Exhibit No.:
Issues: Need, Economic Feasibility, Public Interest
Witness: Michael Goggin
Type of Exhibit: Rebuttal Testimony
Sponsoring Party: Sierra Club
Case No.: EA-2025-0275
Date Testimony Prepared: April 25, 2025

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. EA-2025-0275

PUBLIC

REBUTTAL TESTIMONY OF

MICHAEL GOGGIN

SUBMITTED ON BEHALF OF:

SIERRA CLUB

April 25, 2025

****Denotes Confidential Information****

TABLE OF CONTENTS

LIST OF SCHEDULES 2

1. INTRODUCTION 4

2. EVERGY IGNORES SEVERE TRANSMISSION CONGESTION THAT WILL INHIBIT THE ECONOMIC OPERATION OF GAS GENERATORS AT THE PROPOSED LOCATIONS 9

3. ALTERNATIVE RESOURCES WOULD BETTER MEET EVERGY'S NEEDS 31

4. INCREASING EVERGY'S DEPENDENCE ON GAS GENERATION IMPOSES AN ECONOMIC AND RELIABILITY RISK ON RATEPAYERS 52

LIST OF SCHEDULES

MG-1	Resume of Michael Goggin
MG-2	Public Company Responses to Data Requests
MG-3	Confidential Company Responses to Data Requests
MG-4	Lawrence Berkeley National Laboratory, Map of Wind Generation Value in 2023, excerpted
MG-5	Map of Evergy's Proposed Gas Generator Sites, excerpted from Direct Testimony Witness Olson (Schedule JKO-1)
MG-6	SPP Market Monitoring Unit Map, excerpted from "2023 Annual State of the Market" Report (June 2024)
MG-7	Lawrence Berkeley National Laboratory, Map Showing Average LMPs Nationwide in 2024
MG-8	Lawrence Berkeley National Laboratory, Map Showing Percentage of Time Each LMP Node had Negative Prices in 2024
MG-9	Confidential – Grid Strategies Analysis Results for Economic Dispatch of Proposed Generators, Accounting for Transmission Congestion
MG-10	Confidential – Grid Strategies Analysis Starts Analysis
MG-11	Grid Strategies Analysis Comparison of Economic Dispatch Results at Evergy's Proposed Gas Generator Sites Relative to Kansas City Load Center
MG-12	SPP Map Showing Planned Transmission Projects, excerpted from the 2024 Integrated Transmission Plan Education Session
MG-13	SPP Map Showing Transmission Projects Constructed or With Notice to Construct (2005-2032)

MG-14	SPP Seasonal Capacity Value Calculations for Wind, Solar, and Battery Storage, excerpted from the 2024 ELCC Wind Solar and ESR Study Report (August 2024)
MG-15	Reliability Services Table, from M. Milligan, "Sources of grid reliability services," *Electricity Journal,* (November 2018)
MG-16	Lawrence Berkeley National Laboratory, Chart Showing Months Between Submitting an Interconnection Request and Signing an Interconnection Agreement, excerpted from J. Rand *et al.*, *Queued Up: 2024 Edition*, *Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2023*, (April 2024)
MG-17	SPP Chart Showing Forced Outages by Resource Type as a Function of Temperature, excerpted from 2023 SPP Loss of Load Expectation Report
MG-18	Data Presented by SPP on Availability of Gas, Coal, and Wind as a Share of Accredited Capacity During Winter Storms Uri, Elliott, and Gerri, excerpted from Garrett Crowson, System Operations, January 2024 Winter Storm Gerri, Operating Reliability Working Group presentation (February 8, 2024)

1. INTRODUCTION

Q: Please state your name and job title.

A: My name is Michael Goggin, and I am a Vice President at Grid Strategies LLC, a consulting firm based in the Washington, D.C. area.

Q: For whom are you testifying?

A: I am testifying on behalf of the Sierra Club.

Q: Have you previously testified before utility commissions?

A: Yes. I have testified in dozens of proceedings before state utility commissions in Arizona, Colorado, Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Montana, Nevada, New Mexico, North Carolina, Ohio, Oklahoma, South Carolina, Virginia, Washington, and Wisconsin, as well as before the Federal Energy Regulatory Commission ("FERC").

Q: In what proceedings have you testified in front of the Missouri Public Service Commission ("the Commission")?

A: I testified in several dockets related to the petition for a Certificate of Convenience and Necessity ("CCN") for the Grain Belt Express transmission line (Commission Docket Nos. EA-2014-0207, EA-2016-0358, and EA-2023-0017).

Q: What is your background and educational experience?

A: I have worked on renewable energy, transmission, and electricity market issues for over 20 years. I have served as an expert on those topics for a range of clean energy industry and environmental clients in my seven years at Grid Strategies. For the 10 years before that, I worked at the American Wind Energy Association (now known as the American Clean Power Association), where I provided technical analysis and

advocacy regarding renewable energy, transmission, and renewable integration into electricity markets, including directing the organization's research and analysis team from 2014 to 2018. Prior to the American Wind Energy Association, I worked at a firm serving as a consultant to the U.S. Department of Energy ("DOE").

In the course of that work, I have co-authored nearly one hundred filings with the Federal Energy Regulatory Commission; served as a technical reviewer for over a dozen national laboratory reports, academic articles, and renewable integration studies; and published academic articles and conference presentations on renewable integration, transmission, and policy. I graduated with honors from Harvard University. A copy of my resume is provided in Schedule MG-1.

Q: What is the purpose of your testimony?

A: My testimony reviews the following three "*Tartan* Factors" the Commission uses to assess CCN applications: (1) there must be a need for the service; (2) the applicant's proposal must be economically feasible; and (3) the service must promote the public interest. I do not address the other two *Tartan* Factors, which are that the applicant must be qualified to provide the proposed service, and that the applicant must have the financial ability to provide the service. Generally, I address whether Evergy has engaged in reasonable utility planning, which I believe should include cost-effective spending and reasonable consideration of alternatives.

Q: Please outline your testimony.

A: First, I explain that Evergy failed to assess how transmission congestion at the proposed gas generator sites undermines their economic value and ability to operate profitably. Evergy **[redacted]

[redacted]** particularly as renewable generation continues to expand in the western part of the Southwest Power Pool ("SPP") footprint. I present my own analysis of recent congestion at the proposed gas plant sites, confirming there is major transmission congestion that will greatly inhibit the economic value and profitable operation of the proposed generators. My analysis shows that all three proposed gas generators are uneconomic under a range of scenarios for gas prices, power prices, and costs and constraints for generator starts. My findings are supported by data from SPP's Market Monitoring Unit, Lawrence Berkeley National Laboratory, and others showing congestion greatly reduces Locational Marginal Prices ("LMPs") and causes frequent periods of low and negative prices at the proposed gas generator sites. The economics of the proposed gas generators are further constrained by their limited capability for flexible dispatch, particularly for the proposed combined-cycle generators.

In light of those concerns, I next discuss alternative resources, including wind, solar, batteries, demand response, and capacity purchases, that together offer a less risky portfolio of resources that can more economically and reliably meet the needs of Evergy ratepayers. These alternatives can be deployed more quickly and are less susceptible to the risks and uncertainties related to the cost of and need for the proposed gas generators, as well as the LMP congestion and basis risk discussed in the first section of my testimony and the risks of gas price volatility and gas generator correlated outages discussed in the next section.

Finally, I outline the economic and reliability risks associated with increasing Evergy's dependence on gas generation. Evergy acknowledges that, during recent peak demand periods, a large share of the region's gas generation has been unavailable due to correlated outages. Even gas generation with firm gas transportation has been unavailable due to gas supply and transportation interruptions or correlated equipment failures. The onsite fuel oil Evergy proposes for the Mullin Creek #1 site may also be insufficient for many severe weather events. Gas prices are inherently uncertain and volatile, particularly as electric sector gas use grows and increased liquefied natural gas exports tether domestic gas prices to global economic and geopolitical events. Gas prices can be extremely high and volatile during peak demand periods, as Missouri ratepayers experienced during Winter Storms Uri and Elliott.

Q: What are your conclusions and recommendations?

A: I respectfully recommend that the Commission reject Evergy's petition for CCNs for the Viola, McNew, and Mullin Creek #1 gas plants proposed in its application.[1] Evergy's analysis has not adequately demonstrated that its application meets the three *Tartan* factors I reviewed: (1) there must be a need for the service; (2) the applicant's proposal must be economically feasible; and (3) the service must promote the public interest.

Most notably, Evergy failed to consider how transmission congestion could prevent the gas generators from operating profitably and thus undermine their value

[1] Evergy Application at 1.

for serving Evergy's existing and new load, despite abundant evidence that the proposed gas generator sites are some of the worst in the country for low and negative power prices due to the confluence of transmission congestion and surplus wind generation. Before approving any of the proposed gas plants, the Commission should require Evergy to complete a congestion analysis, assessing the economics of the proposed gas plants relative to alternative resources such as batteries based on historical and projected patterns of congestion and locational marginal prices in the SPP market. I am confident that if Evergy conducts this analysis, it will verify my conclusion that all three proposed gas generators are uneconomic under a range of scenarios for gas prices, power prices, and costs and constraints for generator starts. If Evergy's application is approved as submitted, Missouri ratepayers will be on the hook for gas plants that are likely to be unprofitable, operate less than expected, and incur high maintenance costs or even premature failure due to excessive generator starts and cycling.

My testimony establishes that major sources of uncertainty, including congestion, the gas plants' all-in cost including gas and electric interconnections as well as the impact of tariffs, the pricing of capacity purchases, load growth projections, and the price and availability of fuel during peak demand periods, make the proposed gas plants highly risky for Missouri ratepayers. Under many likely scenarios, the proposed gas plants will neither be needed, economically feasible, or in the public interest, failing those three *Tartan* Factors. A portfolio of alternative resources is less vulnerable to those risks.

2. EVERGY IGNORES SEVERE TRANSMISSION CONGESTION THAT WILL INHIBIT THE ECONOMIC OPERATION OF GAS GENERATORS AT THE PROPOSED LOCATIONS

Q: How does transmission congestion affect the value of generation?

A: Transmission congestion can significantly increase or decrease the value of generation, depending on the location of the generator. SPP's day-ahead and real-time wholesale energy markets include an economic optimization that calculates LMPs for each geographical pricing node for each pricing interval, which reflects the cost of generating a marginal MWh at each point on the grid. The LMP set by the marginal generator sets the value of all MWh generated or consumed in those areas. When transmission congestion limits the delivery of a lower-cost MWh, it is replaced by a higher-cost MWh from a local generator that is not constrained by the congestion. Congestion thus results in lower LMPs on the low-cost generator side of the transmission constraint and a higher clearing price on the load side of the constraint. While the higher LMP harms consumers on the load side of the constraint, the lower LMP on the low-cost generator side reduces the value of that generation. For example, a utility attempting to serve customers in an area with $35/MWh LMPs using a generator producing in an area with $20/MWh LMPs will only be credited $20/MWh for each MWh generated, leaving the utility short $15/MWh. This reduction in generation value due to transmission congestion is called basis risk.

Q: How do renewable generators affect LMPs?

A: Renewable generation can greatly reduce LMPs. Their impact is particularly pronounced when transmission congestion prevents renewable generators from delivering all of their potential output to customers, which causes the renewable

generator to set the LMP. Wind and solar plants are able to offer into wholesale electricity markets at around $0/MWh because they have no fuel cost and negligible variable operations and maintenance costs, and non-emitting generators receiving federal Production Tax Credits ("PTCs") can offer in at prices that are below zero by roughly the value of the PTC. The federal PTC provides a $30 tax credit for each MWh produced by a non-emitting generator for its first ten years of operation, and the value is indexed for inflation.[2]

Q: How is renewable generation affecting LMPs at Evergy's proposed gas generator sites?

A: The proposed gas generator sites are some of the worst in the country for low and negative power prices due to the confluence of transmission congestion and surplus wind generation. At Evergy's proposed gas generator sites, wind plants routinely set negative LMPs. A Lawrence Berkeley National Laboratory ("LBNL") map included as Schedule MG-4 illustrates how congestion reduces the LMPs received by many wind generators in western SPP to below $10/MWh.[3] A separate LBNL dataset and mapping tool shows that near Evergy's proposed gas generator sites (shown on Evergy's map in Schedule MG-5), LMPs are very low on average

[2] 89 Fed. Reg. 56,924 (July 11, 2024); Ernst & Young, LLP, Tax News Update; U.S. Edition, "IRS issues 2024 inflation adjustments for renewable energy production tax credits," (July 11, 2024), available at: https://taxnews.ey.com/news/2024-1358-irs-issues-2024-inflation-adjustments-for-renewable-energy-production-tax-credits.

[3] LBNL Data File, "2023 Market Value by Location" tab, https://emp.lbl.gov/sites/default/files/2024-12/Land-Based%20Wind%20Market%20Report_2024%20Edition_Data_File.xlsx.

(Schedule MG-7) and routinely negative (Schedule MG-8).[4] Specifically, LMPs near the proposed Viola combined-cycle site in Sumner County, Kansas were negative 24.9% of the time and averaged only $15.30/MWh in 2023-2024. Near the proposed McNew combined cycle site in Reno County, Kansas, LMPs were negative 23.5% of the time and averaged only $16.30/MWh in 2023-2024. Near the proposed Mullin Creek #1 combustion turbine site in Nodaway County, Missouri, LMPs were negative 15.8% of the time and averaged $18.60/MWh in 2023-2024. For comparison, the average price across SPP was $24/MWh in 2023,[5] around 50% higher than prices near the sites of Evergy's proposed combined cycle generators.

Q: Have other analysts noted the congestion and low LMPs in the areas Evergy has selected for its proposed gas plants?

A: Yes. The SPP Market Monitoring Unit's most recent Annual Market Report noted that the greatest "average day-ahead marginal congestion costs occurred around central Kansas and into central Oklahoma, at -$15/MWh to -$12/MWh."[6] That text accompanies the map shown in Schedule MG-6, which shows major congestion between Evergy's proposed generator sites and the Kansas City area where most of Evergy's current and future load is located. That report also noted that western Kansas saw the lowest prices in all of SPP: "Annual average day-ahead market prices ranged from around $12/MWh in west Kansas to $95/MWh in the northwest

---

[4] LBNL, "The Renewables and Wholesale Electricity Prices (ReWEP) Tool," available at: https://emp.lbl.gov/renewables-and-wholesale-electricity-prices-rewep.

