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MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. EA-2024-0302

DIRECT TESTIMONY

OF

TODD SCHATZKI

ON

BEHALF OF

AMEREN TRANSMISSION COMPANY OF ILLINOIS

St. Louis, Missouri
July, 2024

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DIRECT TESTIMONY

OF

TODD SCHATZKI

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I. INTRODUCTION AND BACKGROUND

Q. Please state your name and business address.

A. My name is Todd Schatzki. My business address is 111 Huntington Avenue, 14th Floor, Boston, Massachusetts 02199.

Q. By whom are you employed and in what capacity?

A. I am a Principal at Analysis Group, Inc. (Analysis Group).

Q. What is Analysis Group?

A. Analysis Group is one of the largest economics consulting firms, with over 1,200 professionals across 14 offices in North America, Europe, and Asia. Since 1981, Analysis Group has provided expertise in economics, finance, analytics, strategy, and policy analysis to top law firms, Fortune Global 500 companies, government agencies, and other clients. The firm's energy and climate practice area is distinguished by its expertise in economics, finance, market modeling and analysis, economic and environmental regulation, analysis and policy, and infrastructure development. Analysis Group's consultants have worked for a wide variety of clients, including energy suppliers, energy consumers, utilities, regulatory commissions, other federal and state agencies, tribal governments, power system operators, foundations, financial institutions, start-up companies, and others.

Q. Please describe your educational and professional background.

A. I am an economist with expertise in energy and environmental economics and policy. My experience in energy markets and regulation includes wholesale and retail electricity markets, natural gas markets, and other fuels markets. I have extensive experience in wholesale power markets for energy, capacity, and ancillary services in most regions of North America. I have helped in the review and redesign of market rules used in organized wholesale markets, performed economic analysis of the impacts of proposed market rules and infrastructure changes, evaluated the rules and procedures for monitoring and mitigation by market monitors in organized markets, evaluated the conduct of market participants with respect to allegations of market manipulation, and assessed economic damages associated with disputes regarding wholesale power contracts. With respect to transmission, I have assessed transmission planning procedures and policies as they affect delivery of remote renewable resources, system congestion, and achievement of policy objectives, and have analyzed the economic and environmental impact of new transmission infrastructure. In particular, I have estimated economic and environmental impacts in support of state Certificates of Public Convenience and Necessity for 8 of 17 regionally beneficial projects in Midcontinent Independent System Operator, Inc.'s (MISO) Multi-Value Project (MVP) portfolio and, more recently, for a transmission program encompassing Illinois' portion of MISO's Long Run Transmission Planning (LRTP) Tranche 1 Portfolio. I have worked directly with independent system operators including ISO New England Inc. (ISO-NE) and New York Independent System Operator, Inc. (NYISO), and some of my other work has involved organized and non-organized wholesale markets including those administered by ISO-NE, NYISO, Alberta Electric System Operator, California Independent System Operator, Corp., MISO, PJM Interconnection, L.L.C., and Southwest Power Pool, Inc., as well as in Western U.S.

wholesale electricity markets. Across engagements, I have worked on behalf of system and market operators, market monitors, and market participants. My Curriculum Vitae is provided as **Schedule TS-D1** to my testimony.

Q. Have you previously testified before the Missouri Public Service Commission (Commission)?

A. Yes. I have provided testimony on behalf of Ameren Transmission Company of Illinois (ATXI) in Case No. EA-2015-0146 and Case No. EA-2017-0345, both of which concerned ATXI's Certificate for the Mark Twain transmission project, and rebuttal testimony on behalf of Union Electric Company d/b/a Ameren Missouri (Ameren Missouri) in Case No. ER-2019-0335, which concerned the participation of long lead-time units in MISO's energy markets. I have also testified before the Federal Energy Regulatory Commission (FERC) and various other state and Canadian provincial regulatory commissions. A list of that testimony is included in my Curriculum Vitae, **Schedule TS-D1**.

II. PURPOSE OF TESTIMONY AND SCHEDULES

Q. Are you familiar with the electric transmission projects for which ATXI requests Commission approvals in this proceeding?

A. Yes. ATXI, the Missouri Joint Municipal Electric Utility Commission, and Ameren Missouri are working together to build a more reliable and resilient energy grid for the future, and to construct, acquire, and operate certain transmission assets as part of the Northern Missouri Grid Transformation Program (the Program) described in the direct testimony of ATXI witness Mr. Shawn Schukar. The Program represents the Missouri jurisdictional portion of the first wave, or "Tranche," of MISO's ongoing long term transmission planning effort. The facilities included

in ATXI's application address the first phase of the overall Program in Missouri (Phase 1). Phase 1 includes approximately 53 miles of new transmission lines across northwest and northeast Missouri, as well as a new substation and upgrades to an existing substation. Phase 1 includes two projects: the Fairport-Denny-Iowa/Missouri border project in Worth, Gentry, and DeKalb counties, and the Maywood-Mississippi River Crossing project in Marion County (collectively, the Projects or Phase 1 Projects). As Mr. Schukar discusses, this Program will ensure continued energy reliability and resiliency for Missouri electricity consumers as conventional generation sources cease operation and wind, solar, and other distributed and renewable generation resources come online in Missouri and the broader Midwest region. Other ATXI witnesses describe the route of Phase 1 in Missouri in detail.

Q. What is the purpose of your direct testimony?

A. I am testifying on behalf of ATXI in support of its request for a Certificate of Convenience and Necessity (CCN) for the Phase 1 Projects. I understand that this Commission has generally evaluated an application for a CCN under the five criteria commonly called the *Tartan* factors,[1] which include:

1. Whether there is a need for the facilities and service;
2. Whether the applicant is qualified to own, operate, control and manage the facilities and provide the service;
3. Whether the applicant has the financial ability for the undertaking;
4. Whether the proposal is economically feasible; and
5. Whether the facilities and service promote the public interest.

[1] These factors were outlined in *In Re Tartan Energy*, GA-94-127, 3 Mo. P.S.C.3d 173, 177 (1994).

My testimony provides economic analysis relevant to the first, fourth and fifth of these criteria—that is, whether there is a need for the Program, including the Phase 1 Projects, whether the Program is economically feasible and whether the Program is in the public interest. In addition, my testimony provides an analysis of the impacts on air emissions of the Program relevant to the fifth of these criteria.[2]

Q. Are you sponsoring any schedules with your direct testimony?

A. Yes. I am sponsoring:

- **Schedule TS-D1** (Curriculum Vitae);
- **Schedule TS-D2** (Technical Appendix); and
- **Schedule TS-D3** (Tables of Results).

