Fiscal Year 2004, $45,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Fiscal Year 2003, $8,300.

External Funding (cont'd)

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS ($5,000); AT&T ($2,500); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); Fiscal Year 2003, $32,500 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 2002, $15,700.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS ($2,500); AT&T ($5,000); Commonwealth Edison ($2,500); Illinois Power ($2,500); MidAmerican Energy ($2,500); NICOR Energy ($2,500); People Gas Light and Coke ($2,500); Calendar Year 2002, $17,500 total.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates ($10,000); Taylor Nelson Sofres Telecoms ($10,000); Calendar Year 2002, $20,000 total

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS ($5,000); AT&T ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 2001, $35,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 2001, $19,400.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates ($10,000); Taylor Nelson Sofres Telecoms ($10,000); SAS Institute ($10,000); Calendar Year 2001, $30,000 total.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS ($5,000); AT&T ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 2000, $35,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 2000, $20,270.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates ($10,000); Taylor Nelson Sofres Telecoms ($10,000); Calendar Year 2000, $20,000 total.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS ($5,000); AT&T ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 1999, $35,000 total.

External Funding (cont'd)

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 1999, $10,520.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates ($10,000); PNR Associates ($10,000); Calendar Year 1999, $20,000 total.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS ($5,000); CILCO ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 1998, $30,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 1998, $44,334.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates ($10,000); PNR Associates ($10,000); Calendar Year 1998, $20,000 total.

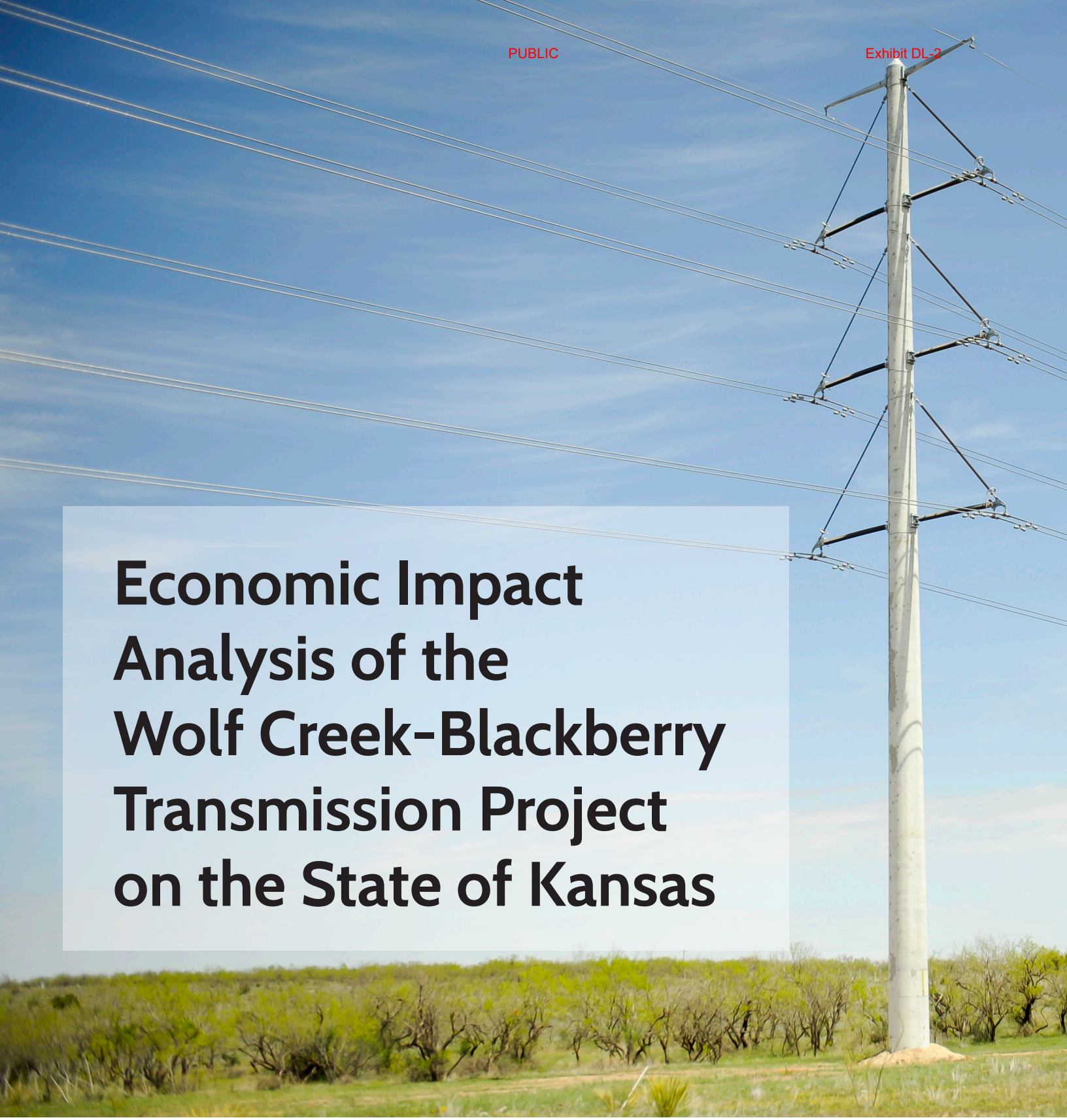
Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS ($5,000); CILCO ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 1997, $30,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 1997, $19,717.