[5] SPP Market Monitoring Unit, State of the Market 2023 Report at 182, available at: https://www.spp.org/documents/71645/2023%20annual%20state%20of%20the%20market%20report%20v2.pdf.

[6] *Id.*

section of North Dakota. Almost 60 percent of the 1,200 settlement locations had an annual average day-ahead market price between $20/MWh and $30/MWh."[7]

Q: Did Evergy evaluate transmission congestion or LMPs at the proposed gas generator sites?

A: No, Witness Olson's direct testimony lists the factors the Company evaluated, which did not include congestion and LMPs.[8] When asked for more information in discovery, Evergy answers that for the generator siting study and other analysis that led to the selection of the sites for the three proposed gas plants:

**
[redacted]

[7] *Id.* at 179.

[8] Direct Testimony of Witness Olson, Table 4 at p. 15.

[9] Evergy Response to Sierra Club Data Request SC 1-1(b)-(d).

[10] Evergy Response to Missouri Public Service Commission Staff Data Request 61, attachment DR 0061 – CONF – 2023 Conventional Generation Siting Study.pdf; Evergy Response to Sierra Club 1-1, attachment QSierraClub1-1_CONF_Siting Study.

[redacted] ** [11]

Excluding congestion as a siting factor[12] was a major mistake, given the severe congestion and low LMPs at the proposed gas generator sites. Before approving any of the proposed gas plants, the Commission should require Evergy to ** [redacted] ** assessing the economics of the proposed gas plants based on historical and projected patterns of congestion and locational marginal prices in the SPP market at or near the proposed generator interconnection points. I am confident that if Evergy conducts this analysis, it will verify the conclusion of my analysis presented below that all three proposed gas generators are uneconomic under a range of scenarios for gas prices, power prices, and costs and constraints for generator starts.

Q: ** [redacted] **

A: ** [redacted]

[11] Evergy Response to Missouri Public Service Commission Staff Data Request 66.

[12] Direct Testimony of Witness Olson at pp. 12-15.

[redacted] ** [13]

Q: ** [redacted]

[redacted] **

A: ** [redacted]

[redacted]

[13] Evergy Response to Sierra Club Data Request SC 1-1(a), attachment QSierraClub1-1_CONF_Siting Study, Power Engineers, Conventional Generation Siting Study, Appendix B: Market Evaluation Report, at pdf p. 24.

[redacted]

[14] SPP, Day-Ahead LMP by Bus, available at: https://portal.spp.org/pages/da-lmp-by-bus.

[15] Evergy Response to Missouri Public Service Commission Staff Data Request 66, attachment ** [redacted] **

[16] *Id.* at tab annual nodal.

[17] Evergy Response to Sierra Club Data Request SC 1-1(a), attachment QSierraClub1-1_CONF_Siting Study, Power Engineers, Conventional Generation Siting Study, at pdf p. 118 ** [redacted] *

[redacted]**

Q: **[redacted]**

A: **[redacted]

[redacted]

[18] *Id.* at pdf p. 118.

[19] *Id.*

[20] Evergy Response to Missouri Public Service Commission Staff Data Request 66, attachment **[redacted]*

[redacted] ** [23]

Q: How do these findings shape the scope of the analysis that you are recommending Evergy conduct?

A: As noted above, I am recommending that, before approving any of the proposed gas plants, the Commission should require Evergy **[redacted]

[21] Confidential Work Paper PIE agreement with Tech Exhibits, at pdf p. 229, 714. **[redacted] *

[22] Evergy Response to Sierra Club Data Request SC 1-1(a), attachment QSierraClub1-1_CONF_Siting Study, at pdf p. 122.

[23] *Id.*

[redacted]** This should include assessing the economics of the proposed gas plants relative to alternative resources such as batteries based on historical and projected patterns of congestion and locational marginal prices in the SPP market. Without this analysis, Evergy is making a risky bet on three gas plants that may not be profitable, may operate less than expected, and may incur high maintenance costs or even premature failure due to excessive generator starts and cycling. I am confident that if Evergy conducts this analysis, it will verify the conclusions of my analysis presented below that all three proposed gas generators are uneconomic under a range of scenarios for gas prices, power prices, and costs and constraints for generator starts.

Q: Has other analysis confirmed the costs associated with frequent starts and cycling at gas generators?

A: Yes. Analysis commissioned by the Energy Information Administration ("EIA") estimates that gas turbines (including both stand-alone combustion turbines and the gas turbine component of a combined-cycle generator) that frequently start incur costs of $23,100 per start.[24] Analysis by the National Renewable Energy Laboratory ("NREL"), leveraging detailed analysis and expertise from Aptech, a consulting firm that specializes in operations of thermal power plants, showed even higher costs associated with gas generator starts and cycling.[25] In contrast,

[24] EIA, Sargent and Lundy, "Capital Cost and Performance Characteristic Estimates for Utility-Scale Electric Power Generating Technologies," (Jan. 2024), at pdf p. 71, available at: https://www.eia.gov/analysis/studies/powerplants/capitalcost/pdf/capital_cost_AEO2025.pdf.

[25] NREL, D. Lew, G. Brinkman, E. Ibanez, et al., "The Western Wind and Solar Integration Study Phase 2," at pp. 53-62, available at: https://www.nrel.gov/docs/fy13osti/55588.pdf.

Evergy assumes that each ** [redacted] ** [26] This could be a reasonable assumption for a gas generator that has few starts and operates for extended durations once started. As EIA's analysis explains, for gas generators with that operating profile, maintenance costs can be more a function of total operating hours rather than number of starts.[27] However, ** [redacted] ** my own analysis below show that gas generators at these sites will not operate in that way, and instead will undergo so many starts that the number of starts and not the number of operating hours determines the time interval between major maintenance and overhaul events.

Q: ** [redacted] **

A: Yes. First, it only assumes that ** [redacted] ** [28] Wind and solar plants and other non-emitting resources receive the PTC for their first 10 years of operation, so a wind plant installed today will set negative LMPs through 2035. Under current law, plants beginning construction through at least 2032 are eligible for a decade of credits, indicating many wind plants will continue to set negative LMPs until the mid-2040s, given that wind

---

[26] Evergy Response to Missouri Public Service Commission Staff Data Request 39, attachment CONF_Viola_McNew CCGT_Mullin Creek SC_MOW Model_11.13.24.xlsx.

[27] EIA, Sargent and Lundy, "Capital Cost and Performance Characteristic Estimates for Utility-Scale Electric Power Generating Technologies," (Jan. 2024), at pdf p. 71, available at: https://www.eia.gov/analysis/studies/powerplants/capitalcost/pdf/capital_cost_AEO2025.pdf.

[28] Evergy Response to Sierra Club Data Request SC 1-1(a), attachment QSierraClub1-1_CONF_Siting Study, at pdf p. 126: ** [redacted] **

plants typically qualify for the PTC several years before being placed in service.[29] Even this is conservative because the Inflation Reduction Act specifies that the tech-neutral PTC will be available for the first decade of operations for non-emitting generators starting construction until the later of 2032 or when electric sector greenhouse gas emissions are reduced by 75% from 2022 levels,[30] which under current trends is unlikely to occur until significantly later than 2032.

Second, the ** [redacted] ** than more recent projections and prices for gas futures, which currently average below $4/MMBtu through 2037.[32] This partially masks the ** [redacted] ** over the period of the analysis. If the analysis was re-done using current prices for gas futures, it would likely find even lower energy market prices.

Q: ** [redacted] ** **What factors related to transmission constraints at the proposed generator sites did Evergy evaluate?**

[29] 90 Fed. Reg. 4,006, Internal Revenue Service, 45Y Clean Electricity Production Credit and Section 48E Clean Electricity Investment Credit, available at: https://public-inspection.federalregister.gov/2025-00196.pdf, at pdf p. 80.

[30] IRS, Clean Energy Production Credit, https://www.irs.gov/credits-deductions/clean-electricity-production-credit.

[31] *Id.* at pdf p. 129.

[32] CME Group, Henry Hub Natural Gas, Futures and Options, (last accessed April 23, 2025), available at: https://www.cmegroup.com/markets/energy/natural-gas/natural-gas.quotes.html.

A: The Power Engineers generation siting study Evergy commissioned only screened sites for the total capacity at electrical buses on Evergy's transmission system,[33] which does not capture current and future congestion on the SPP transmission system and its impact on LMPs at those locations. Evergy's transmission system is a small portion of the overall SPP system, and measuring the capacity of an electrical bus does not assess how competing generators will set LMPs and affect the profitable dispatch of the proposed gas generators. However, even that analysis suggested **[redacted]** [34]

Evergy's testimony explains that the location of generators relative to the load they will serve is a primary reliability consideration for generation planning,

[33] Direct Testimony Witness Olson at pp. 12-15 (referring to the Power Engineers, Generation Siting Study provided in response to Sierra Club Data Request SC 1-1(a)).

[34] *Id.* at pdf p. 100.

with Witness Humphreys testifying that "[r]eliability considerations include location of resources, proximity of resources to customer load, and availability of resources under various conditions."[35] However, the location of all three of Evergy's proposed gas generators and their distance from Evergy's existing and potential future customer load[36] present major concerns, primarily due to the transmission congestion documented above and below. The availability of those gas generators under various conditions is also a major concern due to the risk of correlated gas generator failures during periods of peak demand, particularly during extreme cold and to a lesser extent extreme heat conditions, as discussed in the final section of my testimony.

Q: Did you conduct your own analysis of LMPs, congestion, and basis risk at Evergy's proposed gas generator sites?

A: Yes. Using publicly available LMP data for the years 2022-2024 for the nearest nodes[37] in SPP's energy market,[38] monthly average prices for gas delivered to power plants in Kansas for that period,[39] and operating parameters such as heat

---

[35] Direct Testimony of Witness Humphrey at 7:8-10.

[36] Announced large loads like Google and Panasonic are located in close proximity to the Kansas City metro area.

[37] These nodes were identified in Evergy's response to Missouri Public Service Commission Staff Data Request 66, question 2.

[38] SPP, Day-Ahead LMP by Bus, available at: https://portal.spp.org/pages/da-lmp-by-bus; SPP Real-Time Balancing Market LMP by Bus, available at: https://portal.spp.org/pages/rtbm-lmp-by-bus. Day-ahead prices were used for the proposed combined cycle plants and real-time prices for the proposed combustion turbine, reflecting how each type of plant is generally committed and dispatched.

[39] EIA, Kansas Natural Gas Price Sold to Electric Power Consumers, available at: https://www.eia.gov/dnav/ng/hist/n3045ks3m.htm. Kansas gas prices were also used for Mullin Creek #1 as it just across the border from Kansas in Missouri.

rates and variable operations and maintenance costs for the proposed generators provided by Evergy,[40] I reconstructed how Evergy's proposed gas generators would be economically dispatched in the SPP market.

The analysis uses three scenarios to address uncertainty regarding the costs and equipment degradation the plants would experience from frequent starts. Frequent periods of low LMPs would force the proposed gas generators to either seldom be dispatched or undergo excessive starts that cause significant costs and potential degradation of plant equipment. The "optimistic" case assumes unlimited starts for the gas generators and Evergy's claimed ** [redacted] ** [41] for each generator. The "mid" case assumes unlimited starts and a cost of $23,100 per start for each generator, based on the Sargent and Lundy report commissioned by EIA.[42] Finally, the "cap starts" case uses Evergy's claimed startup cost and assumes that the gas generators cannot exceed the design basis starts specified by the manufacturer, which are ** [redacted]

[40] Evergy Response to Missouri Public Service Commission Staff Data Request 39, attachment CONF_Viola_McNew CCGT_Mullin Creek SC_MOW Model_11.13.24.xlsx.

[41] *Id*.

[42] EIA, Sargent and Lundy, "Capital Cost and Performance Characteristic Estimates for Utility-Scale Electric Power Generating Technologies," at pdf pp. 71, 86 (Jan. 2024), available at: https://www.eia.gov/analysis/studies/powerplants/capitalcost/pdf/capital_cost_AEO2025.pdf.

[redacted] ** [43]

Q: What were the results of your analysis?

A: My analysis shows major congestion that prevents the proposed gas generators from operating profitably and creates basis risk for serving Evergy load.

All three proposed gas generators were uneconomic in all three scenarios. Each of the proposed gas generators are uneconomic in each scenario for each of the three years of the analysis. This indicates the gas generators were not economic under a range of gas and electricity prices, with high gas prices in 2022 due to Russia's invasion of Ukraine causing high power prices that year, strongly suggesting they will also not be economic under a wide range of future gas and power prices.

Schedule MG-9 quantifies that each of the proposed gas plants were uneconomic by a wide margin in each year in each of the proposed scenarios. This table first shows the net energy market revenues the generator could earn in the SPP energy market, with net revenues reflecting energy market revenues minus fuel and variable operations and maintenance costs. Next, it adds a conservative estimate for the economic value of the generator's capacity contribution to meeting peak demand, which is based on ** [redacted]

[43] *See* Evergy's Confidential Work Paper PIE agreement with Tech Exhibits.pdf, at pdf pp. 229, 714.

[redacted] ** [44] Finally, Evergy's indicated annualized fixed cost for each generator[45] was subtracted from the energy and capacity value revenue streams to calculate the net value of the generator. The final column of the table in Schedule MG-9 shows that every proposed gas generator was uneconomic by a wide margin in every combination of year and scenario.

Schedule MG-9 also shows that the modeled capacity factors of the proposed generators are significantly lower than Evergy's estimates of ** [redacted] ** as Evergy's projections do not account for the impact of congestion on economic dispatch. The analysis of SPP data also shows low average LMPs at each generator site, driving the low capacity factor and net energy market revenue found by the analysis.

Q: Did you quantify the cost of congestion at Evergy's proposed gas generator sites?