Q. Please summarize the conclusions of your direct testimony.

A. My economic analysis supports the conclusion that the Program would provide substantial benefits to Missouri and that it meets the Tartan criteria related to need, economic feasibility, and public interest. The Program would achieve these outcomes through multiple beneficial economic impacts. *First*, the Program's development would be expected to lower the overall social cost to Missouri of providing electricity service to Missouri customers. Reductions in social cost would reflect both the reduction in the costs of producing electricity to meet Missouri customer loads and reduced environmental impacts to Missouri residents from producing electricity, in the form of lower emissions of carbon dioxide (CO_2) generated throughout the MISO

[2] Throughout this testimony, I use "air emissions" and "emissions" interchangeably to refer to the air emissions of carbon dioxide, nitrous oxide, sulfur dioxide, and mercury that result from the use of fossil fuels to generate electricity.

footprint, as well as lower emissions of nitrogen oxides (NO_X), sulfur dioxide (SO_2) and mercury from sources within Missouri.

Second, the Program would also be expected to lower expenditures by Missouri businesses and residents on electricity. These reductions in payments for electric energy service would likely far outweigh the impact of transmission charges to Missouri load-serving entities within MISO from the Program. Thus, on net, the Program would be expected to reduce customer payments.

Third, the Program would also be expected to lower wholesale energy prices, which is consistent with lower social costs, lower customer payments, and improved market efficiency. In total, these impacts would provide substantial benefits to Missouri, as well as to the MISO Midwest Subregion as a whole.

These benefits—including, reductions in costs, lower net customer payments, and improved environmental quality—demonstrate that there is a need for the Program and that the Program is in the public interest. Several factors, including FERC's approval of ATXI's recovery of Program costs through MISO transmission rates and ATXI's demonstration of a plan, ability and willingness to finance the Program, demonstrate that the Program is economically feasible.

Specifically, I find that:

1. The Program will result in lower wholesale electric energy prices in Missouri. Across all scenarios, time periods and discount rates I evaluate, the reduction in wholesale electric energy market prices for Missouri consumers are projected to be reduced by 0.7 percent to 3.1 percent.
2. The Program will result in lower production costs in Missouri, which would translate into lower payments for customers. Across a range of natural gas price forecast scenarios, the reduction in Missouri production costs range from $10.29 to

$10.94 million in 2030, $11.59 to $16.91 million in 2035, and $19.66 to $35.97 million in 2040. These reductions in production costs outweigh the portion of the Program's costs borne by consumers in the MISO Missouri region, with a ratio of benefits to costs ranging from 2.74-to-1 to 7.39-to-1.

3. The Program will result in environmental benefits through a reduction in air pollutant emissions in both Missouri and the entire MISO Midwest Subregion. In Missouri, across natural gas price forecast scenarios and years evaluated, SO_2 emissions reductions range from 0.3 percent to 11.8 percent, NO_X emissions reductions range from 0.5 percent to 4.7 percent, and mercury emissions reductions range from 0.2 to 11.8 percent. In addition, I find reductions in CO_2 emissions for the entire MISO Midwest Subregion range from 0.8 percent to 2.5 percent across the years and scenarios I evaluate.

Based on these results, I find that there is a need for the Program, the Program promotes the public interest and is economically feasible.

Q. Are you offering any legal opinions in your direct testimony?

A. No. Although I refer to certain Missouri statutes in my testimony, I am not an attorney and none of my direct testimony is intended to offer any legal opinions.

III. THE NORTHERN MISSOURI GRID TRANSFORMATION PROGRAM

Q. You testified that this proceeding addresses Phase 1 of the Program. Are there other components of the Program?

A. Yes. As Mr. Schukar notes, following Phase 1 of Program, ATXI plans to undertake a second phase, Phase 2, which includes the Denny—Zachary—Thomas Hill—Maywood Project,

which consists of three new transmission lines comprising approximately 204 miles. My analysis reflects the joint impacts of both Phase 1 and Phase 2 of the Program.

Q. Why do you analyze the impact of the entire Program, rather than only Phase 1 of the Program?

A. The Program was designed as a single package that requires all of its elements to be included to achieve its full potential.[3] As such, the whole is not the sum of the parts. Physically, the integrated nature of the Program reflects the fact that Phase 1 and Phase 2 represent segments of a larger circuit that runs from Iowa to Missouri to Illinois. As such, reliable estimates of the impact of the Program—or individual Program Phases—requires that both Phase 1 and Phase 2 be modelled together so that the effects of the full circuit are captured by the analysis. Analysis focusing on only one phase or the other will fail to reliably capture impacts, like modeling the impact of adding portions of a proposed new highway between two cities on a standalone basis, rather than modeling the full length of the highway. Given this, my analysis considers the entire Program, rather than only Phase 1 of the Program, to determine the effects of the Phase 1 Projects.

Q. Does your analysis consider Missouri projects not included in the Program?

A. Yes. Along with the Program, Tranche 1 of the LRTP includes additional upgrades to two Associated Electric Cooperative Incorporated (AECI) facilities. These facilities consist of

[3] Together, my PROMOD analysis of system benefits, which I describe in Section IV, considers LRTP Tranche 1 Portfolio MVPs #9, #10 and #11, which includes the Program, the AECI facilities, and facilities in Illinois and Iowa. *See*, for example, MISO, "MTEP21 Report Addendum: Long Range Transmission Planning Tranche 1 Portfolio Report with Executive Summary," 2022, available at: https://cdn.misoenergy.org/MTEP21%20Addendum-LRTP%20Tranche%201%20Report%20with%20Executive%20Summary625790.pdf (hereafter "MISO LRTP Tranche 1 Report"), pp. 44-46.

one substation, located at Fairport, and a second substation, located at Thomas Hill.[4] I include these AECI facilities in my analysis for the same reason that I include the entire Program, rather than only Phase 1 of the Program—the AECI facilities are a part of the single package of projects designed and intended by MISO to function together.

Q. What is your understanding of the principal benefits to the electric system that the Program will provide?

A. The Program will provide a combination of reliability, resiliency, economic and environmental benefits that are important to achieving both state policy goals and regional electricity system objectives. These benefits are discussed in my testimony and by ATXI witnesses Messrs. Schukar, Dodd, and Davies.

Q. How does the Program support MISO's regional electricity system objectives?

A. As ATXI witnesses Mr. Dodd and Mr. Davies explain, the Program is an integral part of MISO's LRTP Tranche 1 Portfolio of MVPs that was approved by MISO's Board of Directors in 2022 and that will enable the reliable delivery of clean energy within the MISO footprint. MISO's LRTP study is one of several key elements of MISO's response to ongoing transformation in the MISO region's mix of resources due to state energy and environmental policies, technological innovation, customer preferences, and utility goals.[5] MISO's analyses have identified multiple significant grid issues that emerge as renewable deployment expands beyond

[4] *See* MISO, "MTEP21 LRTP Addendum Appendix A.xlsx," tab "Facilities", available at: https://cdn.misoenergy.org/MTEP21%20LRTP%20Tranche%201%20Portfolio626133.zip.