Total External Funding: $2,793,836

Exhibit DL-2

Public



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

February 2022

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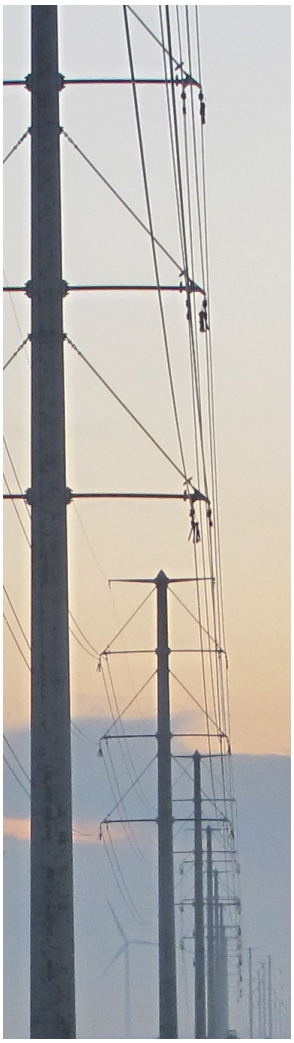

About Strategic Economic Research, LLC

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 Kansas. 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 ($74.6 million estimated to be spent in Kansas) by NextEra Energy Transmission Southwest, LLC (NEET Southwest) and an additional approximately $10.1 million in substation upgrades in Kansas by others. The total development is anticipated to result in the following:

Jobs[1]

- Approximately 998 new jobs during construction for the State of Kansas
- Approximately 6 new long-term jobs for the State of Kansas for the first ten years
- Approximately 9.6 new long-term jobs for the State of Kansas after the first ten years

Worker Earnings[2]

- Over $55.6 million in new earnings during construction for the State of Kansas
- Over $498 thousand in long-term earnings for the State of Kansas for the first ten years
- Over $716 thousand in long-term earnings for the State of Kansas after the first ten years

Economic Output[3]

- Over $145 million in new output during construction for the State of Kansas
- Over $4.4 million in new long-term output for the State of Kansas for the first ten years
- Over $5.1 million in new long-term output for the State of Kansas after the first ten years

[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 Kansas

Kansas is located in the Central part of the United States. It has a total area of 82,278 square miles and the U.S. Census estimates that the 2020 population was 2,937,880 with 1,288,401 housing units. The state has a population density of 35 (persons per square mile) compared to 87 for the United States. Median household income in the state was $59,597 in 2019.

Table 3.1 – Employment by Industry in Kansas

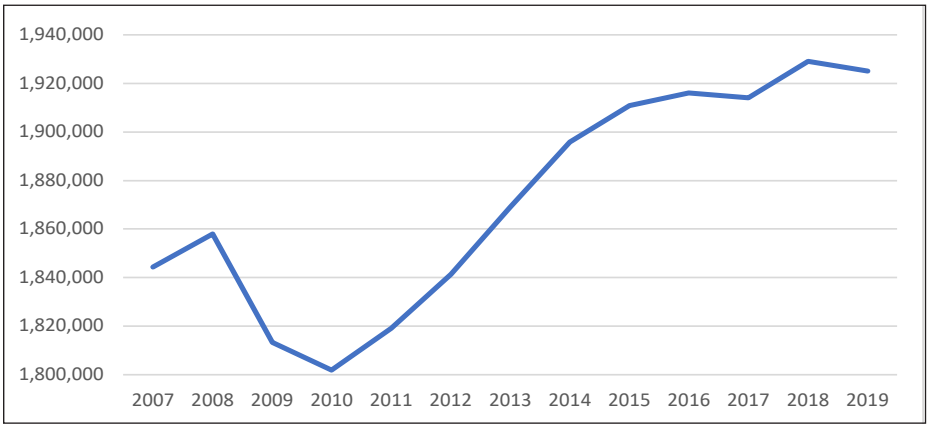
Industry	Number	Percent
Administrative Government	260,465	13.8%
Health Care and Social Assistance	203,383	10.8%
Manufacturing	163,887	8.7%
Retail Trade	156,019	8.3%
Professional, Scientific, and Technical Services	128,527	6.8%
Accommodation and Food Services	122,505	6.5%
Other Services (except Public Administration)	110,517	5.9%
Finance and Insurance	103,324	5.5%
Construction	101,681	5.4%
Administrative and Support and Waste Management and Remediation Services	96,432	5.1%
Transportation and Warehousing	81,281	4.3%
Real Estate and Rental and Leasing	76,303	4.0%
Agriculture, Forestry, Fishing and Hunting	75,187	4.0%
Wholesale Trade	60,291	3.2%
Mining, Quarrying, and Oil and Gas Extraction	28,186	1.5%
Arts, Entertainment, and Recreation	27,367	1.5%
Management of Companies and Enterprises	25,548	1.4%
Information	21,161	1.1%
Educational Services	20,484	1.1%
Government Enterprises	15,093	0.8%
Utilities	6,536	0.3%

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

As shown in Table 3.1, the largest industry is "Administrative Government" followed by "Health Care and Social Assistance," "Manufacturing" and "Retail Trade." 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 Kansas was at its lowest at 1,801,873 in 2010 and its highest at 1,929,242 in 2018.

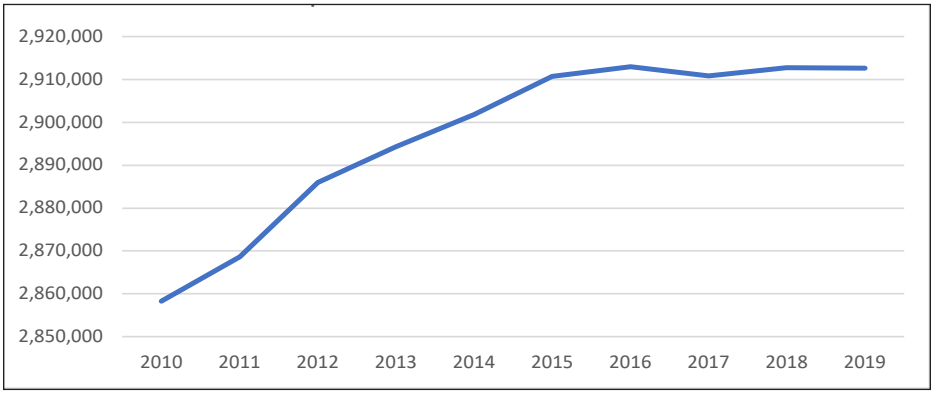
Figure 3.1 – Total Employment in Kansas from 2007 to 2019



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

Similar to the upward trend of employment, the overall population in the state has been increasing steadily, as shown in Figure 3.2. Kansas population was 2,858,266 in 2010 and 2,912,635 in 2019, a gain of 54,369. The average annual population increase over this time period was 6,041.