A: Yes. To isolate the economic impact of congestion and basis risk at Evergy's proposed sites, Schedule MG-11 compares the economic dispatch of the proposed generators against an equivalent gas generator located near the Kansas City load center. These results show that the LMP, net market revenue, and capacity factor

[44] This is based on the conservative assumption that each gas generator provides full capacity value that is worth ** [redacted] ** per Evergy's response to Sierra Club Data Request SC 1-22.

[45] Evergy Response to Missouri Public Service Commission Staff Data Request 39, attachment CONF_Viola_McNew CCGT_Mullin Creek SC_MOW Model_11.13.24.xlsx., at cell F6 on the respective tabs for each proposed gas generator.

are much lower at Evergy's proposed gas plant sites than they are in the Kansas City area.

Q: Did you compare the economically optimal number of gas generator starts to the design basis for Evergy's proposed plants?

A: Yes. Schedule MG-10 shows that in the "optimistic" and "mid" cases in which the proposed gas generators were not constrained to the number of starts specified in their design basis, the economically optimal number of starts would greatly exceed their design basis. Exceeding the plants' design basis for significant periods of time could lead to excessive maintenance costs or even premature equipment failure, as metals and other materials fatigue as they expand and contract with temperature changes due to repeated starts and stops. When asked in discovery, Evergy acknowledges that exceeding the number of starts the gas generators were designed to accommodate would result in ** [redacted] ** [46] In addition to failing to account for congestion, Evergy did not use high-resolution production cost modeling to analyze chronological dispatch patterns at the proposed locations and assess how they compare to the design basis for the generators. Such an analysis would show the value of batteries relative to gas generators, particularly relatively inflexible gas combined-cycle generators. Moreover, the single-shaft combined-cycle design Evergy has chosen for McNew and Viola, in which the combustion turbine and

[46] Evergy Response to Sierra Club Data Request SC 2-2.

steam turbines are attached to the same shaft and generator, has less operational flexibility than dual shaft designs.

** [redacted] **

Q: How will continued expansion of renewable generation in SPP affect LMPs, congestion, and basis risk at Evergy's proposed generator sites?

A: While my analysis was historical and not forward-looking, ** [redacted] ** Other analyses have confirmed that renewable resources reduce wholesale electricity prices and increase price volatility,[47] which can be better managed by battery resources because they can charge during periods of low prices and are more flexible than gas generators, particularly Evergy's proposed single-shaft combined-cycle generators.

Ongoing expansion of solar generation in SPP will reduce the proposed gas generators' opportunities for summer and daytime profitability, and wind expansion will further reduce winter and nighttime profitability. As SPP adds solar generation, there will be fewer opportunities for gas generators to economically run for

[47] *See* Joachim Seel, Andrew Mills, Ryan Wiser, et al., LBNL, "Impacts of High Variable Renewable Energy Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making," (May 2018), available at: https://eta-publications.lbl.gov/sites/default/files/report_pdf_0.pdf.

extended periods. Daily solar output patterns in particular will limit the opportunity for gas generators to run for extended periods of time in summer.

Q: How will SPP's ongoing and planned transmission expansion affect LMPs and congestion at Evergy's proposed gas plant sites?

A: SPP's planned expansion of transmission in and from western SPP is shown in Schedule MG-12. This expansion includes large new lines from the Texas Panhandle, New Mexico, Nebraska, and the Dakotas,[48] which will allow more renewable interconnection that will further reduce LMPs at the locations of the proposed gas plants. SPP's transmission plans do not include significant transmission expansion between the proposed gas plant locations and the Kansas City area where most of Evergy's existing and planned load is located,[49] so congestion at the proposed generator sites and basis risk relative to Evergy load will continue to worsen. An SPP map included as Schedule MG-13 shows transmission projects that were completed or given a notice to construct during the 2005-2023 period. Those lines primarily increase delivery of renewable generation from western SPP to near Evergy's proposed combined-cycle sites in central Kansas, but do not fully deliver it to Kansas City and load centers further east.[50] This is consistent with the major congestion between the proposed gas plant sites and the Kansas City load center quantified above.

---

[48] SPP, 2024 ITP Education Session Powerpoint Slides at 21, available at: https://www.spp.org/documents/72472/mopc%20education%20session_%202024%20itp%20presentation_20241004.pdf.

[49] *Id.*

[50] *See* Direct Testimony of Witness VandeVelde, Schedule CV-1 (SPP, "Our Generational Challenge" Report) at p. 18.

**Q: What conclusions do you draw from your analysis of the proposed gas generator sites ** [redacted] **

A: Evergy's proposed generator sites are poorly suited for gas generators, particularly the relatively inflexible single-shaft gas combined-cycle generators Evergy has proposed for Viola and McNew. Batteries would be far more suitable for each of the three proposed sites due to frequent and extended periods of low prices and volatile prices that cause frequent starts and cycling of the gas generators. Modeling how LMPs and congestion affected the economic dispatch of the proposed generators should have been a centerpiece of Evergy's site selection process, yet Evergy did not consider that.[51] ** [redacted] **

Q: Did Evergy's IRP analysis capture the impact of transmission congestion on the proposed gas generators?

A: No, Evergy's IRP did not adequately model either the geographic or chronological constraints that limit the economic value of the proposed gas generators. The tools Evergy used in its IRP model dispatch in a limited number of time slices, such as peak demand hours, instead of modeling the sequential dispatch of generators. Sequential dispatch is essential for seeing how patterns of low LMPs affect the

[51] Direct Testimony of Witness Olson at p. 15.

economic viability of generators, particularly relative to more flexible resources like batteries. As discussed, frequent low and negative LMPs make it very challenging to operate gas generators at Evergy's proposed sites, particularly the combined-cycle generators. However, these frequent periods of low and negative prices are a boon for the economics of batteries, as they can earn money by charging at negative prices. The economic analysis Evergy presented in its IRP and in this case lacked the geographic and chronological resolution to adequately capture that value.

Q: What is your recommendation to the Commission?

A: I respectfully recommend that the Commission reject Evergy's CCN application due to Evergy's failure to account for transmission congestion and its impact on the economic dispatch of the proposed generators, among other shortcomings described above. The Commission should require Evergy to address the serious shortcomings in its economic analysis by conducting production cost modeling with detailed geographic representation to capture the impact of transmission congestion on the dispatch of the proposed generators. This modeling should also have hourly chronological resolution and sequential modeling of dispatch to adequately model and assess the economic dispatch of alternative resources. That analysis should include modeling of alternative resources like batteries. Because batteries and gas generators have very different dispatch capabilities, with batteries capable of earning revenue by charging during periods of low prices, this analysis may provide very different results and conclusions for the economically optimal resource additions than Evergy's analysis to date. In generation approval cases, it

is typical for the requestor to present production cost analysis with sufficient geographic and chronological resolution to accurately account for the impact of transmission congestion on economic dispatch. **[redacted]** [52] A number of other tools can be used for high-resolution production cost analysis, which is a standard tool for generation planning and economic analysis. I am confident that if Evergy conducts this analysis, it will verify the conclusion of my analysis that all three proposed gas generators are uneconomic under a range of scenarios for gas prices, power prices, and costs and constraints for generator starts.

3. ALTERNATIVE RESOURCES WOULD BETTER MEET EVERGY'S NEEDS

Q: What analysis of alternatives should Evergy conduct?

A: As explained above, I am recommending that Evergy analyze the economics of the proposed gas plants and alternatives using production cost analysis with sufficient geographic and chronological resolution to accurately account for transmission congestion and sequential dispatch. As part of this analysis, Evergy should also increase or remove build limits that may have artificially constrained the deployment of more cost-effective resources in the modeling Evergy conducted for the 2024 IRP and for its testimony in this case. In both analyses, Evergy imposed

[52] Evergy Response to Sierra Club Data Request SC 1-1; Evergy Response to Missouri Public Service Commission Staff Data Request 66.

150 MW per year caps on the deployment of each of wind, solar, battery, and wind-solar hybrid resources, while 740-795 MW of gas generation could be added each year.[53] Finally, this revised analysis should use updated cost and availability information for all resources, including capacity purchases.

Q: How has the cost of Evergy's proposed gas generators increased over time?

A: Dramatically. Witness Olson's supplemental direct testimony shows the costs for Viola at ** [redacted] ** As Mr. VandeVelde explained in his direct testimony, for "the CCGT, the IRP used an estimate of $1,271/kW in 2029. As Mr. Olson testifies, Evergy Missouri West's current estimate is that the cost of CCGT is ** [redacted] ** an increase of approximately ** [redacted] **[55] Similarly, the IRP used an estimate of $1,294/kW to construct a SCGT in 2030. Today, EMW estimates that the cost would be ** [redacted] **" which was an increase of ** [redacted] ** above the IRP.[56] The most recent cost estimate for Mullin Creek #1 of ** [redacted] ** from Witness Olson's supplemental direct testimony equals nearly ** [redacted] ** an increase of almost ** [redacted] ** above the IRP assumption for a combustion turbine.[57]

---

[53] Evergy Response to Sierra Club Data Request SC 1-31, attachment Q-SC-1-31 Build Limits IRP and Direct Testimony.xlsx.

[54] Supplemental Testimony of Witness Olson at pp. 2-3.

[55] Direct Testimony of Witness VandeVelde at p. 10.

[56] *Id.* at p. 11.

[57] Supplemental Testimony of Witness Olson at pp. 2-3.

This appears to primarily be caused by supply chain disruptions and demand outpacing supply.[58] As Witness Olson explains in his direct testimony,

> "I have observed a significant increase in construction cost trends. The most recent project for which I provided oversight went commercial in 2023 and experienced large price increases as the project neared completion. These cost increases began during COVID and continued to increase as a result of Russia's invasion of Ukraine. Costs have further increased as utilities across the country have announced plans for additional builds. This large demand in new builds has further caused pricing to increase as both PIE and EPC contractors have limited capacity and are having to expedite and work overtime to keep up with demand."[59]

Q: Are other generating resources also experiencing price fluctuations?

A: Yes, but less dramatically. Pandemic-related supply chain issues that affected the cost and delivery timeline for solar and storage equipment appear to have subsided. Battery cell prices fell by 50-60% from early 2023 to early 2024, with continued declines expected for the foreseeable future as supply growth outpaces demand.[60] Costs for grid-tied batteries fell 19% in 2024 from the prior year.[61] For solar, industry data show prices for solar modules fell by around 12% over the last year.[62]

It remains to be seen how recently announced tariffs, most notably with China, will affect the cost of solar and storage resources. In the past, industry has

---

[58] Rebecca F. Elliot, New York Times, "Why a Plane-Sized Machine Could Foil a Race to Build Gas Power Plants," available at: https://www.nytimes.com/2025/04/08/business/energy-environment/gas-turbines-power-plants.html.

[59] Direct Testimony of Witness Olson at p. 32.

[60] J. Weaver, *Battery prices collapsing, grid-tied energy storage expanding*, PV Magazine (March 2024), https://pv-magazine-usa.com/2024/03/06/battery-prices-collapsing-grid-tied-energy-storage-expanding/.

[61] C. Murray, *Lithium-ion battery pack prices fall 20% in 2024 amidst 'fight for market share'*, Energy Storage News (December 2024), available at: https://www.energy-storage.news/lithium-ion-battery-pack-prices-fall-20-in-2024-amidst-fight-for-market-share/.

[62] *Price Index – March 2025*, PVXchange, available at: https://www.pvxchange.com/Price-Index.

been able to adapt to tariff changes by sourcing from other countries, and there has recently been a resurgence of domestic manufacturing of solar and battery components.

Q: Do alternatives meet Evergy's need for capacity?

A: Batteries, renewables, capacity purchases, and demand response together provide year-round dependable peaking capacity. The table in Schedule MG-14 shows SPP's results for seasonal capacity value for wind, solar, and storage.[63] This table shows the seasonal complementarity between wind and solar, with wind providing more capacity value in winter and solar providing more capacity value in summer. This table also shows that SPP's analysis indicated 4-hour battery storage offers its full nameplate capacity as capacity value in winter and nearly 89% of its nameplate capacity in summer, under the assumptions and methods SPP has proposed to use for accrediting battery storage.[64] Despite SPP's results, ** [redacted] ** [65] These three resources' output profiles also complement each other on a daily basis, in addition to a seasonal basis. Wind tends to produce more at night, complementing daytime solar production. Solar production shortens the duration of late afternoon and early evening periods of peak need, increasing the capacity

[63] SPP, 2024 ELCC Wind Solar and ESR Study Report at pp. 6-11, (Aug. 2024), available at: https://www.spp.org/documents/72346/2024%20spp%20elcc%20wind%20solar%20&%20esr%20report.pdf.

[64] SPP, 2025 Wind/Solar/ESR Effective Load Carrying Capability Summer and Winter Study Scope at p. 8, available at: https://spp.org/documents/73277/2025%20spp%20elcc%20study%20scope.pdf.

[65] Evergy Response to Sierra Club Data Request SC 1-15(c).

contribution of limited-duration battery resources. This synergy has been widely documented.[66] Battery storage is ideally suited for shifting early afternoon solar output several hours later to meet late afternoon peak demand, and also helping to address morning and evening ramps in solar output. Because solar and wind complement storage by shortening the duration of periods of peak need, portfolios of wind, solar, and storage resources provide a capacity value that is greater than the sum of their component parts.

Q: Are there concerns that the capacity value of renewable and storage resources will significantly decline over time?

A: Capacity value decline for solar and batteries does not happen until those resources reach much higher penetrations than their current levels in SPP. Moreover, as explained above, growing solar penetrations will shorten the duration of peak net load periods in both winter and summer, helping batteries retain a high capacity value. SPP's high wind penetration will also help ensure that solar and batteries maintain high capacity value, due to the synergies among those three resources. Gas generators are also likely to see their capacity value decline as their penetration in SPP increases, as they display the same type of output correlation that causes the capacity value of wind, solar, and storage to decline as the penetration of each increases. As I document later in my testimony, gas generators typically experience correlated outages during peak winter demand events.