[5] The transmission projects in MISO's LRTP Tranche 1 Portfolio were "developed to ensure that the regional transmission system can meet demands in all hours while supporting the resource plans and renewable energy penetration targets reflective of MISO member utilities' goals and state policies." MISO LRTP Tranche 1 Report, p. 1.

certain thresholds.[6] These potential issues can be addressed, in part, by investment to make the transmission system more reliable and resilient. As Mr. Dodd explains, MISO's LRTP studies address these needs by developing "Futures" transmission planning scenarios that integrate the forward-looking policies and plans of the states and utilities within the MISO system, and identifying projects that can mitigate the grid issues arising under these "Futures" scenarios.

Q. Is the Program a Multi-Value Project?

A. Yes. As Mr. Dodd notes, the projects comprising the LRTP Tranche 1 integrated portfolio each meet the criteria to be defined as a regionally beneficial Multi-Value Project for regional cost sharing as approved by FERC.[7] As such, the costs of each project within the LRTP Tranche 1 Portfolio, including the Missouri portions of the portfolio comprising the Program, will be recovered from all load within the MISO Midwest Subregion via a per megawatt hour (MWh) charge.[8] The revenue requirement for the Program, and all elements of the LRTP Tranche 1 Portfolio, as calculated under the MISO Tariff, has been reviewed and approved by FERC. Thus, ATXI has approval to recover the costs of Phase 1 Projects through the MISO Tariff. ATXI witness Mr. Gudeman also addresses this regional cost-sharing, provides details on this revenue requirement, and provides evidence that ATXI has a plan, the capability and a willingness to finance the Program.

[6] *See* MISO, "MISO's Renewable Integration Impact Assessment (RIIA)," February 2021, available at: https://cdn.misoenergy.org/RIIA%20Summary%20Report520051.pdf, pp. 2-5.

[7] *Midwest Independent Transmission Sys. Operator, Inc.*, 133 FERC ¶ 61, 221, at P 3.

[8] *See* MISO LRTP Tranche 1 Report, p. 14.

Q. Is the Program included in MISO's LRTP Tranche 1 Portfolio?

A. Yes. As Mr. Dodd explains in more detail, the LRTP Tranche 1 Portfolio is the first of four currently planned LRTP tranches and comprises 18 MVPs in the MISO Midwest Subregion.[9] The Program itself comprises the Missouri portions of three of these 18 projects.[10]

Q. Are the LRTP Tranche 1 Portfolio projects expected to produce regional benefits?

A. Yes. The investments support a wide range of regional benefits, including reduced congestion, cost-effective delivery of clean energy, and improved environmental outcomes, among others. The MISO LRTP Tranche 1 Report attached to Mr. Dodd's testimony as **Schedule JLD-D3** is a comprehensive assessment of the LRTP Tranche 1 Portfolio.[11] As noted by Mr. Dodd, the report quantifies six of the many benefits created by the LRTP for the MISO Midwest Subregion: congestion and fuel savings, avoided local resource capital costs, avoided future transmission investment, reduced resource adequacy requirement, avoided risk of load shedding, and decarbonization.

Q. Is the LRTP Tranche 1 Portfolio and the Program expected to produce any benefits to Missouri specifically?

A. Yes, the types of benefits created by the LRTP Tranche 1 Portfolio would be provided to Missouri as well as other locations in the MISO Midwest Subregion. The MISO LRTP

[9] *See* MISO LRTP Tranche 1 Report, Executive Summary, pp. 1-2. The MISO Midwest Subregion comprises portions of Montana, North Dakota, South Dakota, Iowa, Wisconsin, Michigan, Missouri, Illinois, Indiana, and Kentucky.

[10] The Program encompasses all of Tranche 1 Project #10 and portions of Tranche 1 Projects #9 and #11. *See* MISO LRTP Tranche 1 Report, pp. 3-4, 44.

[11] *See* MISO LRTP Tranche 1 Report.

Tranche 1 Report estimates that the entire Tranche 1 portfolio would generate benefits that are 3.0 to 4.2 times greater than the costs for Missouri (Cost Allocation Zone 5).[12] My analysis quantifies the benefits of the Program alone to Missouri. As with the entire portfolio, the Program is expected to improve economic outcomes in Missouri, including production costs and overall customer payments for electricity, and improve environmental outcomes by enabling delivery of additional renewable energy supplies, thus reducing certain air emissions that affect human health. In fact, I conclude that the Program will provide benefits to Missouri through lower wholesale electric energy market payments, lower production costs, and lower air emissions for Missouri residents. I explain my analysis and these conclusions in depth below.

Q. What is your understanding of the total dollar cost to construct the Program?

A. I understand that the total cost of the Program to ATXI, representing relevant portions of LRTP Projects (Projects #9, #10, and #11), is approximately $611.1 million. In addition, these LRTP Projects include upgrades at two AECI substations in Fairport and Thomas Hill, which MISO estimates at a total cost of $15.5 million.[13] The direct testimony of ATXI witnesses Ms. Dencker and Mr. Gudeman provide more detail regarding the total costs of the Program.

[12] MISO LRTP Tranche 1 Report, p. 69.

[13] In 2022 dollars. *See* MISO, "MTEP21 LRTP Addendum Appendix A.xlsx," tab "Facilities", available at: https://cdn.misoenergy.org/MTEP21%20LRTP%20Tranche%201%20Portfolio626133.zip.

IV. THE IMPACT OF THE PROGRAM ON ECONOMIC OUTCOMES AND ENVIRONMENTAL POLLUTANTS

A. Analytical Approach

Q. What measures of economic outcomes do you evaluate in your analysis?

A. In my analysis, I develop quantitative estimates of the Program's impact on prices, production costs, and emissions. These measures, in turn, are used to evaluate the Program's impacts on social costs, customer expenditures, and environmental impacts, each of which have important implications for whether the Program is in the public interest and is economically feasible, two of the five *Tartan* criteria.

Q. Please describe why new transmission capacity is expected to be needed and in the public interest.

A. From an economic perspective, overall social welfare is improved if electricity services can be provided at a lower economic cost. Projects or policies that lower the social costs of electricity services ensure that society's resources are used in the most efficient manner. By lowering costs, such projects or policies are said to provide net social benefits. The economic costs of providing electricity services include all of the underlying costs of generating and transmitting electricity, which includes environmental externalities that impose social costs through their impact on public health and environment services (*e.g.*, recreation).

Economic analysis of new projects or policies should also consider impacts to particular groups given that impacts to individual groups, such as the consumers and producers of electricity, may differ from impacts to society as a whole. Thus, distributional impacts—particularly to

customers—can also be an important factor in determining whether a project or policy is needed[14] and in the public interest. Accordingly, my analysis considers impacts to consumers of electricity, including residences and businesses, by evaluating expected changes in consumer expenditures for electricity services.

Q. How do the economic measures in your analysis help inform your assessment of whether the Program is needed and in the public interest?