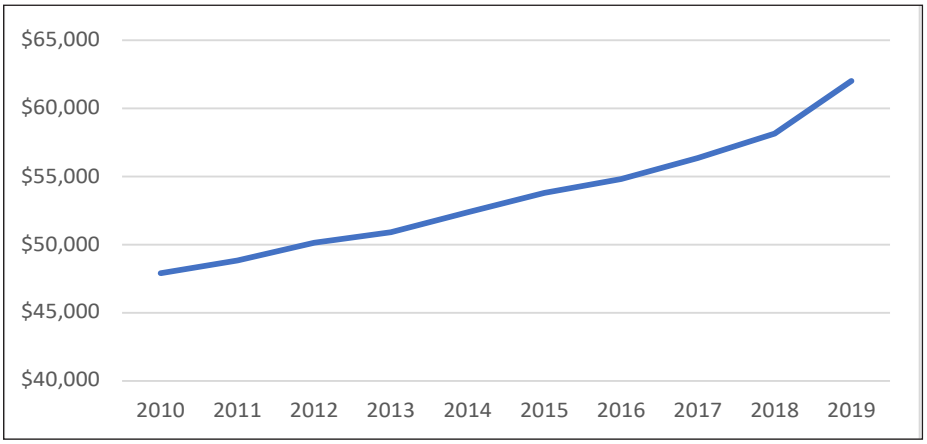
Figure 3.2 – Population in Kansas 2010 to 2019



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

Like the population trend, household income has been trending upward in Kansas. Figure 3.3 shows the median household income in Kansas from 2010 to 2019. Household income was at its lowest at $47,888 in 2010 and its highest at $62,028 in 2019.

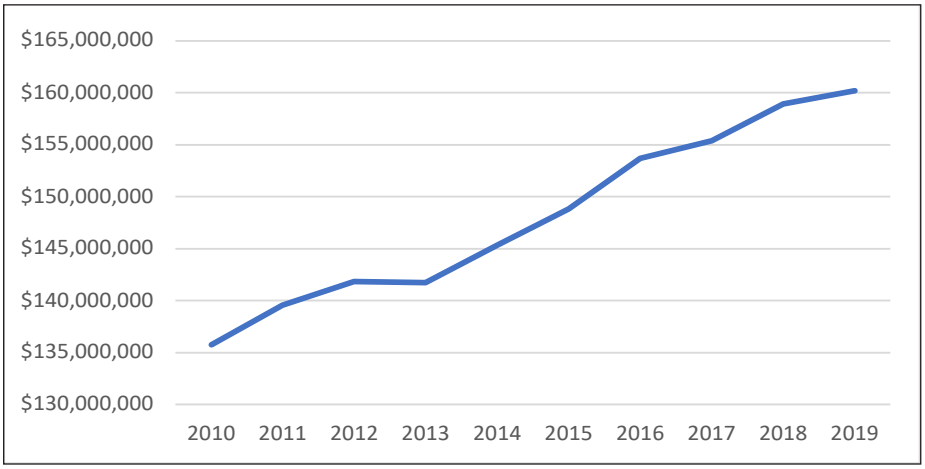
Figure 3.3 – Median Household Income in Kansas from 2010 to 2019



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 Kansas has been increasing since 2010, as shown in Figure 3.4.

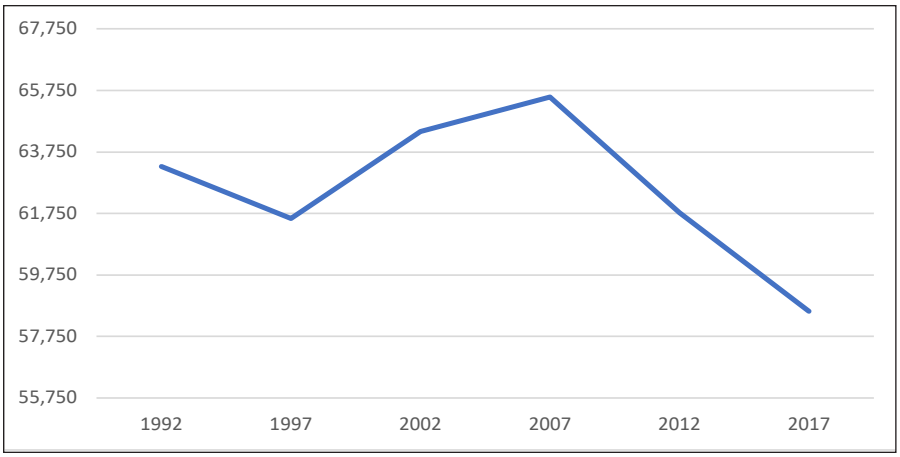
Figure 3.4 – Real Gross Domestic Product (GDP) in Kansas from 2010 to 2019