---

[66] E3, Capacity and Reliability Planning in the Era of Decarbonization (Aug. 2020), available at: https://www.ethree.com/wp-content/uploads/2020/08/E3-Practical-Application-of-ELCC.pdf.

Q: What role can capacity purchases play in cost-effectively meeting a need for capacity?

A: A major one. Data provided by Evergy show that capacity purchase offers continue to be available in SPP **[redacted]**

[67] Evergy Response to Sierra Club Data Request SC 1-22S, attachment Q1-22S_CONF_EMW_Evergy Capacity Offers 2022-2025.xlsx.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]** [69] In supplemental testimony[70] and in response to discovery, Evergy admits that the supply of capacity contracts in SPP is increasing, **[redacted]

[redacted]

[redacted]** [71]

Q: What role can demand-side resources like demand response and energy efficiency play in cost-effectively meeting a capacity need?

A: Evergy indicated it can extend[72] and expand its current demand response programs[73] cost-effectively providing hundreds of MW of additional capacity.

---

[68] Evergy Response to Missouri Public Service Commission Staff Data Request 39, attachment CONF_Viola_McNew CCGT_Mullin Creek SC_MOW Model_11.13.24.xlsx., at cell F6 on the respective tabs for each proposed gas generator.

[69] Evergy Response to Sierra Club Data Request SC 1-30 **[redacted]*

[70] Supplemental Direct Testimony of Witness VandeVelde at p. 6.

[71] Evergy Response to Sierra Club Data Request SC 2-10.

[72] Evergy Response to Sierra Club Data Request SC 1-28.

[73] Evergy Response to Sierra Club Data Request SC 1-29.

Evergy should also explore the ability to obtain demand response from new large loads, including data centers. These facilities may be able to reduce demand or even shift to their backup generation supplies during short-term periods of need, if properly incentivized to do so.[74] ** [redacted] ** [75]

Q: Given the current spike in gas generator costs and significant uncertainty regarding cost and need for the proposed gas generators, are more modular resources that can be deployed more quickly a better fit than gas generators with a long lead time?

A: Yes.

Q: What factors are causing uncertainty about the cost and need for the proposed gas generators?

A: The cost of the proposed gas plants is highly uncertain, including the impact of tariffs on the cost of materials to build the gas plants, interconnection costs for the gas plants, and firm gas transportation costs for the gas plants. Evergy may not need as much capacity as indicated due to uncertainty about load growth, the Crossroads generator, and the availability and pricing of market purchases. Much of this

---

[74] Tyler H. Norris, Tim Profeta, Dalia Patino-Echeverri, et al., Duke Nicholas Institute for Energy, Environment, & Sustainability, "Rethinking Load Growth: Assessing the Potential for Integration of Large Flexible Loads in US Power Systems," available at: https://nicholasinstitute.duke.edu/sites/default/files/publications/rethinking-load-growth.pdf

[75] Evergy Response to Sierra Club Data Request SC 2-14(d) ** [redacted] *

uncertainty will not be resolved until after the Commission acts in this case, imposing significant risk on ratepayers.

Q: Is there uncertainty about load growth?

A: Yes. Nationwide, many planned additions of large loads are being canceled, including battery[76] and electric vehicle factories,[77] data centers,[78] and other large loads. Uncertainty regarding federal incentives for domestic manufacturing are adding to the uncertainty regarding large load growth, ** [redacted] [redacted] [79] Potential changes to federal incentives for electrification of transportation and building heating may also affect the rate at which those technologies are adopted and thus the load growth trajectory. There is significant uncertainty about growth in data center electricity demand due to artificial intelligence.[80] The rapid increase in demand for large load interconnection over the last several years also appears to be driving speculative interconnection requests as companies shop around for available interconnection points, so it is difficult to predict large customer interconnection success rates. Historical

---

[76] Michelle Lewis, Electrek, "FREYR kills plans to build a $2.6 billion battery factory in Georgia," (Feb 10. 2025), available at: https://electrek.co/2025/02/10/freyr-battery-factory-georgia/.

[77] S. Osaka, "A stunning number of electric vehicle, battery factories are being canceled," (April 4, 2025), available at: https://www.washingtonpost.com/climate-environment/2025/04/03/ev-factories-canceled/.

[78] Nick Rommel, Wisconsin Public Radio, "Microsoft pauses construction on parts of Mount Pleasant site again," (Mar. 20, 2025), available at: https://www.wpr.org/news/microsoft-pauses-construction-on-parts-of-mount-pleasant-site-again.

[79] Evergy Response to Missouri Public Service Commission Staff Data Request 34.

[80] Ben Geman, Axios, "DeepSeek shakes up the energy-AI equation," (Jan. 28, 2025), available at: https://www.axios.com/2025/01/28/deepseek-ai-model-energy-power-demand.

interconnection completion rates may not accurately predict success rates for entirely new industries, like artificial intelligence data centers. Utility load growth projections deserve extra scrutiny because utilities have a financial incentive to overstate load growth to increase their profits with larger rate-based investments in generating capacity.

Q: Given that uncertainty, do Evergy's proposed gas plants impose risk on Missouri ratepayers?

A: Yes, ratepayers would be on the hook for the cost of unneeded capacity if large loads do not show up. In Witness Gunn's direct testimony at page 30, condition 1 for proceeding with allocating 50% of the cost of McNew to Evergy Missouri West ("EMW") ratepayers was "1. The addition of an incremental large load customer under evaluation is confirmed to be located in EMW territory and EMW is responsible for developing capacity resources to meet the new load."

That did not materialize, but Evergy has proposed moving forward with its proposal to allocate 50% of the cost of McNew to EMW ratepayers anyway. As Witness Gunn explains in his supplemental direct at pages 6-7: "Although no particular load addition or additions anticipated by any affiliate drove the decision, the Company did analyze likely load additions in each affiliate's territory, which included an Attachment AQ assessment with Southwest Power Pool." The load has not "been publicly announced or confirmed at this point. However, it has completed Evergy's internal review process that allows the Company to complete due diligence on large load customer requests, sets forth numerous data points to vet the feasibility of the customer locating in Evergy's service territory, and requires a

sizeable deposit to support analysis to study the viability of the customer's project."[81] Witness VandeVelde's Supplemental Direct confirms that projected need is speculative: "The new large load profile ramp included in the CCN Supplemental Direct modeling was informed by current discussions with prospective new large load customers."[82]

Witness Gunn's direct testimony confirms that the claimed need for McNew is based on a speculative bet that load will materialize:

> "Based on our analysis, the addition of even just one of these large customers would create an additional capacity need for Evergy Missouri West or Evergy Metro above and beyond what was reflected in the 2024 IRP. The second half of the McNew plant could be used to meet that capacity need. Because we believe that the addition of one or more of these large customers is highly likely within the next three-year period; because we need to be prepared to meet our obligation to serve them when they request service and want to encourage and foster the economic development benefits that would result for Missouri from the addition of such a customer… ."[83]

Evergy's existing ratepayers should not be forced to shoulder the risk of being saddled with the cost of an unnecessary gas plant in the vague interest of fostering economic development, particularly given that most data centers provide few long-term jobs.

VandeVelde confirms that Evergy's strategy involves committing now before a large load customer is confirmed:

> "Based on our analysis, the addition of just one large customer, such as a Google or Meta data center, would create an additional capacity need for either EMW or EMM that would greatly exceed what is reflected in the Companies' respective 2024 Triennial IRP reports. Therefore, 50% of a

[81] Supplemental Direct Testimony of Witness Gunn at pp. 6:23-7:5.

[82] Supplemental Direct Testimony of Witness VandeVelde at p. 6:7-9.

[83] Direct Testimony of Witness Gunn at p. 27:17-23.

second CCGT in the form of the McNew plant would be needed to meet this capacity need. Evergy believes that – *within the next three years* – it is highly likely that its electric utilities must be prepared to meet their obligation to serve these new customers when they request service."[84]

Witness Humphrey argues that "[i]n the Evergy utility territories alone, more than 750 MW of new, high load-factor customers have been announced, with approximately 6 gigawatts in the pipeline."[85] However, Evergy's response to **[redacted]**

Q: Are there other reasons why Evergy's projected load growth may not materialize?

A: Yes, many large loads provide their own energy. Google has publicly announced that it plans to provide 400 MW of renewable energy for its data center,[86] which accounts for **[redacted]**

[84] Direct Testimony of Witness VandeVelde at p. 15:17-23.

[85] Direct Testimony of Witness Humphrey at p. 20:21-22.

[86] Laura Phillips, KC News, "Google Announces $1 Billion Data Center in Kansas City," (Mar. 20, 2024), available at: https://thinkkc.com/news/press-releases/thinkkc-blog/2024/03/20/google-announces-data-center-investment-in-kansas-city.

Q: You mentioned uncertainty about the cost of Evergy's proposed generators. What are the sources of that uncertainty?

A: Yes. Evergy notes that the impact of tariffs on the cost of the proposed gas generators is highly uncertain.[87] Evergy indicates that it intends to provide the Commission with an update on how tariffs have affected the cost of the proposed gas generators,[88] but given ongoing uncertainty regarding tariffs it is unclear if this updated information will be available in time for the Commission and intervenors to adequately account for it in this proceeding.

There is also major lingering uncertainty about network upgrade costs for the proposed gas generators, which will likely not be resolved until 2026, as Witness Onnen acknowledges.[89] As noted above, SPP's planned regional transmission projects do not help alleviate congestion between the proposed gas plant sites and load centers, and in fact may exacerbate that congestion by delivering more renewable generation from western SPP to the gas plant sites. Evergy admits that no analysis has been done of potential affected system costs on the MISO or AECI systems,[90] which could be significant given the proposed

---

[87] Supplemental Direct Testimony of Witness Gunn at p. 4:13-15 ("new tariffs may increase cost and create additional uncertainty for the project teams to manage throughout the development cycle.").

[88] Supplemental Direct Testimony of Witness Humphrey at p. 7:9-13 ("After the impacts of the tariff proclamations and other changes in law or tariff policy become more certain, EMW recommends that it be allowed to submit an adjusted cost estimate to account for any known and quantifiable tariff-related or other governmental or economic impacts. EMW requests that the Commission grant it leave at such time to provide this information to the Commission and the parties.")

[89] Direct Testimony of Witness Onnen at pp. 8-10.

[90] Evergy Response to Sierra Club Data Request SC 1-6(d).

generators' electrical proximity to those systems. Evergy indicates the gas generators could receive a significant allocation of costs for the Joint Targeted Interconnection Queue upgrades,[91] which could go higher if federal funding for the construction of those projects is withdrawn.

Firm gas transportation costs for the proposed gas generators are also high and uncertain.[92] In addition to uncertainty over gas transportation costs, the cost of gas supply is also highly uncertain and will remain intractably volatile and unpredictable, as explained in the next section.

Q: Can alternative resources be brought online more quickly than the proposed gas generators?

A: Yes. Wind, solar, and battery resources can typically be constructed within a year or two of contract execution. Wind plants can generally be built in less than one year,[93] solar plants less than two years[94] with portions of the facility typically brought online as they are completed, and in some cases battery plants have been installed in a matter of months.[95] As a result, these alternative resources could

---

[91] Evergy Response to Sierra Club Data Request SC 1-6(a)-(c)

[92] Evergy Response to Sierra Club Data Request SC 1-10b: "The supplemental testimony resource planning analysis filed in February 2025 used a firm transport cost estimate of $15.22/kw-yr. for CCGT and $21.45/kw-yr. for SCGT. Evergy is still working with the natural gas transportation companies to obtain a detailed transportation cost. This is expected to be received in Q1/Q2 2025."

[93] NextEra Energy Resources, American Wind, available at: https://www.nexteraenergyresources.com/what-we-do/wind.html.

[94] DOE, Energy Transitions Initiative: Energy Transitions Playbook (Book): Phase 4, available at: https://www.energy.gov/eere/articles/eti-phase-4-execute-projects-and-ensure-quality-control.

[95] Thuy Ong, The Verge, "Elon Musk has finished building the world's biggest battery in less than 100 days," (Nov. 23, 2017), available at: https://www.theverge.com/2017/11/23/16693848/elon-musk-worlds-biggest-battery-100-days.

readily be brought online by the 2029 and 2030 in-service dates Evergy has proposed for the gas plants, if not before.

If Evergy were to use these resources instead of gas, Evergy could even wait and potentially benefit if the current high prices for all generator types come down as supply increases to meet demand and uncertainty about both resolves. As discussed above, battery and renewable costs are trending downward over the long term. Wind turbines are mostly domestically manufactured with minimal sourcing from China,[96] so they should be relatively immune to ongoing tariff uncertainty. Domestic solar and battery supply chains are expanding as well, reducing the potential impact of tariffs on those industries.

While some wind and solar projects take a relatively long time to move through the interconnection queue, Evergy can pull from the massive quantity of renewable and storage resources that are already in advanced stages of SPP's queue, including 23,611 MW with signed interconnection agreements. These projects have interconnection cost certainty and in many cases are simply looking for a utility or other customer to buy their output before proceeding to construction. As of April 14, 2025, the SPP interconnection queue contains 23,611 MW of proposed renewable and storage resources with signed interconnection agreements, an additional 7,665 MW listed as "interconnection agreement pending," and another 127,067 MW in various stages in the interconnection study process.[97] As the

[96] LBNL, Land-Based Wind Market Report 2024 Edition at pp. 16-22, available at: https://emp.lbl.gov/sites/default/files/2024-08/Land-Based%20Wind%20Market%20Report_2024%20Edition.pdf.

[97] SPP, GI Active Requests, available at: https://opsportal.spp.org/Studies/GIActive.

potential purchaser of a resource's output, Evergy has extensive control over the fate and timing of resources in the queue. Not all projects in the queue come online, and others can be delayed, but in many cases project delays and failures are primarily due to an inability to find a purchaser for their output.

Q: Are batteries typically able to interconnect faster than other resources?

A: Yes. Analysis from a 2024 Lawrence Berkeley National Laboratory report,[98] included as Schedule MG-16, shows that batteries tend to have the shortest time of any resource type between submitting an interconnection request and signing an interconnection agreement, with a median of less than 20 months, nearly a year less than gas generators. ** [redacted] ** [99] As noted above, many renewable and storage resources are already quite advanced in SPP's queue or have even signed interconnection agreements, so in many cases they can be brought online even more quickly.