A. Changes in production costs, air emissions and prices each have important implications—on their own and when used to calculate other economic metrics—for whether the Program is in the public interest and economically feasible. Changes in production costs provide a direct measure of the Program's impact on social cost and overall economic efficiency and well-being, all else equal. For reasons I describe in detail below, changes in production costs also provide a good measure of how the Program would be expected to impact payments by customers in Missouri for electric energy service given the way in which customer rates are set. When reductions in production costs exceed the Program's investment and operations costs, the Program benefits customers and society as a whole, indicating that it is in the public interest. The net benefits from the Program, along with the approval of the sharing of the Program's costs across all MISO customers and ATXI's plans, ability and willingness to finance the Program, supports the Projects' economic feasibility.

[14] My understanding is that the Commission's criterion for need includes services that are "cost justified," which I interpret to include services that provide benefits greater than costs. *State ex rel. Intercon Gas, Inc. v. Pub. Serv. Commission of Missouri*, 848 S.W.2d 593, 597 (Mo. Ct. App. 1993) ("The PSC has authority to grant certificates of convenience and necessity when it is determined after due hearing that construction is 'necessary or convenient for the public service.' § 393.170.3. The term 'necessity' does not mean 'essential' or 'absolutely indispensable', but that an additional service would be an improvement justifying its cost.").

Changes in air emissions are another element of the Program's impact on social cost, as poor air quality can adversely affect health, productivity, environmental services and other societal values. Thus, if the Program reduces emissions, which in fact is likely the case, it would lower the social costs of providing electricity services, all else equal, and thus be in the public interest.

Although Missouri electricity customers generally do not buy electricity at wholesale market prices, changes in prices provide another useful metric for understanding the Program's economic impact, particularly to the extent that Missouri's load-serving entities (LSEs) procure energy from other energy suppliers. All else being equal, lower wholesale market prices provide an indication of lower costs of production (on the margin), a more efficient wholesale market and greater access for Missouri to renewable and other energy sources from throughout the MISO footprint, in turn reducing costs for electric customers in Missouri. Together, these outcomes show that the Program is in the public interest.

Q. How do you consider whether Phase 1 Projects are economically feasible?

A. The economic feasibility of the Phase 1 Projects reflects multiple considerations: (1) FERC has reviewed and approved the revenue requirement for recovery through the MISO Tariff, thus providing ATXI with a means to recover Phase 1 Project development and operation costs; (2) as stated in the direct testimony of ATXI witness Mr. Gudeman, ATXI has provided a plan to finance the Phase 1 Projects, demonstrated the ability to finance the Phase 1 Projects, and indicated its willingness to finance the Phase 1 Projects; and (3) Phase 1 Projects lower wholesale market prices and costs of production, creating a more efficient wholesale market and greater access for Missouri to renewable and other energy sources from throughout the MISO footprint, in turn reducing costs for electric customers in Missouri.

Q. Please provide a brief summary of your analytical approach.

A. Changes in prices, production costs, and emissions are estimated in two steps. In the first step, a market model is used to estimate the market outcomes of interest—prices, production costs, and emission costs—under different assumptions about the transmission infrastructure elements that are in service. A "with" case assumes the Program is in service, while the "without" case assumes the Program is not in service. The second step calculates the difference between outcomes in the "with" case and "without" case—this change in market outcomes captures the market impact from developing the new infrastructure.[15] In this section of my testimony, I describe the approach used to evaluate prices, production costs, and emissions, with further detail provided in **Schedule TS-D2**.

Q. Has the Commission accepted that approach before?

A. Yes. The approach that I employ to document whether there is a need for the facilities and services, whether the Program is economically feasible, and whether the Program is in the public interest for Missouri is the same approach I previously used in analyses submitted by ATXI in Case No. EA-2015-0146 and Case No. EA-2017-0345 involving its application for a CCN for the Mark Twain transmission project. In that proceeding, the Commission agreed with my methodological approach and overall conclusions in their order's Findings of Fact:

> ATXI also performed an economic analysis of Mark Twain. The analysis found that Mark Twain would enable additional wind generation to support achievement of Missouri renewable requirements, thus demonstrating the need for. It also found that Mark Twain's development would be expected to decrease wholesale prices for electric power and decrease the costs of producing electricity to meet customer

[15] My approach differs from the approach taken by MISO in its LRTP Tranche 1 Report. MISO's analyses compare the results between a "with LRTP Tranche 1" case and a "without LRTP Tranche 1" case that does not include any of the 18 LRTP Tranche 1 projects, whereas my analysis compares the results between the "with the Program" case including all 18 LRTP Tranche 1 projects and a "without the Program" case that includes only the other 15 LRTP Tranche 1 projects, excluding the three associated with the Program.

> loads. Reductions in production costs, in turn, would lead to reductions in the charges for electric power to retail customers in Missouri that far outweigh the impact of transmission charges to Missouri load-serving entities (primarily Ameren Missouri) that would arise from Mark Twain. Thus, these reductions in payments for electric energy would far outweigh the ultimate impact of Mark Twain on Missouri customers' retail electric rates. […] Mark Twain would also reduce emissions of carbon dioxide ('CO_2') generated throughout the MISO footprint, as well as reduce emissions of nitrogen oxides ('NOx'), sulfur dioxide ('SO_2') and mercury from sources within Missouri.[16]

The Commission concluded by stating that "In total, these impacts would provide substantial benefits to Missouri."[17]

Q. Please describe generally how you estimate expected future market outcomes.

A. The analysis uses the PROMOD V (PROMOD) market simulation model to estimate market outcomes in Missouri with and without the Program. PROMOD, which is marketed by Hitachi Energy, simulates the operation of the regional generation and transmission system by reflecting a variety of generator operating characteristics, constraints, and transmission system topologies and limits. The model simulates the operation of all generation resources, given resource-specific estimates of fuel costs, plant generation efficiency (heat rate), variable operation, emission allowance, and start-up costs by minimizing the production cost needed to meet customer loads given the physical and security constraints to flowing electricity over available transmission. The resulting plant-level output is consistent with decisions by individual utilities to cost-effectively meet their customers' loads through a combination of generation of electricity (with

[16] Report and Order, File No. EA-2015-0146, Public Service Commission of the State of Missouri, April 27, 2016, available at: https://www.efis.psc.mo.gov/Document/Display/29943, pp. 14-15.

[17] Report and Order, File No. EA-2015-0146, Public Service Commission of the State of Missouri, April 27, 2016, available at: https://www.efis.psc.mo.gov/Document/Display/29943, p. 15.

their own plants) and purchase and sale of electricity with other customers on the grid, when profitable.

My analysis employs the PROMOD data set used by MISO in the above-noted MISO LRTP Tranche 1 Report assessing the 18 MVP projects in the integrated LRTP Tranche 1 Portfolio. **Schedule TS-D2** further describes the PROMOD analysis and the data set that was used.

Q. What geographic region is covered by the PROMOD analysis?

A. The geographic region covered by the PROMOD analysis includes a large portion of the Eastern Interconnection,[18] including (1) all of MISO, which includes parts of Missouri, and (2) the parts of Missouri outside of MISO in SPP and other systems. The region covered includes the footprint of the adjacent SPP and PJM Interconnections, and other directly and indirectly interconnected systems.