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

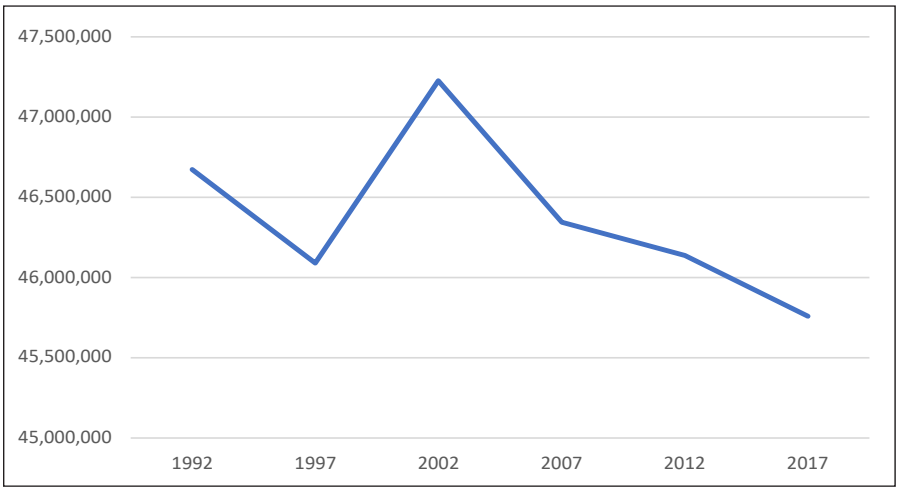
The farming industry has decreased in Kansas. As shown in Figure 3.5, the number of farms has decreased from 63,278 in 1992 to 58,569 in 2017. The amount of land in farms has fluctuated greatly. The state farmland hit a high of 47.2 million acres in 2002 and a low of 45.7 million acres in 2017 according to Figure 3.6.

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



Source: Census of Agriculture, 1992-2017

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



Source: Census of Agriculture, 1992-2017

3.2 County Economics

The economic and demographic statistics of all of the Kansas counties traversed by the Project are contained in this section. As listed in Table 3.2, the population and population density for Crawford County is much higher than the other counties. Because it is so different, Crawford County's employment and population data is graphed separately from the rest of the counties. Figure 3.7 shows the location of each of the counties across the State of Kansas.

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
Allen County	505	12,526	6,342	25	$45,333
Anderson County	584	7,836	3,755	14	$50,213
Bourbon County	639	14,360	7,108	23	$43,917
Coffey County	654	8,360	4,148	14	$59,583
Crawford County	595	38,972	18,245	66	$41,004

Figure 3.7 – Location of Counties in Kansas

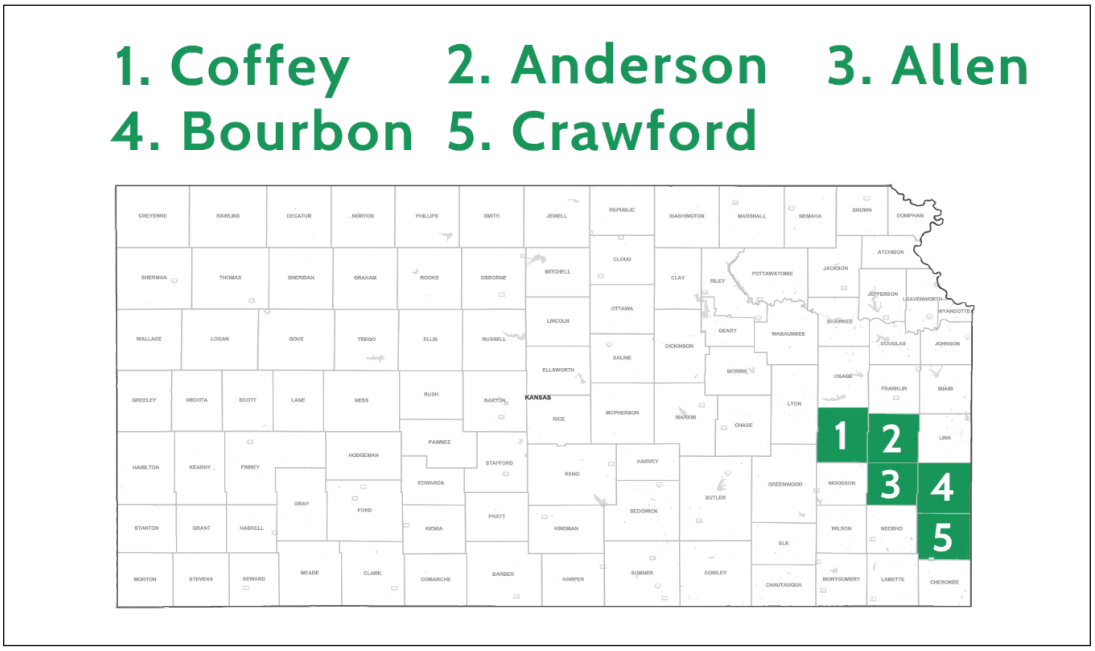
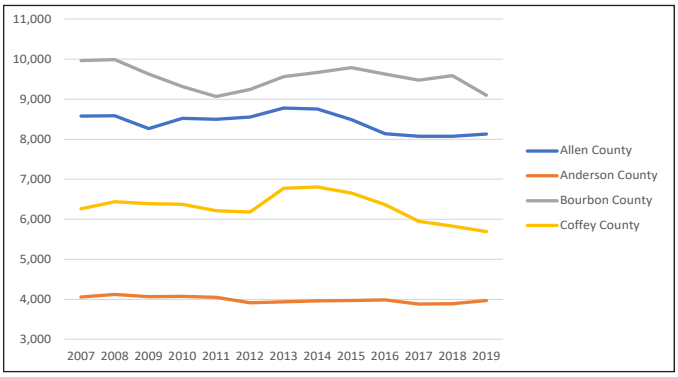