Battery resources tend to be easier to interconnect than other resources because batteries are highly modular and have small footprints so they can be strategically sited at optimal points on the grid to avoid interconnection costs or concerns about congestion, and can even mitigate interconnection or congestion

---

[98] J. Rand *et al.*, LBNL, *Queued Up: 2024 Edition*, *Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2023* at p. 36 (April 2024), available at: https://emp.lbl.gov/sites/default/files/2024-04/Queued%20Up%202024%20Edition_1.pdf.

[99] Evergy Response to Sierra Club Data Request SC 1-22S, attachment Q1-22S_CONF_EMW_Evergy Capacity Offers 2022-2025.xlsx.

concerns triggered by other new resources or loads. Batteries' small and modular footprint and flexibility in siting also helps mitigate land use and permitting challenges, in addition to facilitating interconnection.

In contrast, other generating resources are more geographically limited in where they can be deployed, which tends to make interconnection more challenging. For example, gas generators need access to interstate gas pipelines, limiting where they can be cost-effectively deployed.

Q: Do batteries' ability to provide grid reliability services also facilitate their interconnection?

A: Yes. Batteries also tend to be easier to interconnect due to their flexibility and ability to provide other grid reliability services. Batteries can quickly and accurately inject or withdraw power or regulate voltage, allowing them to not only avoid triggering overload or stability concerns, but even helping to address those concerns. Batteries' flexibility to immediately respond to the LMP signals from SPP's economic dispatch ensures that batteries will be operated to avoid causing transmission system overloads that trigger a need for grid upgrades. For example, a battery will discharge and not charge when high LMPs indicate that power is in high demand or local transmission constraints are limiting the ability to deliver power to its location. As noted above, batteries are small and modular and thus can be deployed at points on the grid where they can be easily interconnected, or even where local grid reliability services are most needed.

FERC Order 2023 now allows battery owners to specify assumptions regarding how they will be dispatched for generator interconnection studies,

including charging and discharging behavior.[100] This accurately reflects that interconnection upgrades are typically not needed to accommodate charging because batteries are dispatched so that they do not charge during periods of peak transmission system usage.

Q: How do batteries' contributions to reliability services compare to those of thermal generators?

A: Batteries offer far more flexibility than thermal generators and generally can match or exceed other reliability services contributions of thermal generators, as shown in Schedule MG-15.[101] In contrast to thermal generators, batteries can be nearly instantaneously dispatched to any output level, with no minimum output level. Through charging, batteries can also absorb power during periods of low demand or high supply, including renewable output that would have been curtailed. Thermal generators cannot absorb excess power. Thermal generators must start up and be kept online to provide flexibility and other ancillary services, while batteries can start up within seconds to provide flexibility, voltage and reactive support, or other reliability services. Batteries also offer at least twice the dispatch range that conventional generators offer, as they can ramp between fully charging and fully discharging, while even the most flexible thermal generators have a limited dispatch range.

---

[100] FERC, *Order 2023, Improvements to Generator Interconnection Procedures and Agreements*, Docket No. RM22-14-000 at p. 17 (July 28, 2023), https://www.ferc.gov/media/e-1-order-2023-rm22-14-000.

[101] For example, see Table 1 in M. Milligan, *Sources of grid reliability services,* The Electricity Journal, (November 2018) available at: https://www.sciencedirect.com/science/article/pii/S104061901830215X.

Q: If Evergy needs enhanced reliability services at some point or in a certain location, can batteries be configured to provide that?

A: Yes, if Evergy needs batteries with an enhanced capability to stabilize frequency, improve local short circuit strength (which helps maintain stable operations in areas with a weak grid and few synchronous resources), or assist with grid restoration by providing blackstart service, a battery with a grid-forming inverter could be installed for a modest cost premium. Grid-forming inverters can set voltage and frequency signals and thus contribute more to blackstart, stabilizing frequency, and supporting local short circuit strength than grid-following inverters, which follow the voltage and frequency signals set by other resources.[102]

Grid-forming batteries are operating today, mostly on small power systems where they are needed. For example, a battery in South Australia, the 150 MW Hornsdale Power reserve, has provided fast frequency response to stabilize the grid within seconds of major real-world grid disturbances.[103] A 185 MW battery project in Hawaii has fully replaced the grid services that were provided

---

[102] J. Matevosyan & J. MacDowell, Energy Systems Integration Group, *Grid-Forming Technology in Energy Systems Integration* at pp. 10-11, (Mar. 2022), available at: https://www.esig.energy/wp-content/uploads/2022/03/ESIG-GFM-report-2022.pdf.

[103] G. Parkinson, *"Virtual machine": Hornsdale battery steps in to protect grid after Callide explosion*, Renew Economy (May 27, 2021), available at: https://reneweconomy-com-au.cdn.ampproject.org/c/s/reneweconomy.com.au/virtual-machine-hornsdale-battery-steps-in-to-protect-grid-after-callide-explosion/amp/.

by a nearby coal plant by providing blackstart, fast frequency response, and grid-forming services.[104]

Q: Can batteries help address transmission upgrade needs?

A: Yes. Due to batteries' speed of dispatch to increase or decrease power output, the ability of their power electronics to regulate voltage and reactive power and address local stability concerns, and their ability to be quickly deployed at points on the grid where they are needed, battery storage can be an effective alternative to transmission upgrades.[105] This is particularly true for grid upgrades needed to ensure reliability is maintained under contingency conditions, as the battery can nearly instantly respond to avoid an overload or stabilize grid conditions when a large generation or transmission asset abruptly goes offline.

Q: Can batteries facilitate the interconnection of other generators or loads?

A: Yes. By using the flexibility discussed above, batteries can help reduce the need for interconnection network upgrades for other generating resources, including by absorbing renewable output that would have been curtailed due to transmission system overloads. Batteries can be added to a renewable deployment to make a

---

[104] K. Balaraman, *Pioneering 565-MWh battery storage facility now online in Hawai'i, Plus Power says*, UtilityDive (Jan. 16, 2024), available at: https://www.utilitydive.com/news/plus-power-energy-storage-online-hawaii-HECO-rolling-blackouts/704561/.

[105] *See* Brent Oberlin, *Storage as a Transmission Only Asset*, ISO New England (May 31, 2022) at 11-15, available at: https://www.iso-ne.com/static-assets/documents/2022/05/a7_storage_as_a_transmission_only_asset.pdf; and W. Brown *et al.*, *Storage as Transmission Asset Market Study*, Quanta Technology (Jan. 2023), available at: https://cdn.ymaws.com/ny-best.org/resource/resmgr/reports/SATA_White_Paper_Final_01092.pdf.

hybrid resource or installed as a stand-alone resource nearby or at other optimal points on the grid.

Strategically-sited batteries can similarly reduce the need for grid upgrades to interconnect new loads. Batteries can even be strategically located on the distribution system to alleviate upgrade needs there, and distribution-connected batteries can still provide the same services to the bulk power system. In short, the controllability of batteries and their small modular footprint provides tremendous flexibility in where they can be interconnected, making batteries less susceptible to interconnection challenges than other resources.

Q: Are there tools Evergy can use to more quickly interconnect these alternative resources?

A: Yes. One valuable new option is Surplus Interconnection Service, which could be used to interconnect renewable or battery resources at existing generator sites with little to no need for upgrades. FERC has taken action over the last several years to allow for the sharing of an existing interconnection through Surplus Interconnection Service. For example, an existing generator which seldom operates can share its interconnection with a renewable and/or storage resource that primarily produces in different hours. Surplus Interconnection Service is particularly useful for interconnecting batteries at existing generators that are not fully using their interconnection capacity.

4. INCREASING EVERGY'S DEPENDENCE ON GAS GENERATION IMPOSES AN ECONOMIC AND RELIABILITY RISK ON RATEPAYERS

Q: How do gas prices affect Missouri ratepayers?

A: They are directly passed through to ratepayers, with minimal hedging or use of long-term contracts. Evergy's 2024 10-K filing with the Securities and Exchange Commission notes that "Evergy purchases natural gas for use in its generating units primarily through spot market purchases."[106]

Q: How does this risk change as Evergy increases its reliance on gas?

A: It increases. Evergy currently relies on gas generators for 27% of its installed capacity,[107] and Evergy has recently increased its exposure to these risks with greater dependence on gas with recent purchases of gas capacity at the Dogwood and Crossroads sites. As noted below, extreme winter weather events typically result in large increases in spot natural gas prices, and in some cases reliability concerns if they result in reduced gas availability. Increased U.S. exports of liquefied natural gas have also increasingly tethered domestic gas prices to the global price for gas, which is heavily affected by geopolitical events. SPP's "Our Generational Challenge" report that was appended to VandeVelde's testimony also confirms that "gas price volatility impacts energy costs."[108]

---

[106] Evergy, 2024 10-K filing with the Securities and Exchange Commission at p. 13, available at: https://investors.evergy.com/static-files/1745ffa2-a24c-40b9-8f22-d15c4f32edcb.

[107] *Id.* at p. 10.

[108] Direct Testimony of Witness VandeVelde, Schedule CV-1, at p. 7. Also available at: https://spp.org/media/2163/our-generational-challenge-paper.pdf.

Q: What about the reliability risks of excessive dependence on gas?

A: ** [redacted] ** [110] Evergy acknowledges that its assumptions for the availability of its proposed gas generators do not account for higher forced outage rates as their minimum operating temperature limit is approached,[111] and that it assumed the new gas generators will not experience correlated outages.[112]

Q: Is this assumption reasonable?

A: No. Data provided by Evergy shows ** [redacted] ** [113] SPP's loss of load expectation study also shows that fossil generators experience higher outage rates during extreme heat or cold.[114] Per the chart from the SPP LOLE study shown in Schedule MG-17, gas combined cycle and combustion turbine account for a large share of low temperature outages. This chart also confirms that coal units experience higher outage rates under both extreme

---

[109] Evergy Response to Sierra Club Data Request SC 1-16(d) ** [redacted] *

[110] Evergy Response to Sierra Club Data Request SC 1-16(a).

[111] Evergy Response to Sierra Club Data Request SC 1-9.

[112] Evergy Response to Sierra Club Data Request SC 1-24.

[113] Evergy Response to Sierra Club Data Request SC 1-16(b).

[114] SPP, 2023 SPP Loss of Load Expectation Report, Figure 10 at p. 20, available at: https://www.spp.org/documents/71904/2023%20spp%20lole%20study%20report.pdf.

cold and extreme heat conditions. SPP has also documented that during Winter Storms Uri, Elliott, and Gerri, SPP coal and gas generators fell well below their accredited capacity value, while wind generators outperformed their accreditation,[115] as shown in the table in Schedule MG-18. In fact, gas generators only provided 43% of their accredited capacity value during the periods of Winter Storm Uri when SPP load was shed.

Q: Has SPP changed its capacity value accreditation for thermal resources?

A: Yes. SPP's capacity value accreditation now partially accounts for gas outages, but Evergy did not,[116] so the actual accreditation of the proposed gas plants will likely be lower than Evergy assumes. SPP states that its new accreditation method includes a "fuel assurance policy that recognizes generating capacity based on performance during critical hours and incentivizes increased fuel certainty."[117]

Even SPP's new method understates this risk of gas generation, as SPP's method only reflects average power plant availability across a full season, and does not account for the much higher risk of generator failures during winter storms.[118]

---

[115] Garrett Crowson, System Operations, January 2024 Winter Storm Gerri, Operating Reliability Working Group presentation (Feb. 8, 2024), available at: https://www.spp.org/Documents/71037/ORWG%20Meeting%20Materials%2020240208.zip (file 11 Winter storm Gerri MOPC ORWG.pptx, slides 21-23).

[116] Evergy Response to Sierra Club Data Request SC 1-23.

[117] Direct Testimony of Witness VandeVelde, Schedule CV-1, at p. 24. Also available at: https://spp.org/media/2163/our-generational-challenge-paper.pdf.

[118] Protest of Public Interest Organizations to Southwest Power Pool's Proposed Accreditation Methodologies for Thermal and Renewable Generators, Federal Energy Regulatory Commission Docket No. ER24-1317, (Mar. 29, 2024), available at: https://www.sierraclub.org/sites/default/files/2024-04/ER24-1317,%20Public%20Interest%20Organizations%27%20Protest%20of%20SPP%27s%20Proposed%20Accreditation%20Methodologies.pdf; Ethan Howland, "SPP capacity accreditation plan disadvantages clean power, threatens reliability, ACP, others say," UtilityDive, (April 1, 2024),

As a result, Evergy and its ratepayers may be caught short, resulting in economic costs for purchasing replacement generation and potentially even generation shortfalls if Evergy's gas plants fail to perform at the unrealistically high accreditation SPP awards them. Moreover, the proposed gas plants' capacity accreditation may decrease in the future if SPP adopts methods that better account for this risk. My economic analysis of Evergy's proposed gas generators, discussed earlier and presented in Schedule MG-9, conservatively assumes that the generators offer their full rated capacity as dependable capacity. Accounting for how likely correlated outages of these generators would reduce their capacity value would further reduce their economic value.

Q: Are correlated outages of thermal generators common?

A: Correlated outages of gas have occurred across many recent events, including some like Winter Storms Uri and Elliott that resulted in loss of load. FERC and NERC have documented that 55% of the unavailable generating capacity during Winter Storm Uri was gas, with coal capacity contributing another 18%.[119] Similarly, gas accounted for 63% of unplanned outages and derates during Winter

available at: https://www.utilitydive.com/news/spp-capacity-accreditation-ferc-clean-power-comments/711825/.

[119] FERC and NERC Regional Entity Staff Report, *The February 2021 Cold Weather Outages in Texas and the South Central United States* at 16, (Nov. 16 2021), available at: https://www.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and.

Storm Elliott[120] and 55% during the 2014 Polar Vortex,[121] while coal accounted for a large share of the remainder. Correlated outages and derates of gas generators have also played a major role in reliability concerns during extreme heat, including the 2022[122] and 2020[123] heat waves in California.