Q. Please describe generally the analysis of prices.

A. The hour-by-hour locational marginal price (LMP)[19] values produced by the PROMOD analysis were used, along with the amount of load served from each of the pricing nodes, to develop load-weighted average wholesale electric energy prices. The difference between the load-weighted average electric energy prices with the Program and the load-weighted average electric energy prices without the Program represents the change in wholesale electric energy

[18] The Eastern Interconnection includes roughly the eastern two-thirds of the "lower 48" states (with the exception of portions of Texas) plus Canadian provinces to the east of Alberta.

[19] In MISO, electricity prices are developed for individual "nodes" on the system. These location-specific "nodal" prices are commonly referred to as LMPs. Differences in LMPs from location to location occur because of differences in marginal losses as well as the presence of transmission congestion. When transmission congestion is present, it is not possible to fully exploit differences in marginal generating costs at different locations and LMPs in transmission-constrained areas will rise above LMPs outside those transmission-constrained areas. I also refer to LMPs as "wholesale electric energy prices" or "wholesale electricity prices."

prices from implementing the Program. If this difference is negative, as turns out to be the case, then the Program results in *lower* average wholesale electric energy prices.

Q. Please describe generally the analysis of production costs.

A. My testimony provides estimates of the change in production costs to supply Missouri load associated with the Program. I refer to these as Missouri Production Costs.[20] These costs reflect the fuel, variable operations and maintenance, emission allowance, and start-up costs associated with supplying Missouri load, adjusted for net sales and purchases of energy with areas outside of Missouri, including areas within and outside of MISO. Missouri Production Costs reflect the costs to supply all Missouri loads, including those located in MISO, SPP and other systems. I also estimate the change in production costs for all of the MISO Midwest Subregion, which reflects the fuel, variable operations and maintenance, emission allowance, and start-up costs associated with supplying all MISO Midwest Subregion load, adjusted for net sales and purchases of energy with areas outside of the MISO Midwest Subregion. I refer to these as MISO Production Costs.

I also compare the modeled reductions in production costs in Missouri against the present value of transmission payments by MISO Missouri customers to support the cost of the Program. I estimate costs to Missouri associated with the Program of $51.1 million (under a 3.0% discount rate) or $43.7 million (under a 6.9% discount rate), which reflect (1) the $611.1 million cost of the Program to ATXI and the MISO-estimated $15.5 million to upgrade two AECI substations; (2) ongoing operating and maintenance costs associated with the Program; and (3) the share of

[20] MISO refers to these as adjusted production costs. *See* MISO, "MISO Adjusted Production Cost White Paper," April 22, 2021, available at: https://cdn.misoenergy.org/20210427%20PSC%20Item%2007%20MISO%20APC%20Calculation%20Methodology%20Whitepaper544059.pdf.

Program costs borne by MISO Missouri customers, which MISO estimates at 7.7 percent in its modeling of LRTP Tranche 1 costs.[21]

Q. Do these production cost estimates account for net sales and purchases made by LSEs in Missouri?

A. Yes, they do. To serve their customer's loads, LSEs in Missouri can own generation facilities, with the costs of owning and operating these facilities, including production costs, being recovered through the rates charged to their customers. These generation facilities may produce less than, greater than or exactly the amount consumed by LSE customers. When there is excess supply, these LSEs realize positive net revenues from sales to the wholesale market, with some portion (and potentially all) of revenues in excess of costs returned to customers. Likewise, when LSEs rely on market purchases to meet some portion of its customer loads, the cost of these purchases, which would reflect wholesale market prices and not production costs, are included in customer rates.

Because these net sales and purchases (relative to load) affect the LSE's cost to serve load, an adjustment to account for them is appropriate. Consider the impact of a project that reduces both LMPs and production costs for an LSE that generates more energy than its load consumes. For this LSE's customers, the sale of excess energy provides a benefit by offsetting a portion of the production costs of meeting their load. If the project reduced LMPs, this would reduce the net revenues earned from these sales, which could make customers worse off (*i.e.*, higher payments) if this reduction in net sales revenue was larger than any production cost savings created by the

[21] MISO, "LRTP Tranche 1 Detailed Business Case Analysis.xlsx," tab "0_Portfolio_CAZallocation," available at: https://cdn.misoenergy.org/LRTP%20Tranche1%20Detailed%20Business%20Case%20Analysis625787.xlsx. *See* **Schedule TS-D2** for a more thorough description of the calculation of transmission payments.

Program. By adjusting production cost estimates to account for net sales and purchases (at appropriate wholesale market prices), my approach accounts for such a possibility, although, as it turns out, production costs decline with the Program in service in all scenarios evaluated, even after accounting for any potential reductions in the revenues from energy sales.

Q. Do the estimated LMPs and production costs reflect ancillary services requirements?

A. Ancillary services are services provided by resources to ensure reliable, secure and efficient operation of the electric power system. In MISO, these services include operating reserves (spinning and supplemental), ramp capability, and regulation. The PROMOD analysis incorporates MISO's operating reserve requirements but does not account for ramp or regulation requirements. However, the costs of meeting these requirements generally reflect a small share of overall production costs.[22]

Q. Do production costs reflect social costs?

A. Yes. Social costs include the opportunity cost of using resources, including the various electricity production costs described above, such as the use of fuel to produce electricity or the use of labor to operate electric power plants. Thus, the costs captured by the estimated production costs are all social costs. Social costs also include welfare losses associated with economic decisions, including environmental impacts associated with the production of electricity.

[22] In 2022, the ancillary services component contributed only $0.16 per MWh to the average all-in price of electricity of $73 per MWh. "2022 State of the Market Report for the MISO Electricity Markets," Potomac Economics, June 15, 2023, available at: https://www.potomaceconomics.com/wp-content/uploads/2023/06/2022-MISO-SOM_Report_Body-Final.pdf, p. 4.

As I discuss below, to capture these types of impacts, I separately calculate the change in emissions from development of the Program.

Q. Do production cost estimates also provide a reliable means of assessing expected changes in retail payments by Missouri customers?

A. Yes. Missouri customers are served by LSEs that charge prices that are based on the LSE's cost of service. These LSEs include investor-owned utilities regulated by the Commission, and electric cooperatives and municipal utility companies that establish prices independent of state regulation. When customers are served by utilities with rates that are set based on the cost of service, the prices charged to customers will generally reflect costs of producing energy, rather than wholesale market prices. As a result, a reduction in the cost of producing energy will generally flow through to customers in the form of lower rates. Because Missouri customers are served by utilities that charge rates that are set based on the cost-of-service, changes in production costs of Missouri LSEs provide an appropriate means of estimating *expected changes* in retail payments for electric energy by Missouri customers from development of the Program.[23]

[23] The actual rates charged to Missouri customers are developed based on the utility's cost of service reflecting valid actual expenditures encompassing distribution, transmission and generation. For regulated utilities, rate setting occurs through rate cases heard by the Commission. By contrast, my analysis estimates *expected* changes in rates associated with portions of generation and transmission costs expected to change due to the Program's development. These estimates support determinations of whether the Program should be awarded a CCN and are not intended for the purpose of determining specific modifications to customer rates. Actual change in rates due to the Program's development may differ from my estimates for many reasons, but the expected changes I model would be indicative of those actual rate changes. Sensitivity analysis performed under many future scenarios test the robustness of my findings to uncertainty in future market conditions.