Table 3.3 – Employment by Industry for County Locations

	Allen County		Anderson County		Bourbon County		Coffey County		Crawford County	
Industry	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Manufacturing	1,738	20.9%	225	5.7%	1,492	16.8%	200	3.5%	2,780	11.5%
Administrative Government	1,443	17.4%	478	12.0%	1,084	12.2%	900	15.8%	4,955	20.5%
Mining, Quarrying, and Oil and Gas Extraction	776	9.3%	76	1.9%	30	0.3%	161	2.8%	535	2.2%
Retail Trade	692	8.3%	480	12.1%	651	7.3%	437	7.7%	1,931	8.0%
Agriculture, Forestry, Fishing and Hunting	603	7.3%	681	17.1%	882	9.9%	614	10.8%	986	4.1%
Health Care and Social Assistance	563	6.8%	392	9.9%	870	9.8%	421	7.4%	2,505	10.4%
Construction	496	6.0%	407	10.2%	437	4.9%	266	4.7%	1,325	5.5%
Accommodation and Food Services	473	5.7%	246	6.2%	836	9.4%	221	3.9%	1,951	8.1%
Other Services (except Public Administration)	267	3.2%	240	6.1%	358	4.0%	234	4.1%	1,601	6.6%
Professional, Scientific, and Technical Services	234	2.8%	108	2.7%	542	6.1%	133	2.3%	798	3.3%
Wholesale Trade	180	2.2%	77	1.9%	384	4.3%	91	1.6%	617	2.6%
Transportation and Warehousing	180	2.2%	87	2.2%	129	1.5%	164	2.9%	672	2.8%
Real Estate and Rental and Leasing	177	2.1%	31	0.8%	223	2.5%	158	2.8%	546	2.3%
Finance and Insurance	174	2.1%	194	4.9%	387	4.4%	280	4.9%	714	3.0%
Administrative and Support and Waste Management and Remediation Services	103	1.2%	21	0.5%	294	3.3%	228	4.0%	944	3.9%
Information	87	1.0%	22	0.5%	23	0.3%	22	0.4%	342	1.4%
Educational Services	34	0.4%	6	0.2%	71	0.8%	36	0.6%	192	0.8%
Government Enterprises	32	0.4%	47	1.2%	60	0.7%	138	2.4%	94	0.4%
Management of Companies and Enterprises	27	0.3%	35	0.9%	61	0.7%	0	0.0%	335	1.4%
Arts, Entertainment, and Recreation	16	0.2%	118	3.0%	47	0.5%	102	1.8%	234	1.0%
Utilities	13	0.2%	0	0.0%	18	0.2%	900	15.8%	95	0.4%

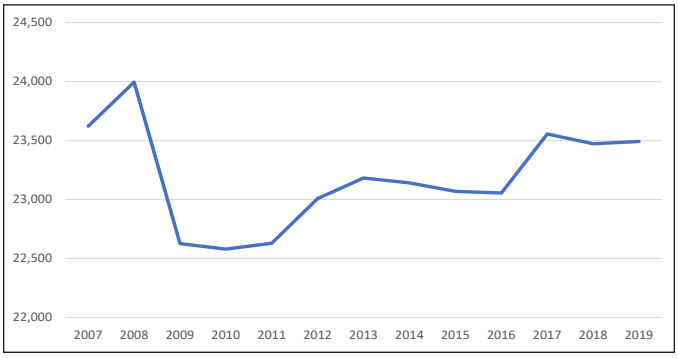
Figures 3.8 and 3.9 show the historical trends of employment from 2007 to 2019 within the counties. Total employment has been increasing in Crawford County and fluctuating in the other counties.

Figure 3.8 – Total Employment in Counties from 2007 to 2019



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

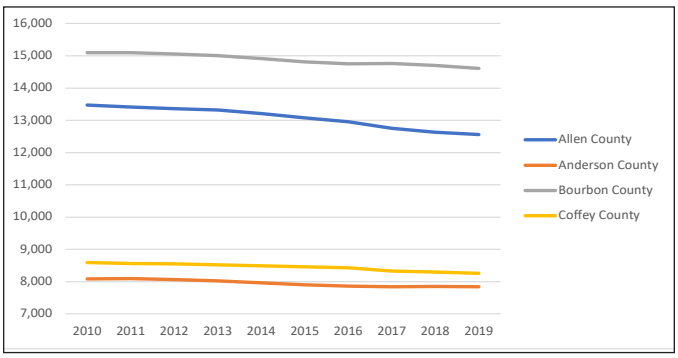
Figure 3.9 – Total Employment in Crawford County from 2007 to 2019



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

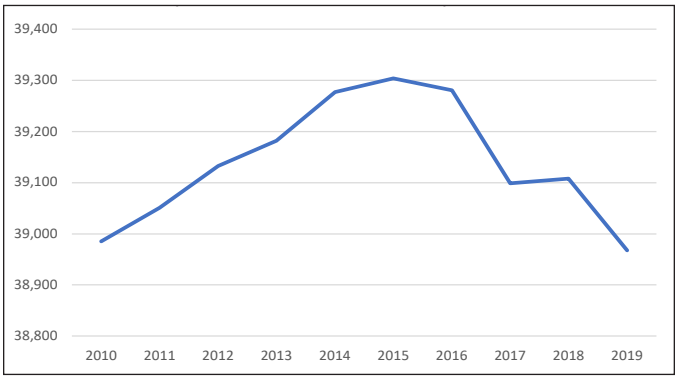
Unlike the employment trends, the overall population in all of the counties has declined in recent years, as shown in Figures 3.10 and 3.11. Allen County has seen the greatest decrease in population, a loss of 917 people since 2010.