Other data confirm that thermal generator outages tend to be correlated events. A paper co-authored by experts from NERC and Carnegie Mellon University found that conventional generators experience correlated outages many times more frequently than is predicted under the assumption that individual plant outages are uncorrelated independent events. The data show that correlated forced outages tend to occur more frequently at certain types of conventional generators, with gas generators experiencing some of the highest correlated outage rates.[124] Charts included in the analysis show that in almost all regions, including SPP, actual winter generation outages are much more common than would be expected under the assumption that generator outages are uncorrelated independent

---

[120] FERC and NERC, *December 2022 Winter Storm Elliott Grid Operations: Key Findings and Recommendations* at p. 5, (Sep. 21, 2023), available at: https://www.ferc.gov/news-events/news/presentation-ferc-nerc-regional-entity-joint-inquiry-winter-storm-elliott.

[121] NERC, *Polar Vortex Review* at p. 13, (Sept. 2014), available at: https://www.nerc.com/pa/rrm/January%202014%20Polar%20Vortex%20Review/Polar_Vortex_Review_29_Sept_2014_Final.pdf.

[122] Regenerate California, *California's Underperforming Gas Plants*: *How Extreme Heat Exposes California's Flawed Plan for Energy Reliability* (July 2023), available at: https://caleja.org/wp-content/uploads/2023/06/2023-Regenerate-Heat-Wave-Report.pdf.

[123] CAISO, *Root Cause Analysis: Mid-August 2020 Extreme Heat Wave*, (Jan. 2021), available at: http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme-Heat-Wave.pdf.

[124] Sinnott Murphy et al., Carnegie Mellon University, *Resource adequacy risks to the bulk power system in North America*, (Feb. 15, 2018), available at: https://www.sciencedirect.com/science/article/pii/S0306261917318202.

events.[125] The authors of that report explained that resource adequacy and capacity accreditation methods like those used by SPP and Evergy that do not fully account for correlated outages can leave grid planners and operators blind to the reliability risk of these events:

> *Our findings highlight an important limitation of current resource adequacy modeling (RAM) practice: distilling the availability history of a generating unit to a single value (e.g. EFORd, the equivalent forced outage rate during times of high demand) discards important information about when units in a power system fail in relation to one another. Only by incorporating the full availability history of each unit into RAM can we account for correlations among generator failures when determining the capacity needs of a power system. We strongly recommend that system planners incorporate correlated failure analysis into their RAM practice.*[126]

In other reports, NERC has also noted how correlated outages are a major risk, particularly for gas generators.[127] NERC's Winter Reliability Assessments, Long Term Reliability Assessment, and other NERC reports have continued to highlight this risk.

Q: What can Evergy do to decrease these economic and reliability risks?

A: Some gas generators are being built with backup oil capability and storage, but Witness Olson explains that of Evergy's three proposed gas generators, only Mullin

---

[125] *Id*.

[126] *Id.* at p.13.

[127] NERC, *Reliability Guideline: Fuel Assurance and Fuel-Related Reliability Risk Analysis for the Bulk Power System* (Mar. 2020), available at: https://www.nerc.com/comm/PC_Reliability_Guidelines_DL/Fuel_Assurance_and_Fuel-Related_Reliability_Risk_Analysis_for_the_Bulk_Power_System.pdf; NERC, *Special Reliability Assessment: Potential Bulk Power System Impacts Due to Severe Disruptions on the Natural Gas System* at pp. 3, 20 (Nov. 2017), available at: https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SPOD_11142017_Final.pdf.

Creek #1 will have the option to run on liquid fuel.[128] As a result, less than a quarter of Evergy's proposed gas capacity in this case will have backup fuel. Olson also notes that the fuel oil storage tank at Mullin Creek #1 is sized to support operation of the unit for only 48 hours, which may limit the plant's availability during long-duration severe weather events. For example, during the 2018 Bomb Cyclone, New England experienced cold temperatures for two weeks, and in many cases that region's dual-fuel generators' much larger onsite oil supplies were nearly depleted.[129] Replenishing oil supplies during extreme winter weather conditions can be challenging.

Diversifying Evergy's generation mix with more renewable and storage resources will also increase its resilience to extreme weather and other unexpected events. As Evergy Witness Humphrey explained: "As solar resources are developed, including those proposed in Docket No. EA-2024-0292, there will be another resource available for Evergy's customers in the cold-weather times that is not dependent on an external fuel supply to operate."[130]

Q: Please summarize your testimony

A: First, I explain that Evergy failed to assess how transmission congestion at the proposed gas generator sites undermines their economic value and ability to operate

---

[128] Direct Testimony of Witness Olson at p. 35:18-20.

[129] Testimony of Charles A. Berardesco, Interim President and Chief Executive Officer North American Electric Reliability Corporation, Before the U.S. Senate Committee on Energy and Natural Resources, "The Performance of the Electric Power System Under Certain Weather Conditions," at p. 4, (Jan. 23, 2018), available at: https://www.energy.senate.gov/services/files/D982B4F9-ECAF-403B-88BA-C82D2634E2DA.

[130] Direct Testimony of Witness Humphrey at p. 9:16-18.

profitably. Evergy ** [redacted] ** particularly as renewable generation continues to expand in the western part of the SPP footprint. I present my own analysis of recent congestion at the proposed gas plant sites, confirming there is major transmission congestion that will greatly inhibit the economic value and profitable operation of the proposed generators. This analysis shows that all three proposed gas generators are uneconomic under a range of scenarios for gas prices, power prices, and costs and constraints for generator starts. The economics of the proposed gas generators are further constrained by their limited capability for flexible dispatch, particularly for the proposed combined-cycle generators.

In light of those concerns, I next discuss alternative resources, including wind, solar, batteries, demand response, and capacity purchases, that together offer a less risky portfolio of resources that can more economically and reliably meet the needs of Evergy ratepayers. These alternatives can be deployed more quickly and are less susceptible to the risks and uncertainties related to the cost of and need for the proposed gas generators, as well as the LMP congestion and basis risk discussed in the first section of my testimony and the risks of gas price volatility and gas generator correlated outages discussed in the final section of my testimony.

Finally, I outlined the economic and reliability risks associated with increasing Evergy's dependence on gas generation. Gas prices can be extremely high and volatile during peak demand periods, and many gas generators experience

correlated outages during peak demand periods, as Missouri ratepayers experienced during Winter Storms Uri, Elliott, and Gerri.

Q: Does this conclude your testimony?

A: Yes.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Evergy Missouri West, Inc. d/b/a Evergy Missouri West and Evergy Metro, Inc. d/b/a Evergy Missouri Metro for Permission and Approval of a Certificate of Public Convenience and Necessity for Natural Gas Electrical Production Facilities	)	Case No. EA-2025-0075

AFFIDAVIT OF MICHAEL GOGGIN

Pursuant to Missouri Public Service Commission requirements, I, Michael Goggin, hereby state:

1. My name is Michael Goggin. I am a Vice President of Grid Strategies LLC. My business address is 4704 Blagden Terrace NW, Washington DC 20011.

2. Attached hereto and made a part hereof for all purposes is my Rebuttal Testimony on behalf of Sierra Club, including schedules, which have been prepared in written form for introduction into evidence in the above-referenced docket.

3. I hereby swear and affirm that based upon my personal knowledge, the facts stated in the Rebuttal Testimony are true. In addition, my judgement is based on my professional experience, and the opinions and conclusions stated in the testimony are true, valid, and accurate.

Under penalty of perjury, I declare the preceding to be true and correct to the best of my knowledge and belief.

Date: April 25, 2025

Michael Goggin

Michael Goggin

Education:

Harvard University class of 2004, B.A. *cum laude* in Social Studies

- Wrote thesis "Is it Time for a Change? Science, Policy, and Climate Change"

Experience:

Grid Strategies Vice President February 2018-present

- Serve as an expert consultant on electricity transmission, grid integration, reliability, market, and policy issues for non-profit, grid operator, state regulator, and industry clients
- Have testified before FERC and in dozens of state regulatory commission cases
- Actively engaged in NERC Standards development processes related to renewable and storage resources

AWEA Senior Director of Research, other titles February 2008-February 2018

- Led team responsible for all American Wind Energy Association analysis
- Served as primary technical and economic expert on market design, transmission, grid integration, carbon policy, and other topics
- Authored regulatory filings at state (IRP and transmission siting cases), regional (RTO transmission and market design), and federal levels (FERC transmission, interconnection standard, grid integration, and market design cases; EPA carbon policy)
- Directed economic and power sector modeling to inform AWEA's policy strategy and support advocacy positions
- Communicated with the press and policy makers about wind energy
- Other titles included Electric Industry Analyst, Senior Analyst, Manager of Transmission Policy, Director of Research

Sentech, Inc. Research Analyst October 2005-February 2008

- Conducted economic analyses of solar, wind, geothermal, hydrogen, and energy storage technologies for U.S. Department of Energy officials
- Provided analytical support for DOE's renewable energy R&D funding decisions

Union of Concerned Scientists Clean Energy Intern May 2005-October 2005

- Worked with the legislative and field staff to promote the inclusion of pro-renewable energy measures in the Energy Policy Act of 2005

State Public Interest Research Groups Policy Analyst August 2004-May 2005

- Analyzed and advocated for clean energy policies at the state and federal level

Publications available at https://gridstrategiesllc.com/reports/

MISSOURI PUBLIC SERVICE COMMISSION
CASE NO. EA-2025-0275

SCHEDULE MG-2

Public Company Responses to Data Requests

Sierra Club
Evergy Response to Sierra Club Data Request SC 1-6
Evergy Response to Sierra Club Data Request SC 1-9
Evergy Response to Sierra Club Data Request SC 1-10
Evergy Response to Sierra Club Data Request SC 1-23
Evergy Response to Sierra Club Data Request SC 1-24
Evergy Response to Sierra Club Data Request SC 1-28
Evergy Response to Sierra Club Data Request SC 1-29
Evergy Response to Sierra Club Data Request SC 1-31, attachment Q-SC-1-31 Build Limits IRP and Direct Testimony.xlsx.

Evergy Missouri West
Case Name: 2025 EMW CCN Viola, Mullin Creek #1, and McNew
Case Number: EA-2025-0075

Requestor Rubenstein Sarah -
Response Provided February 28, 2025

Question:1-6
Please see the statement at page 14 of Witness Onnen's direct testimony that "The costs associated with the JTIQ portfolio and to the natural gas resources in this filing are equivalent to $44.4 million for the site at Viola and $27.24 million for the site at Mullin Creek #1. This is not inclusive of any additional upgrades that may be identified by on the MISO or AECI systems."

a. Please confirm that the JTIQ costs would be allocated to the proposed gas generators, in addition to the costs for SPP network upgrades.

b. What JTIQ costs would be allocated to the proposed McNew generator?

c. Please provide the calculation of the JTIQ costs that would be allocated to each proposed gas generator.

d. If Evergy or its consultants have produced any estimate for affected system costs for the MISO or AECI systems that may be allocated to the proposed gas generators, please provide that analysis.

RESPONSE: (do not edit or delete this line or anything above this)

Confidentiality: PUBLIC
Statement: This response is Public. No Confidential Statement is needed.

Response:

a. The costs listed would be allocated to the proposed gas generators in addition to SPP network upgrade costs.
b. The JTIQ costs allocated to the proposed McNew generator would be approximately $43.1 million.
c. The estimated JTIQ costs allocated to the proposed gas generators were approximated by multiplying the estimated JTIQ Generator Rate of $60 per kilowatt, as referenced in the

original filing, by the requested interconnection capacity for each request. However, the numbers used for the generator capacities were slightly different than the numbers requested in the SPP generator interconnection requests. Updated estimates using the capacity from the generator interconnection requests are listed below.

a. Viola: 721.1 MW * $60 / KW = $43.3 million
b. Mullin Creek #1: 450.6 MW * $60 / KW = $27.0 million
c. McNew: 717.8 MW * $60 / KW = $43.1 million

d. No analysis has been done for affected system costs on the MISO or AECI systems.

Information provided by: Katy Onnen, Director, Transmission & Distribution Planning

Attachment(s):

Missouri Verification:

I have read the Information Request and answer thereto and find answer to be true, accurate, full and complete, and contain no material misrepresentations or omissions to the best of my knowledge and belief; and I will disclose to the Commission Staff any matter subsequently discovered which affects the accuracy or completeness of the answer(s) to this Information Request(s).

Signature /s/ *Brad Lutz*
Director Regulatory Affairs

Evergy Missouri West
Case Name: 2025 EMW CCN Viola, Mullin Creek #1, and McNew
Case Number: EA-2025-0075

Requestor Rubenstein Sarah -
Response Provided March 03, 2025

Question:1-9

Please see the statement at page 34 of Witness Olson's direct testimony that "The CCGT projects' current design allows each facility to continue conducting normal operations in temperatures as low as approximately -10 degrees Fahrenheit."

a. How frequently does Evergy expect temperatures to fall below -10 degrees F at each proposed gas generator site?

b. Does the design specify a higher outage rate as temperatures approach -10 degrees F? If so, please provide

RESPONSE: (do not edit or delete this line or anything above this)

Confidentiality: PUBLIC
Statement: This response is Public. No Confidential Statement is needed.

Response:

a. Evergy used 50 year extreme low temperate from the closest ASHRAE weather station to set the minimum temperatures at site.
b. No.

Information provided by:
J Kyle Olson, Director – Conventional Generation Development

Attachment(s):

Missouri Verification:

I have read the Information Request and answer thereto and find answer to be true, accurate, full and complete, and contain no material misrepresentations or omissions to the best of my knowledge and belief; and I will disclose to the Commission Staff any matter subsequently discovered which affects the accuracy or completeness of the answer(s) to this Information Request(s).