Q. Does the PROMOD analysis reflect the complete set of wholesale electricity market benefits from the Program?

A. No. The Program would generate many other types of benefits that are not quantified in my analysis. For example, MISO's Tranche 1 LRTP Report measures four additional categories of benefits that I do not quantify, including capital cost savings enabling more efficient generation resources,[24] avoided capital cost of future transmission investment, reduced resource adequacy requirements, and reduced risk of load shedding.[25] Other types of benefits may also occur (*e.g.*, lower operating reserve requirements). MISO estimated that, across the MISO Midwest Subregion, the magnitude of benefits from these other benefit categories exceeded production cost savings, the metric that I estimate.[26] Missouri and its customers could therefore experience sizable gains from these other benefit categories that are not captured by my analysis. Thus, focusing just on the change in economic outcomes from the PROMOD analysis will understate the full range of market benefits that can be expected from the Program.[27]

[24] That is, the LRTP lowers investment in generation facilities by allowing delivery of more efficient, but more distant, wind and solar energy resources.

[25] The MISO LRTP Tranche 1 Report also estimates decarbonization benefits using alternative monetary values per metric ton of carbon emissions reduced. *See* MISO LRTP Tranche 1 Report, Section 7 (LRTP Tranche 1 Portfolio Benefits), pp. 47-67.

[26] MISO estimates that these four categories of benefits (*i.e.*, avoided capital cost of local resource investment, avoided transmission investment, resource adequacy savings, and avoided risk of load shedding) lower costs by $20.6 to $31.9 billion compared to $13.1 to $19.9 billion on production costs savings (which MISO refers to as congestion and fuel savings). MISO LRTP Tranche 1 Report, p. 47.

[27] The economic benefits include, for example, production cost savings (generator startup, hourly generator no-load, generator energy and generator Operating Reserve costs), capacity losses savings, capacity savings due to reductions in the overall Planning Reserve margins resulting from transmission expansion, long-term cost savings realized by Transmission Customers. MISO LRTP Tranche 1 Report, pp. 7-8.

Q. Please describe the environmental benefits analysis that you conducted for the Program.

A. The goal of the environmental benefits analysis is to quantify the environmental benefits associated with the Program. My analysis is consistent with MISO's study of the LRTP Tranche 1 Portfolio, which documented a decline in CO_2 emissions in the MISO region over the next forty years due to the LRTP Tranche 1 Portfolio.[28] In my analysis, I use PROMOD output for the three study years—2030, 2035 and 2040—to evaluate the reduction in CO_2, SO_2, NO_X, and mercury emissions due to the Program. Since the negative health impacts of SO_2, NO_X, and mercury are generally associated with the geographic area near the emitting electric power producer, I present results for these air emissions for Missouri. Recognizing that the adverse impacts of CO_2 emissions are uniform regardless of location, I present results for the entire MISO Midwest Subregion for CO_2.[29]

My analysis estimates the change in emissions from the development of the Program. If emissions are lower with the Program, which happens to be the outcome, this indicates the environmental impacts, and thus costs to Missouri citizens and society as a whole, are lower with the Program in service, thus promoting the public interest in reducing the environmental impacts of providing electricity service. For NO_X and SO_2 emissions, production costs include the cost of allowances required for regulatory compliance, which varies across locations. I provide actual

[28] *See* MISO LRTP Tranche 1 Report, p. 65.

[29] Although the negative health impacts of SO_2, NO_X, and mercury are generally contained to the geographic area near the emitting electric power producer, CO_2 emissions mix uniformly in the atmosphere. As such, the precise geographic location of CO_2 emissions does not alter its impact on the global climate or, as a consequence, any associated damages to Missouri citizens.

emission levels, as well accounting for these allowance costs, because the cost of allowances included in production costs may differ (higher or lower) from the social cost of these emissions.[30]

Q. What specific years are included in your analysis?

A. Consistent with the MISO LRTP Tranche 1 Report, the PROMOD analyses were run for three future study years—2030, 2035 and 2040—using three different scenarios for each year. These scenarios contain different assumptions about natural gas prices and therefore allow an assessment of the relative robustness of the study results across a range of possible market conditions. As I describe below, I interpolate and extrapolate values from these three future study years when I estimate production cost reductions.

Q. What specific sensitivity scenarios are included in your analysis?

A. The following three sensitivity scenarios were included, each pertaining to a different natural gas price forecast. These sensitivity scenarios are the same scenarios used by MISO in its LRTP Tranche 1 Portfolio analysis:

i) Base Forecast – Natural gas price forecast from MISO's "Future 1" planning scenario;

ii) Base Forecast + 20% – Assumed 20% increase in the natural gas price forecast, relative to the Base Forecast; and

iii) Base Forecast + 60% – Assumed 60% increase in the natural gas price forecast, relative to the Base Forecast.

[30] My analysis does not account for any reductions in allowance prices that could arise due to reduced demand for allowances.

Q. Please describe the data sets used for your analysis.

A. The PROMOD analysis relies on the same data used by MISO in its economic analysis of the LRTP Tranche 1 Portfolio. These data are based on MISO's "Future 1" planning scenario and include information on customer loads, transmission infrastructure, forecasted fuel prices, and existing and new generation resources. Similarly, the scenarios I analyzed are the same as those analyzed by MISO. Aside from the transmission capacity associated with the Program, the only difference between the cases with the Program and cases without the Program concerns generation capacity whose interconnection to the MISO transmission system is enabled by the Program.

Q. Please describe the enabled generation capacity analysis.

A. In its analysis of the LRTP Tranche 1 Portfolio, MISO identified enabled generators by evaluating which of the renewable resources included in the Future 1 Regional Resource Forecast (RRF) with distribution factors (DFAX) greater than or equal to 5% had transmission reliability constraints resolved by the LRTP Tranche 1 projects.[31] Consistent with MISO's methodology, Ameren Services Company Transmission Planning staff identified generators enabled by the Program as all generators with a DFAX greater than or equal to 5% that had transmission reliability constraints resolved by the Program. These identified generators were then removed from all of my modeled scenarios without the Program. These assumptions are described in further detail in **Schedule TS-D2**. Generators enabled by the Program comprise 1,813

[31] This DFAX analysis required "the computation of change in flow on a network branch in the transmission model to the injection of power at a bus where generation is located which determines the amount of generator impact on facility loading." MISO LRTP Tranche 1 Report, p. 48.

megawatts (MW) of capacity in the MISO Midwest Subregion by 2030, 2,181 MW by 2035, and 2,289 MW by 2040.