Figure 3.10 – Population in Counties 2010 to 2019



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

Figure 3.11 – Population in Crawford County from 2010 to 2019

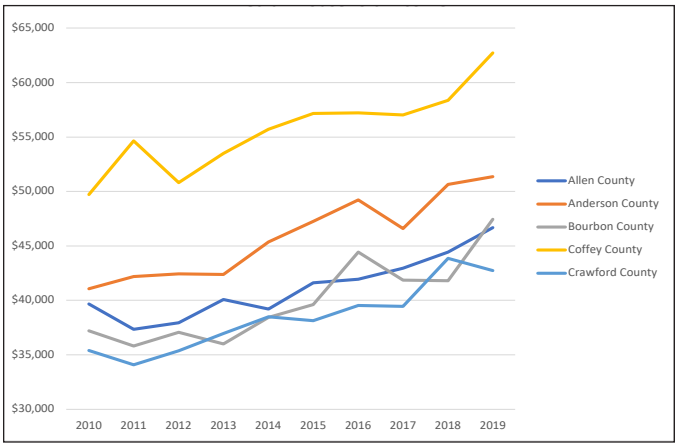


Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Population Estimates

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

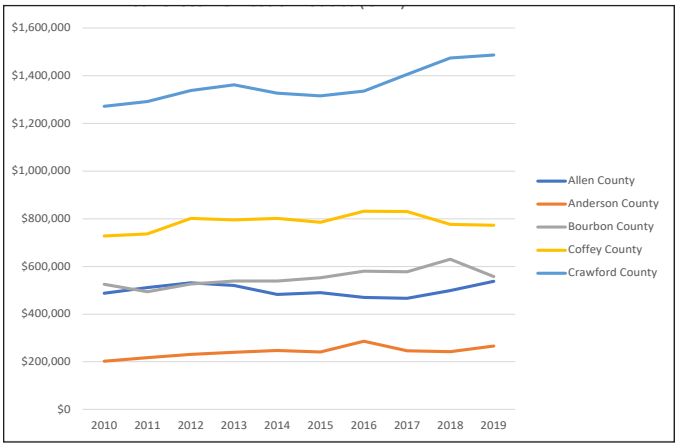
Real Gross Domestic Product (GDP) is a measure of the value of goods and services produced in an area and adjusted for inflation over time. The Real GDP has increased for Anderson and Crawford Counties while the other counties have been fluctuating over the last decade, as shown in Figure 3.13.

Figure 3.12 – Median Household Income in All 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 All Counties from 2010 to 2019



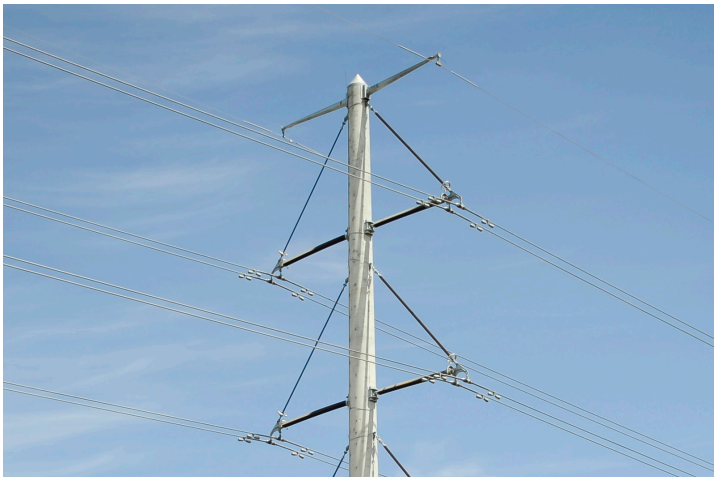
Source: Bureau of Economic Analysis, Regional Data, GDP and Personal Income

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 Kansas.

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 Kansas 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 Kansas 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, $10.1 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 Coffey County.

Table 4.3 – Estimated Construction Cost by IMPLAN Category and County

IMPLAN Code	IMPLAN Description	Allen County	Anderson County	Bourbon County	Coffey County	Crawford County
	Direct Labor	$5,941,541	$2,254,704	$2,347,611	$2,630,865	$5,966,467
	Household Spending from land easements	$279,085	$105,907	$110,271	$123,576	$280,255
29	Sand and gravel mining	$33,930	$12,876	$13,407	$15,024	$34,073
339	All other miscellaneous electrical equipment and component manufacturing	$898,095	$340,810	$354,854	$397,669	$901,863
447	Other real estate	$139,542	$52,954	$55,136	$61,788	$140,128
463	Environmental and other technical consulting services	$111,634	$42,363	$44,109	$49,431	$112,102
465	Advertising, public relations, and related services	$59,771	$22,682	$23,617	$26,466	$60,022
469	Management of Companies and Enterprises	$1,342,251	$509,359	$530,348	$594,338	$1,347,883
475	Investigation and Security Services	$51,097	$19,390	$20,189	$22,625	$51,311
TOTAL		**$8,856,946**	**$3,361,046**	**$3,499,541**	**$3,921,783**	**$8,894,103**

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	Kansas	Crawford County
	Direct Labor [6]	$387,446	$387,446
	Property Tax [7]	$0	$0
TOTAL		**$387,446**	**$387,446**

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 are abated in Kansas for the first 10 years. Property taxes will be paid after this abatement, so the operations results are shown for years 1-10 and then years 11-40.

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 one-half of the number shown in Table 5.1.

The Project is expected to create or support a total of 887 jobs during its two-year construction period. The direct impacts, which include on-site construction workers and direct purchases of material and equipment, are 653 jobs. The indirect impacts, which include supply chain jobs as a result of the increased demand in these industries, are an additional 97 jobs. The induced impacts, which accounts for household purchases like groceries and eating out as a result of this new income, are an additional 175.

As shown in Table 5.1, new local jobs created or retained during construction total over 237 for Allen County, over 91 for Anderson County, over 97 for Bourbon County, over 101 for Coffey County, over 254 for Crawford County, and over 887 for the State of Kansas. New local long-term jobs created from the first ten years of the Project total 4.58 for Crawford County and 5.97 for the State of Kansas. The State of Kansas impacts are larger than the Crawford County impacts because the state impacts capture all of the activity that happens elsewhere in the state. For Year 11 and beyond, the new local long-term jobs will total 0.61 for Allen County, 0.25 for Anderson County, 0.38 for Bourbon County, 0.34 for Coffey County, 5.41 for Crawford County, and 9.6 for the State of Kansas. All of the long-term employees for the transmission line are anticipated to be located in Crawford County; the impacts in the other counties don't begin until year 11 when the property tax abatement ends and the economic impacts from the tax payments begins.