Signature /s/ *Brad Lutz*
Director Regulatory Affairs

Evergy Missouri West
Case Name: 2025 EMW CCN Viola, Mullin Creek #1, and McNew
Case Number: EA-2025-0075

Requestor Rubenstein Sarah -
Response Provided March 03, 2025

Question:1-10

Please see the discussion at pages 34-35 of Witness Olson's direct testimony regarding Evergy's efforts to secure firm gas transportation for the proposed gas generators.

a. Is an estimate for the cost of firm gas transportation included in the gas generator $/kW cost estimates discussed in Witness VandeVelde's direct testimony? If so, please identify where with specificity.

b. If not, please provide an estimate for the cost of firm gas transportation on a levelized $/kW basis for each proposed gas generator.

RESPONSE: (do not edit or delete this line or anything above this)

Confidentiality: PUBLIC
Statement: This response is Public. No Confidential Statement is needed.

Response:

a. No. The IRP modeling includes the cost of firm transport as a $/kw-yr. cost, not a levelized $/kw cost.

b. The supplemental testimony resource planning analysis filed in February 2025 used a firm transport cost estimate of $15.22/kw-yr. for CCGT and $21.45/kw-yr. for SCGT. Evergy is still working with the natural gas transportation companies to obtain a detailed transportation cost. This is expected to be received in Q1/Q2 2025.

Information provided by: J Kyle Olson, Director – Conventional Generation Development

Attachment(s):

Missouri Verification:

I have read the Information Request and answer thereto and find answer to be true, accurate, full and complete, and contain no material misrepresentations or omissions to the best of my knowledge and belief; and I will disclose to the Commission Staff any matter subsequently discovered which affects the accuracy or completeness of the answer(s) to this Information Request(s).

Signature /s/ *Brad Lutz*
Director Regulatory Affairs

Evergy Missouri West
Case Name: 2025 EMW CCN Viola, Mullin Creek #1, and McNew
Case Number: EA-2025-0075

Requestor Rubenstein Sarah -
Response Provided February 28, 2025

Question:1-23
Please indicate the capacity accreditation Evergy assumed for each resource or resource type in the 2024 IRP and the updated economic modeling presented in this proceeding.

RESPONSE: (do not edit or delete this line or anything above this)

Confidentiality: PUBLIC
Statement: (5) Reports, work papers, or other documentation related to work produced by internal or external auditors or consultants, or attorneys

Response:
For the 2024 IRP, each resource was accredited at its tested capacity and the impacts of moving to an ACAP reserve margin and Performance Based Accreditation (PBA) were calculated and applied on a fleet wide basis. Please reference the Evergy Missouri West 2024 Triennial IRP workpaper titled "MOW CAAA Plan" (specifically sheets titled "capworkbookview" and "capworkbookviewWin"). Missouri West's plan workbook "MOW CAAA Plan" shows the tested capacity assumption for each resource for summer and winter and has a PBA Impact line item that adjust the accreditation. The 2024 IRP workpapers titled "IRP 2023 PBAEvergy Summer CapacityCONFIDENTIAL.xlsx" and "IRP2023 PBAEvergy Winter CapacityCONFIDENTIAL.xlsx" have the calculations used to determine the PBA Impact. The analysis presented in the VandeVelde direct testimony used the same assumptions as the IRP. Workpaper MOW GAAW Plan_CONF has the capacity balances in "capworkbookview" and "capworkbookviewWin".

Information provided by: Brexton Madeira, Energy Resource Analyst

Attachment(s):

Missouri Verification:

I have read the Information Request and answer thereto and find answer to be true, accurate, full and complete, and contain no material misrepresentations or omissions to the best of my knowledge and belief; and I will disclose to the Commission Staff any matter subsequently discovered which affects the accuracy or completeness of the answer(s) to this Information Request(s).

Signature /s/ *Brad Lutz*
Director Regulatory Affairs

Evergy Missouri West
Case Name: 2025 EMW CCN Viola, Mullin Creek #1, and McNew
Case Number: EA-2025-0075

Requestor Rubenstein Sarah -
Response Provided February 28, 2025

Question:1-24
Does Evergy's assumed capacity accreditation for the proposed gas generators account for SPP's "fuel assurance policy that recognizes generating capacity based on performance during critical hours and incentivizes increased fuel certainty," as described on page 24 of SPP's report provided as Schedule CV-1 to Witness VandeVelde's direct testimony? If so, please explain how SPP's policy was accounted for. If not, why not.

RESPONSE: (do not edit or delete this line or anything above this)

Confidentiality: PUBLIC
Statement: This response is Public. No Confidential Statement is needed.

Response:
The analysis was based on assumptions consistent with the 2024 IRP, at which time the fuel assurance policy was not known. Evergy Missouri West is updating winter accreditation assumptions in future analysis to account for the expected effect of fuel assurance on winter capacity. The proposed fuel assurance rules in SPP will reduce winter accreditation for resources that experience outages during the highest need times in winter (in addition to performance-based accreditation which is based on the forced outage rate during the entire winter season). Viola, McNew and Mullin Creek are expected to have high commercial availability with firm natural gas supply and brand new equipment, so they are not expected to have meaningful fuel assurance concerns affecting their accreditation.

Information provided by:
Kelli Merwald, Sr. Mgr. Fundamental Analysis
Attachment(s):

Missouri Verification:

I have read the Information Request and answer thereto and find answer to be true, accurate, full and complete, and contain no material misrepresentations or omissions to the best of my knowledge and belief; and I will disclose to the Commission Staff any matter subsequently discovered which affects the accuracy or completeness of the answer(s) to this Information Request(s).

Signature /s/ *Brad Lutz*
Director Regulatory Affairs

Evergy Missouri West
Case Name: 2025 EMW CCN Viola, Mullin Creek #1, and McNew
Case Number: EA-2025-0075

Requestor Rubenstein Sarah -
Response Provided March 03, 2025

Question:1-28

Please see the discussion at pages 11-12 of Witness VandeVelde's direct testimony that "Evergy included a DSM profile for EMW that more accurately reflects the DSM potential resulting from the budgeted amount included in the MEEIA stipulation and agreement, which has approval for programs 2025 through 2027. The updated DSM profile reduces the capacity and energy benefit of DSM programs starting in 2028 when the MEEIA Cycle 4 period ends. The changes also reduce the overall EMW portfolio capacity position compared to what was selected as the RAP+ DSM scenario in EMW's Preferred Plan …"

a. With regulatory approval, could Evergy extend the MEEIA DSM program? If not, why not.

b. Please confirm that extending this program would reduce winter capacity needs by around 150 MW and summer capacity needs by 80-85 MW starting in 2029, per the MEEIA column shown in Figure 3. If not, how much would extending this program reduce capacity needs starting in 2029?

RESPONSE: (do not edit or delete this line or anything above this)

Confidentiality: PUBLIC
Statement: This response is Public. No Confidential Statement is needed.

Response:
Evergy believes it can extend the MEEIA programs with regulatory approval. The current forecast for the programs builds to around 150 MW in summer and 85 MW in winter that Evergy Missouri West could use to reduce its capacity need. Evergy forecasts that it can maintain a slightly reduced program level of demand response after the current MEEIA cycle ends if it can gain regulatory approval. This level is included in future modeling. The expiration of these programs every few years and uncertainty around what levels will get approved does increase forecast uncertainty in the IRP/capacity planning process.

Information provided by:
Tim Nelson, Sr. Mgr. Analytics
Attachment(s):

Missouri Verification:
I have read the Information Request and answer thereto and find answer to be true, accurate, full and complete, and contain no material misrepresentations or omissions to the best of my knowledge and belief; and I will disclose to the Commission Staff any matter subsequently discovered which affects the accuracy or completeness of the answer(s) to this Information Request(s).

Signature /s/ *Brad Lutz*
Director Regulatory Affairs

Evergy Missouri West
Case Name: 2025 EMW CCN Viola, Mullin Creek #1, and McNew
Case Number: EA-2025-0075

Requestor Rubenstein Sarah -
Response Provided February 28, 2025

Question:1-29
Is the higher level of DSM envisioned in the RAP+ scenario relative to the MEEIA scenario, as shown in Figure 3 of Witness VandeVelde's direct testimony:
a. economically optimal
b. attainable with sufficient budget

RESPONSE: (do not edit or delete this line or anything above this)

Confidentiality: PUBLIC
Statement: This response is Public. No Confidential Statement is needed.

Response:
Evergy enlisted a consulting firm to conduct a potential study to understand the options for demand-side programs in the Evergy Missouri West service region. The realistic achievable potential + (RAP+) scenario modeled and selected in the IRP preferred plan was based on the potential study results. The RAP+ estimate is the potential that could be cost-effectively acquired (i.e. economic). The study also projects the budget needed to attain the participation for each level. However, the MEEIA programs were very recently approved for the next few years, so that is the level of demand-side programs in our current forecast.

Information provided by:
Tim Nelson, Sr. Mgr. Analytics

Attachment(s):

Missouri Verification:

I have read the Information Request and answer thereto and find answer to be true, accurate, full and complete, and contain no material misrepresentations or omissions to the best of my knowledge and belief; and I will disclose to the Commission Staff any matter subsequently discovered which affects the accuracy or completeness of the answer(s) to this Information Request(s).

Signature /s/ *Brad Lutz*
Director Regulatory Affairs

Evergy Missouri West
Case Name: 2025 EMW CCN Viola, Mullin Creek #1, and McNew
Case Number: EA-2025-0075

Requestor Rubenstein Sarah -
Response Provided March 03, 2025

Question:1-31
In Evergy's economic modeling in the 2024 IRP and updated analysis conducted for this proceeding, please describe:
a. any timing constraints, annual or cumulative build limits, or other constraints on the model's deployment of wind, solar, batteries, or any other resource
b. the MW limit imposed in each year for each resource type
c. whether these constraints were binding, and if so for which resource types and in which years.

RESPONSE: (do not edit or delete this line or anything above this)

Confidentiality: PUBLIC
Statement: This response is Public. No Confidential Statement is needed.

Response:
See attachment. For base planning assumptions, Evergy Missouri West was allowed one resource build per year as well as market capacity. Other than what was explained in the IRP, Evergy Missouri West did not test other levels because the build limits are intended to enable the Company to maintain its balance sheet and select good development/ contract opportunities.
Information provided by:
Kelli Merwald, Sr. Mgr. Fundamental Analysis

Attachment(s):
Q_SC-1-31 Build Limits IRP and Direct Testimony

Missouri Verification:

I have read the Information Request and answer thereto and find answer to be true, accurate, full and complete, and contain no material misrepresentations or omissions to the best of my knowledge and belief; and I will disclose to the Commission Staff any matter subsequently discovered which affects the accuracy or completeness of the answer(s) to this Information Request(s).

Signature /s/ *Brad Lutz*
Director Regulatory Affairs

IRP 2024 Build Limits

Resource	Max Capacity (MW)	First Year Available (Jan 1)	Units/Year
Wind	150	2026	1
Battery located in generation zone	150	2026	1
Battery located at wind node	150	2026	1
Solar	150	2027	1
Combined Cycle	325	2028	1
Combustion Turbine	415	2028	1
Market Capacity	1	2024	300 (2024-2025), 100 (2026), 20 (2027+)
Combined Cycle with CCS in 2035*	325	2028	2
Nuclear SMR*	300	2038	1

*Some models had CCS and/or Nuclear SMR Options

** Some models allowed higher build limits (as described/labeled in IRP)

Direct Testimony Updated Build Limits

Resource	Max Capacity (MW)	First Year Available (Jan 1)	Units/Year
Wind	150	2027	1
Battery located in generation zone	150	2027	1
Battery located at wind node	150	2027	1
Solar	150	2027	1
Combined Cycle	355	2029	1
Combustion Turbine	440	2030	1
Market Capacity	1	2024	300 (2024-2025), 100 (2026-2029), 20 (2029+)

MISSOURI PUBLIC SERVICE COMMISSION
FILE NO. EA-2025-0275

SCHEDULE MG-3

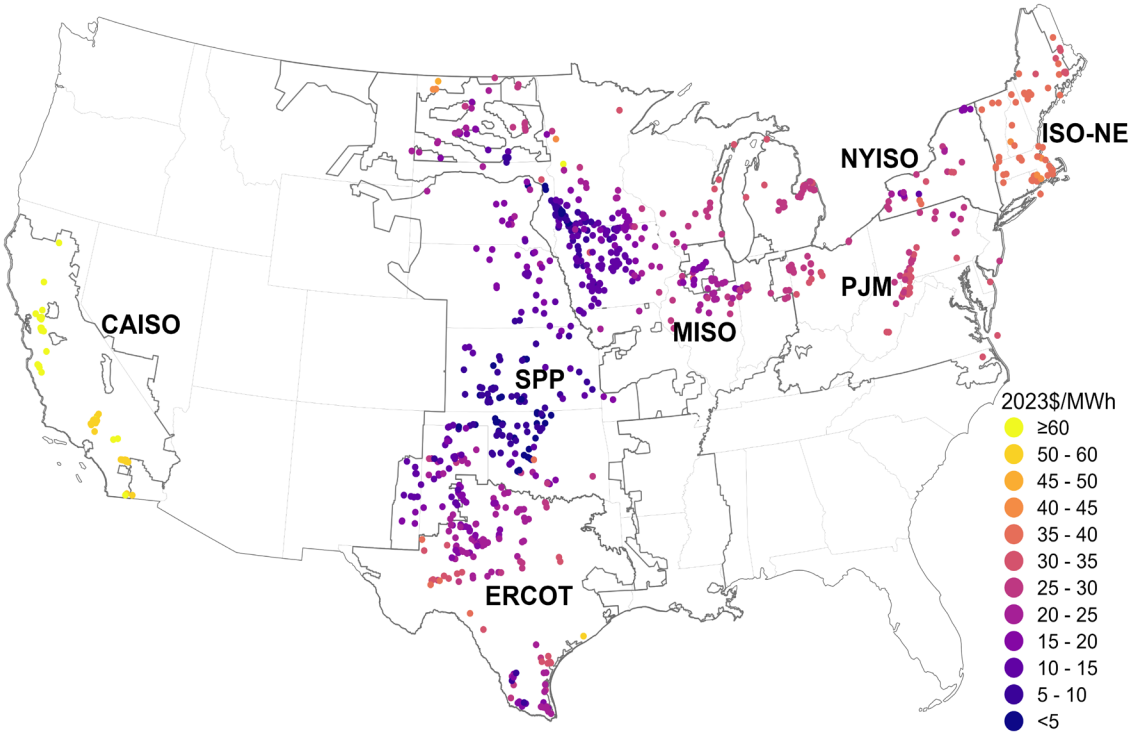
Confidential Company Responses to Data Requests

SCHEDULE MG-3 CONTAINS CONFIDENTIAL INFORMATION NOT AVAILABLE TO THE PUBLIC.