B. Analysis Results

Q. Generally, what does your analysis show?

A. My analysis indicates that the Program will lead to lower wholesale electric energy market payments, reduced production costs, and lower emissions for Missouri. Specifically, my analysis indicates that reductions in customer payments, as reflected by reduced production costs, far outweigh the portion of the Program's costs borne by ratepayers in the MISO Missouri region. As such, I find that the Program is expected to result in net reductions in electricity costs for Missouri customers.

Q. Have you prepared exhibits summarizing these results?

A. Yes, the results of the analysis are described in **Table 1** through **Table 9**, which are provided in **Schedule TS-D3.**

Q. Please describe the Program's impact on Missouri LMPs, as shown in Table 1.

A. The PROMOD analyses involve a comparison of the "with the Program" and "without the Program" cases for three different study years (2030, 2035 and 2040) and three different scenarios within each study year. **Table 1** provides the weighted average LMP values for Missouri from these analyses. Wholesale electric energy prices in Missouri, as measured by the average Missouri LMPs reported in **Table 1**, are lower with the Program in service across all scenarios evaluated. Across these scenarios, the reduction in prices in Missouri from the Program range from $0.19 to $0.47 per MWh in 2030, $0.33 to $0.69 per MWh in 2035 and $1.13 to $1.52

per MWh in 2040. The percent reduction in prices ranges from 0.69 to 1.21 percent in 2030, 1.05 to 1.56 percent in 2035 and 2.71 to 3.13 percent in 2040.

Q. Over what geographic areas do you consider changes in production costs?

A. In my analysis, I consider changes in production costs to the MISO Midwest Subregion and to Missouri. Production cost reductions to Missouri provide information about the state-wide impacts to Missouri that are directly relevant to determining whether the Program is in the public interest and economically feasible from the standpoint of Missouri citizens. In addition, changes in production costs are measured for the MISO Midwest Subregion, which captures a broader, regional view of public interest. Because the LRTP Tranche 1 Portfolio involves programs that are being implemented in states across the MISO Midwest Subregion, with many states similarly considering approvals that produce both in-state and out-of-state positive benefits (including benefits to Missouri citizens), and because the LRTP Tranche 1 Portfolio was developed as a region-wide, integrated solution, such a broader regional view is appropriate to developing an informed view of whether the Program is in the public interest and whether it is economically feasible.

Q. Please describe the Program's impact on Missouri Production Costs, as shown in Table 2.

A. Production costs in Missouri are lower with the Program in service across all of the scenarios evaluated. Across the scenarios evaluated, the reduction in Missouri Production Costs range from $10.29 million to $10.94 million in 2030, $11.59 million to $16.91 million in 2035 and $19.66 million to $35.97 million in 2040. Note that the reduction in Missouri Production Costs is estimated for three individual years, 2030, 2035, and 2040. I would expect similar reductions in

years prior to, between, and subsequent to these years, which, as I show below, will make cumulative reductions much larger. The percent reduction in Missouri Production Costs ranges from 0.46 to 0.57 percent in 2030, 0.54 to 0.62 percent in 2035 and 0.86 to 1.14 percent in 2040.

Q. Please describe the Program's impact on MISO Midwest Subregion Production Costs, as shown in Table 3.

A. Production costs in the MISO Midwest Subregion are lower with the Program in service across all of the scenarios evaluated. Across the scenarios evaluated, the reduction in MISO Production Costs range from $126.32 million to $142.61 million in 2030, $173.86 million to $233.35 million in 2035 and $211.31 million to $300.62 million in 2040. The percent reduction in MISO Production Costs ranges from 1.23 to 1.43 percent in 2030, 1.80 to 1.88 percent in 2035 and 2.03 to 2.06 percent in 2040. As with the Missouri Production Costs, I expect similar reductions in MISO Production Costs in years prior to, between, and subsequent to 2030, 2035 and 2040.

Q. Please describe the change in Missouri Net Costs, as shown in Tables 4 and 5.

A. **Table 4** presents a conservative depiction of the estimated net cost of the Program that reflects both changes in production costs (over a 20-year period) and MISO Missouri LSEs' estimated share of the transmission charges that will arise from the Program's development and operation costs. The net cost reflects the Program's social cost, capturing both changes in production costs and Missouri's share of the transmission charges. Because the rates charged by Missouri LSEs reflect each entity's cost-of-service and because the Program's costs are recovered through rates charged to the LSEs that serve Missouri customers, these estimates of net costs also provide an appropriate estimate of the changes in electric energy payments by Missouri customers

that will arise from the Program. **Table 4** is a one-page summary containing estimates of the reduction in net costs for Missouri from the Program for each of the three scenarios over the 20-year period that I studied. I refer to these net costs as Missouri Net Costs. **Table 5**, which consists of three pages, provides year-by-year detail of the reductions in production costs and estimates of the present value of these reductions for each of the scenarios.

The Missouri Net Costs of the Program is calculated in several steps. To estimate the annual change in energy costs, I use estimates of Missouri Production Cost changes, which are adjusted to account for net sales and purchases of energy by these LSEs. Total cost impacts are estimated for the 20-year period, 2030-2049. I used the 2030, 2035 and 2040 PROMOD-produced electric energy cost amounts to determine growth rates between these years, and used these growth rate to interpolate or extrapolate the values for the other years in the 20-year comparison period. The figures in **Table 5** include the annual values in nominal terms and the present value of the total change over the 20-year period as of the present day (assumed to be mid-year 2024). These discounted present values are computed using alternative discount rates of 3.0 and 6.9 percent, which are the same discount rates used by MISO in its LRTP Tranche 1 analyses.[32] Discounting accounts for the time-value of benefits and costs, such as the opportunity cost of funds. MISO indicates that a discount rate of 3.0 percent was chosen to "represent the value a ratepayer would typically receive on a risk-adjusted investment," while the 6.9 percent discount rate is chosen as a higher rate "based on the gross-plant weighted average of the Transmission Owners' cost of capital."[33]

[32] *See* MISO LRTP Tranche 1 Report, p. 48.

[33] *See* MISO LRTP Tranche 1 Report, p. 48.