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

	Allen County	Anderson County	Bourbon County	Coffey County	Crawford County	State of Kansas
Construction						
Direct	203	77	80	90	204	653
Indirect	10	4	6	4	15	66
Induced	24	10	11	7	36	168
Total	237	91	97	101	254	887
Operations (Annual) Years 1-10						
Direct					3.60	3.60
Indirect					0	0
Induced					0.98	2.37
Total					4.58	5.97
Operations (Annual) Years 11-40						
Direct	0	0	0	0	3.60	3.60
Indirect	0.56	0.23	0.35	0.32	0.84	3.93
Induced	0.04	0.02	0.03	0.02	0.96	2.07
Total	0.61	0.25	0.38	0.34	5.41	9.60

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 $13.1 million for Allen County, over $4.9 million for Anderson County, over $5.3 million for Bourbon County, over $5.7 million for Coffey County, over $13.9 million for Crawford County, and over $50.8 million for the State of Kansas. The new long-term earnings created for the first ten years total over $427 thousand for Crawford County and over $498 thousand for the State of Kansas. The new long-term earnings after ten years total over $22 thousand for Allen County, over $10 thousand for Anderson County, over $16 thousand for Bourbon County, over $13 thousand for Coffey County, over $465 thousand for Crawford County and over $716 thousand for the State of Kansas.

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

	Allen County	Anderson County	Bourbon County	Coffey County	Crawford County	State of Kansas
Construction						
Direct	$11,883,081	$4,509,407	$4,695,222	$5,261,730	$11,932,934	$38,282,375
Indirect	$379,844	$120,203	$219,081	$192,203	$619,551	$4,008,585
Induced	$869,868	$361,041	$465,235	$256,018	$1,445,913	$8,606,462
Total	$13,132,793	$4,990,651	$5,379,538	$5,709,951	$13,998,398	$50,897,422
Operations (Annual) Years 1-10						
Direct					$387,446	$387,446
Indirect					$0	$0
Induced					$39,807	$110,711
Total					$427,253	$498,157
Operations (Annual) Years 11-40						
Direct	$0	$0	$0	$0	$387,446	$387,446
Indirect	$20,961	$9,444	$15,058	$13,121	$38,907	$223,407
Induced	$1,557	$764	$1,438	$617	$39,188	$106,046
Total	$22,518	$10,208	$16,496	$13,738	$465,541	$716,899

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 $32.1 million for Allen County, over $11.0 million for Anderson County, over $12.0 million for Bourbon County, over $11.5 million for Coffey County, over $30.0 million for Crawford County, and over $130 million for the State of Kansas. The new long-term output for the first ten years totals over $4.2 million for Crawford County and over $4.4 million for the State of Kansas. The new long-term output after the first ten years totals over $98 thousand for Allen County, over $37 thousand for Anderson County, over $59 thousand for Bourbon County, over $56 thousand for Coffey County, over $4.3 million for Crawford County and over $5.1 million for the State of Kansas.

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

	Allen County	Anderson County	Bourbon County	Coffey County	Crawford County	State of Kansas
Construction						
Direct	$27,245,320	$9,277,921	$9,716,775	$9,808,994	$22,730,241	$91,097,856
Indirect	$1,503,731	$408,986	$827,212	$662,707	$2,258,252	$12,029,026
Induced	$3,357,668	$1,368,821	$1,538,128	$1,079,202	$5,026,297	$26,889,279
Total	$32,106,719	$11,055,728	$12,082,115	$11,550,903	$30,014,790	$130,016,162
Operations (Annual) Years 1-10						
Direct					$4,102,814	$4,102,814
Indirect					$0	$0
Induced					$138,298	$359,678
Total					$4,241,112	$4,462,492
Operations (Annual) Years 11-40						
Direct	$0	$0	$0	$0	$4,102,814	$4,102,814
Indirect	$92,311	$34,750	$54,435	$54,364	$139,896	$741,534
Induced	$6,018	$2,912	$4,767	$2,624	$136,159	$331,104
Total	$98,329	$37,662	$59,202	$56,988	$4,378,869	$5,175,452

5.2 Substation Upgrade Impacts

Tables 5.4-5.6 show the impacts from the substations on the State of Kansas. 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 95 jobs in Coffey County and 111 jobs in the State of Kansas during its two-year construction period. The direct impacts, which include on-site construction workers and direct purchases of material and equipment, are 80 jobs. The indirect impacts, which include supply chain jobs as a result of the increased demand in these industries, are an additional 20 jobs. The induced impacts, which accounts for household purchases like groceries and eating out as a result of this new income, are an additional 12.

Table 5.4 – Total Employment Impact from the Substation Upgrades

	Coffey County	State of Kansas
Construction		
Direct	80	80
Indirect	10	20
Induced	5	12
Total	95	111

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 $3.6 million for Coffey County and over $4.7 million for the State of Kansas.

Table 5.5 – Total Earnings Impact from the Substation Upgrades

	Coffey County	State of Kansas
Construction		
Direct	$2,866,799	$2,866,799
Indirect	$605,018	$1,368,267
Induced	$174,279	$540,469
Total	$3,646,096	$4,775,535

According to Table 5.6 the new local output during construction totals over $11.9 million for Coffey County and over $15.4 million for the State of Kansas.

Table 5.6 – Total Output Impact from the Substation Upgrades

	Coffey County	State of Kansas
Construction		
Direct	$9,475,675	$9,475,675
Indirect	$1,767,688	$4,086,574
Induced	$742,461	$1,874,166
Total	$11,985,823	$15,436,414

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 237 for Allen County, 91 for Anderson County, 97 for Bourbon County, 196 for Coffey County, 254 for Crawford County, and 998 for the State of Kansas. The new local long-term jobs created from the Project for the first ten years total 4.58 for Crawford County and 5.97 for the State of Kansas. The new local long-term jobs after the first ten years will total 0.61 for Allen County, 0.25 for Anderson County, 0.38 for Bourbon County, 0.34 for Coffey County, 5.41 for Crawford County, and 9.6 for the State of Kansas.

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

	Allen County	Anderson County	Bourbon County	Coffey County	Crawford County	State of Kansas
Construction						
Direct	203	77	80	170	204	733
Indirect	10	4	6	14	15	85
Induced	24	10	11	12	36	180
Total	237	91	97	196	254	998
Operations (Annual) Years 1-10						
Direct					3.60	3.60
Indirect					0	0
Induced					0.98	2.37
Total					4.58	5.97
Operations (Annual) Years 11-40						
Direct	0	0	0	0	3.60	3.60
Indirect	0.56	0.23	0.35	0.32	0.84	3.93
Induced	0.04	0.02	0.03	0.02	0.96	2.07
Total	0.61	0.25	0.38	0.34	5.41	9.60

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 $13.1 million for Allen County, over $4.9 million for Anderson County, over $5.3 million for Bourbon County, over $9.3 million for Coffey County, over $13.9 million for Crawford County, and over $55.6 million for the State of Kansas. The new long-term earnings for the first ten years totals over $427 thousand for Crawford County and over $498 thousand for the State of Kansas. The new long-term earnings after ten years total over $22 thousand for Allen County, over $10 thousand for Anderson County, over $16 thousand for Bourbon County, over $13 thousand for Coffey County, over $465 thousand for Crawford County and over $716 thousand for the State of Kansas.

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

	Allen County	Anderson County	Bourbon County	Coffey County	Crawford County	State of Kansas
Construction						
Direct	$11,883,081	$4,509,407	$4,695,222	$8,128,530	$11,932,934	$41,149,174
Indirect	$379,844	$120,203	$219,081	$797,220	$619,551	$5,376,852
Induced	$869,868	$361,041	$465,235	$430,297	$1,445,913	$9,146,931
Total	$13,132,793	$4,990,651	$5,379,538	$9,356,047	$13,998,398	$55,672,957
Operations (Annual) Years 1-10						
Direct					$387,446	$387,446
Indirect					$0	$0
Induced					$39,807	$110,711
Total					$427,253	$498,157
Operations (Annual) Years 11-40						
Direct	$0	$0	$0	$0	$387,446	$387,446
Indirect	$20,961	$9,444	$15,058	$13,121	$38,907	$223,407
Induced	$1,557	$764	$1,438	$617	$39,188	$106,046
Total	$22,518	$10,208	$16,496	$13,738	$465,541	$716,899

According to Table 5.9 the new local output during construction totals over $32.1 million for Allen County, over $11.0 million for Anderson County, over $12.0 million for Bourbon County, over $23.5 million for Coffey County, over $30.0 million for Crawford County, and over $145 million for the State of Kansas. The new long-term output for the first ten years totals over $4.2 million for Crawford County, and over $4.4 million for the State of Kansas. The new long-term output after the first ten years totals over $98 thousand for Allen County, over $37 thousand for Anderson County, over $59 thousand for Bourbon County, over $56 thousand for Coffey County, over $4.3 million for Crawford County and over $5.1 million for the State of Kansas.

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

	Allen County	Anderson County	Bourbon County	Coffey County	Crawford County	State of Kansas
Construction						
Direct	$27,245,320	$9,277,921	$9,716,775	$19,284,669	$22,730,241	$100,573,531
Indirect	$1,503,731	$408,986	$827,212	$2,430,394	$2,258,252	$16,115,600
Induced	$3,357,668	$1,368,821	$1,538,128	$1,821,663	$5,026,297	$28,763,444
Total	$32,106,719	$11,055,728	$12,082,115	$23,536,726	$30,014,790	$145,452,575
Operations (Annual) Years 1-10						
Direct					$4,102,814	$4,102,814
Indirect					$0	$0
Induced					$138,298	$359,678
Total					$4,241,112	$4,462,492
Operations (Annual) Years 11-40						
Direct	$0	$0	$0	$0	$4,102,814	$4,102,814
Indirect	$92,311	$34,750	$54,435	$54,364	$139,896	$741,534
Induced	$6,018	$2,912	$4,767	$2,624	$136,159	$331,104
Total	$98,329	$37,662	$59,202	$56,988	$4,378,869	$5,175,452

VI. Property Taxes

Table 6.1 – Total Tax Revenue for the State of Kansas

Year	State of Kansas
2025	$0
2026	$0
2027	$0
2028	$0
2029	$0
2030	$0
2031	$0
2032	$0
2033	$0
2034	$0
2035	$2,061,026
2036	$1,932,657
2037	$1,804,300
2038	$1,675,944
2039	$1,547,587
2040	$1,419,231
2041	$1,284,923
2042	$1,156,234
2043	$1,027,651
2044	$899,067
2045	$770,483
2046	$667,616
2047	$667,616
2048	$667,616
2049	$667,616
2050	$667,616
2051	$667,616
2052	$667,616
2053	$667,616
2054	$667,616
2055	$667,616
2056	$667,616
2057	$667,616
2058	$667,616
2059	$667,616
2060	$667,616
2061	$667,616
2062	$667,616
2063	$667,616
2064	$667,616
40 Year TOTAL	$28,263,808
Annual Average	$706,595

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 Kansas.
- Second, the table assumes a 10-year property tax abatement for the State of Kansas.
- Third, the analysis assumes a 4.08% property tax rate.
- Fourth, all tax rates are assumed to stay constant at their 2020 (2019 tax year) rates.
- Fifth, 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 Kansas. The Project starts out paying no property tax due to the tax exemption for the first ten years. In 2035, the Project pays over $2 million. The expected total property taxes paid over the 40-year lifetime of the Project is over $28.2 million, and the average annual property taxes paid will be over $706 thousand.

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VIII. Curriculum Vitae (Abbreviated)

David G. Loomis
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Education

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

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

Experience

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

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

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

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

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

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

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

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

2011-present Strategic Economic Research, LLC
President

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

Bryan A. Loomis
Strategic Economic Research, LLC
Vice President

Education

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

Experience

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

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

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

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

Christopher Thankan
Strategic Economic Research, LLC
Economic Analyst

Education

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

Experience

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

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

by Dr. David G. Loomis,
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