By comparing electric energy production costs in the "with the Program" and "without the Program" cases, I was able to determine the reduction in customer costs for each scenario (column [A], **Table 4**). As indicated, in **Table 4**, from the estimated total costs for electric energy, I subtracted an estimate of the transmission charges arising from the investment costs for the Program that will be borne by MISO Missouri LSEs as well as an estimated variable expense component. The remainder provides an estimate of the reduction in net costs that can be expected for Missouri customers as a result of the Program. The **Table 4** and **Table 5** estimated reductions are likely conservative because they reflect expected reductions in wholesale electric energy costs, and therefore payments (net of increased transmission payments), but not reductions in costs for other components of electricity supply such as capacity, operating reserves, and other transmission costs avoided by the Program. In addition, these estimates also do not account for other social costs and benefits, such as improvements in reliability (*e.g.*, reduction in lost load), access to new renewable resources, and reductions in air emissions, which I discuss below. **Schedule TS-D2** provides a more detailed explanation of the computational procedures employed in developing **Table 4** and **Table 5.**

Q. What do Table 4 and Table 5 indicate?

A. The results of my analysis reported in **Table 4** and **Table 5** show that the Program will lead to substantial reductions in the ultimate electric rates paid by customers in Missouri as compared to the rates that would be paid without the Program. Under the Baseline Natural Gas scenario, the present value of reductions in Missouri production costs from the Program is $119.9 million (at a discount rate of 6.9 percent). The present value of the transmission charges arising from the Program is $43.7 million, resulting in a net reduction in energy costs to be

ultimately borne by Missouri customers of $76.2 million (*i.e.*, $119.9 million minus $43.7 million). Thus, there is a 2.74-to-1 ratio of benefits (in terms of reductions in production costs) to costs (in terms of Missouri's share of Program costs). **Table 4** also shows that the reduction in costs would vary across the other scenarios I evaluated, with reductions in net costs ranging between $119.9 million and $202.2 million. Across the scenarios I evaluated, the ratio of benefits to costs ranges from 2.74-to-1 to 4.62-to-1. When the analysis is performed using a lower 3.0 percent discount rate, the reduction in net costs increases in each scenario and ranges from $214.8 million to $377.3 million. Across these cases, the ratio of benefits to costs ranges from 4.21-to-1 to 7.39-to-1. Thus, across all of the scenarios evaluated, the Program's benefits would far outweigh the costs of the Program's development to Missouri.

Q. Do you have any additional comments relating to Table 4 and Table 5?

A. As noted by ATXI witness Mr. Dodd, the MISO LRTP Tranche 1 Report provides an overall assessment of the benefits of the entire 18-MVP integrated portfolio as well as an assessment of the benefit/cost ratio of the MVP portfolio for each Cost Allocation Zone examined by MISO, one of which is MISO Zone 5, or the MISO Missouri region as I've defined it.[34] The results in the MISO LRTP Tranche 1 Report have been developed using the PROMOD market modeling software, and the same data set and sensitivity scenarios I employed, along with multiple supplemental analyses to measure other economic effects. The MISO report concludes that there are substantial benefits from the LRTP Tranche 1 Portfolio in *each* zone, thus indicating that the economic benefits associated with the LRTP Tranche 1 Portfolio will be distributed across all customers within MISO, including Missouri customers. The information in **Table 4** and **Table 5**

[34] *See* MISO LRTP Tranche 1 Report, pp. 3-5, 47.

complements these findings by demonstrating that Missouri customers will receive greater benefits than costs from the development of the Program alone. This is consistent with the conclusion that there is a need for the Program, that the Program is economically feasible, and that the Program is in the public interest because the Program is expected to generate benefits that exceed the costs by a substantial margin.

Q. Please describe the Program's impact on air emissions, as shown in Table 6 through Table 9.

A. The impact of the Program on emissions of CO_2, NO_X, SO_2, and mercury are shown in **Table 6** through **Table 9**, respectively. Across all of the scenarios, air emissions decrease with the introduction of the Program.

As shown in **Table 6**, with the Program in service, MISO Midwest Subregion CO_2 Emissions decrease by 1.55 to 3.31 million metric tons of CO_2 equivalent (TCO_2e) in 2030, 2.01 to 3.46 million TCO_2e in 2035, and 2.30 to 3.25 million TCO2e in 2040. In percent terms, emissions decrease by 0.83 to 2.16 percent in 2030, 1.18 to 2.45 percent in 2035, and 1.44 to 2.43 percent in 2040.

As shown in **Table 7**, with the Program in service, Missouri NO_X Emissions are reduced by 93 to 741 metric tons in 2030, 227 to 365 metric tons in 2035, and 64 to 158 metric tons in 2040. These reductions reflect a 0.52 to 4.69 percent reduction in 2030, 2.15 to 3.60 percent reduction in 2035, and 0.73 to 1.91 percent reduction in 2040.

As shown in **Table 8**, with the Program in service, Missouri SO_X Emissions decrease by 0.61 to 2.46 million pounds in 2030, 0.55 to 2.79 million pounds in 2035, and 0.04 to 0.17 million

pounds in 2040. In percent terms, emissions are reduced by 1.54 to 9.47 percent in 2030, 1.41 to 11.79 percent in 2035, and 0.32 to 1.50 percent in 2040.

As shown in **Table 9**, with the Program in service, Missouri mercury emissions decrease by 1.1 to 22.1 pounds of mercury in 2030 and 3.6 to 18.3 pounds of mercury in 2035.[35] In percent terms, reductions are 0.22 to 6.36 percent in 2030 and a 1.37 to 11.80 percent reduction in 2035.

Together, these reductions in air emissions further support the conclusion that the Program is in the public interest.

V. CONCLUSION

Q. What do you conclude regarding the economic impact of Phase 1 of the Program in Missouri?

A. My analysis demonstrates that the Program will lead to lower wholesale electric energy market payments and production costs. Consequently, I conclude that Phase 1 of the Program meets the Tartan criteria related to need and public interest. Phase 1 also meets the Tartan criterion for economic feasibility given FERC's approval of ATXI's revenue requirement for recovery through rates and ATXI plans, capability and willingness to finance the Phase 1 Projects' costs.

[35] There are no mercury emissions in either scenario in 2040. The MISO PROMOD models used assume that all generation facilities that produce mercury emissions in Missouri have retirement dates prior to 2040.

Q. What do you conclude regarding the environmental impact of Phase 1 of the Program in Missouri?

A. My analysis demonstrates that the Program will lower air emissions in Missouri and the MISO Midwest Subregion. These lower emissions indicate that Phase 1 will provide environmental benefits to Missouri and meets the Tartan criteria related to public interest.

Q. Does this conclude your direct testimony?

A. Yes.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Ameren Transmission Company of Illinois for a Certificate of Convenience and Necessity under Section 393.170.1, RSMo and Approval to Transfer an Interest in Transmission Assets Under 393.190.1, RSMo relating to Transmission Investments in Northwest and Northeast Missouri.	))))))))	File No. EA-2024-0302

AFFIDAVIT

1. My name is Todd Schatzki. I am a Principal at Analysis Group, Inc., which has been hired as a consultant for Ameren Transmission Company of Illinois, the Applicant in the above-captioned proceeding.

2. I have read the above and foregoing Direct Testimony and the statements contained therein are true and correct to the best of my information, knowledge, and belief.

3. I am authorized to make this statement on behalf of Ameren Transmission Company of Illinois.

4. Under penalty of perjury, I declare that the foregoing is true and correct to the best of my knowledge and belief.

/s/ Todd Schatzki
Todd Schatzki
Principal, Analysis Group, Inc.

Date: *July 16, 2024*