ORIGINALS FILED UNDER SEAL.

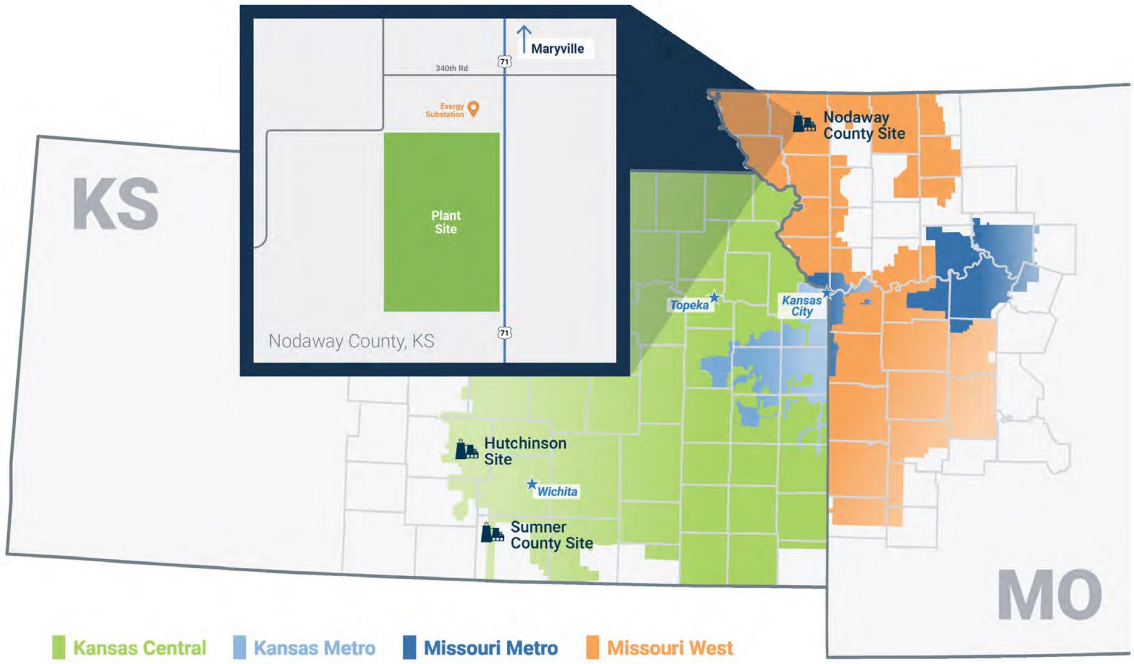
Schedule MG-4

LBNL map of wind generation value in 2023, from "2023 Market Value by Location" tab, available at https://emp.lbl.gov/sites/default/files/2024-12/Land-Based%20Wind%20Market%20Report_2024%20Edition_Data_File.xlsx



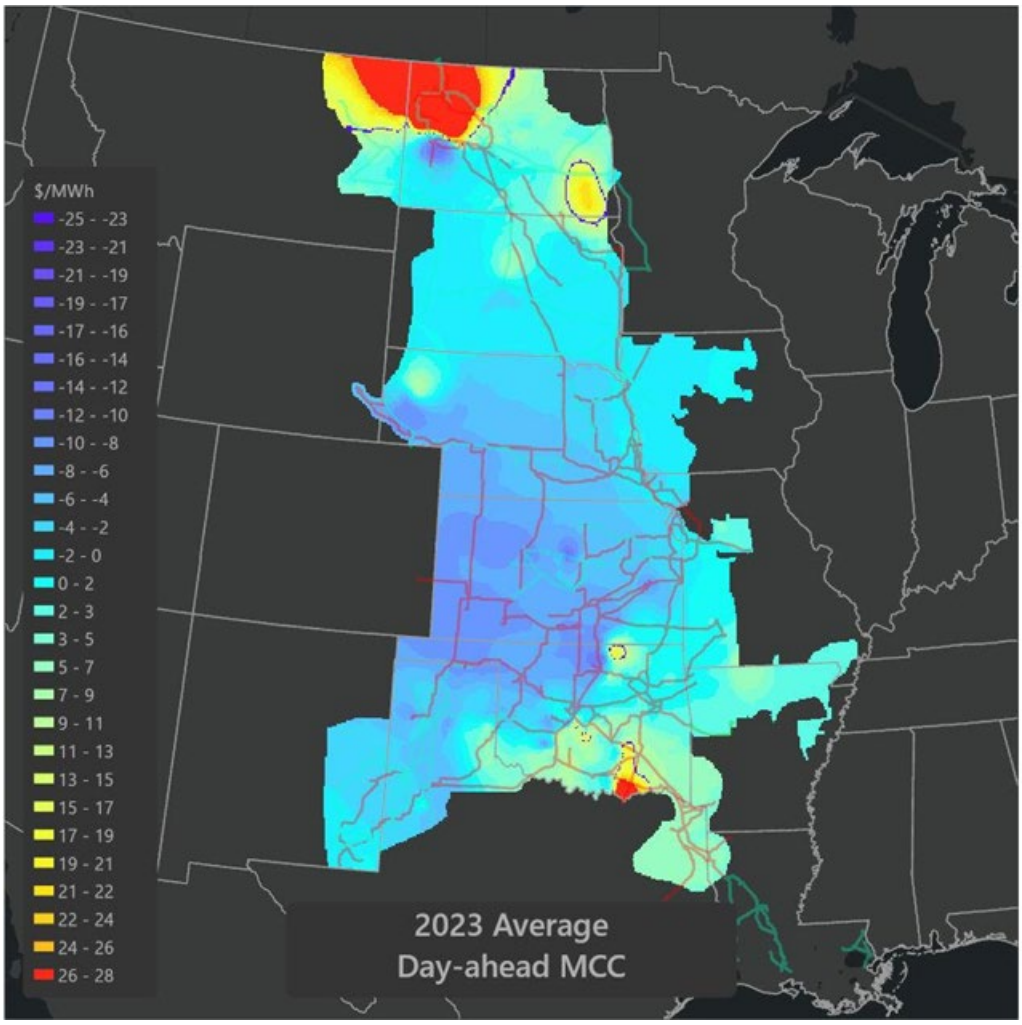
Schedule MG-5

Evergy's proposed gas generator sites, from Witness Olson direct testimony, Schedule JKO-1, page 2



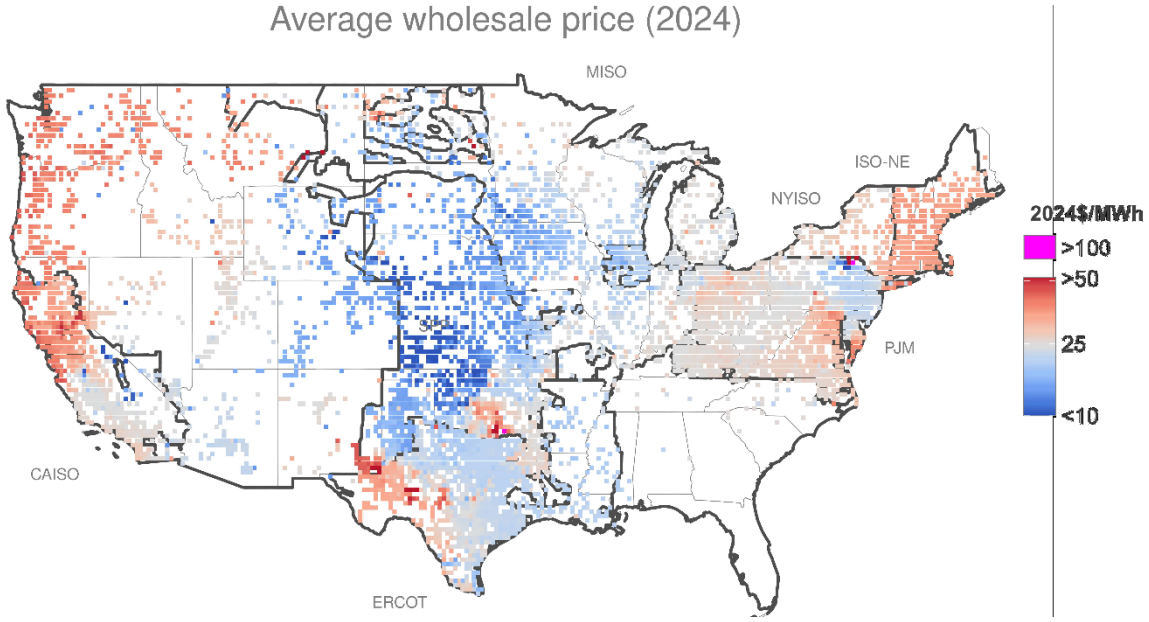
Schedule MG-6

SPP Market Monitoring Unit map showing day-ahead market congestion in 2023, from SPP, 2023 Annual State of the Market Report, (June 2024), available at https://www.spp.org/documents/71645/2023%20annual%20state%20of%20the%20market%20report%20v2.pdf, at 182.



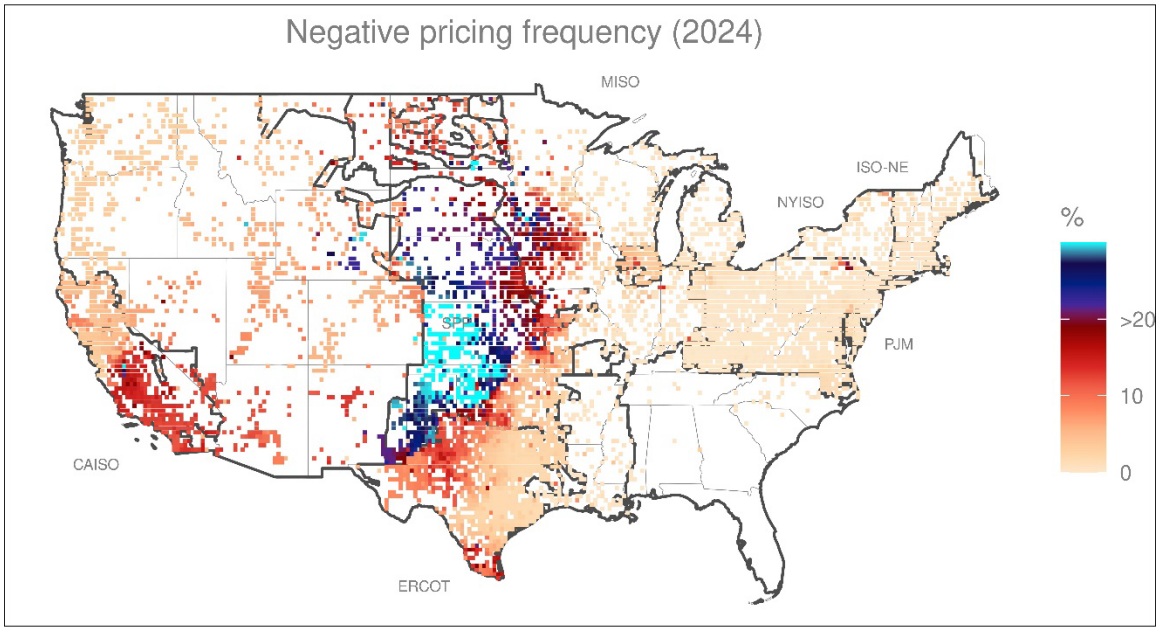
Schedule MG-7

Map from showing average LMPs nationwide in 2024, from LBNL, *The Renewables and Wholesale Electricity Prices (ReWEP) Tool*
https://emp.lbl.gov/renewables-and-wholesale-electricity-prices-rewep



Schedule MG-8

Map showing percentage of time each LMP node had negative prices in 2024, from LBNL, *The Renewables and Wholesale Electricity Prices (ReWEP) Tool* https://emp.lbl.gov/renewables-and-wholesale-electricity-prices-rewep.



Schedule MG-9 - CONFIDENTIAL

Confidential – Grid Strategies Analysis Results for economic dispatch of proposed generators, accounting for transmission congestion

Scenario definitions
Optimistic: Assumes unlimited starts and Evergy's claimed [redacted]

Mid: Assumes unlimited starts and $23,100 startup cost from EIA Sargent and Lundy report cited in testimony text

Cap starts: Evergy's claimed startup cost and gas generator starts capped at design basis (see MG-8 for confidential design basis)

	Scenario	Yr	CF%	LMP $/ MWh	A. Energy net rev ($M)	[redacted]	[redacted]	[redacted]
McNew	Optimistic	22	36.2	$37	$68	[redacted]	[redacted]	[redacted]
	Optimistic	23	48.0	$20	$36	[redacted]	[redacted]	[redacted]
	Optimistic	24	44.9	$17	$39	[redacted]	[redacted]	[redacted]
	Mid	22	34.2	$37	$63	[redacted]	[redacted]	[redacted]
	Mid	23	45.8	$20	$31	[redacted]	[redacted]	[redacted]
	Mid	24	42.3	$17	$34	[redacted]	[redacted]	[redacted]
	Cap starts	22	30.0	$37	$65	[redacted]	[redacted]	[redacted]
	Cap starts	23	44.4	$20	$35	[redacted]	[redacted]	[redacted]
	Cap starts	24	34.5	$17	$36	[redacted]	[redacted]	[redacted]
Viola	Optimistic	22	38.4	$36	$73	[redacted]	[redacted]	[redacted]
	Optimistic	23	47.7	$19	$37	[redacted]	[redacted]	[redacted]

[131] This is based on an assumption that the gas generators' capacity is worth [redacted] per Evergy's response to Sierra Club 1-22

	Optimistic	24	42.9	$16	$38	[redacted]	[redacted]	[redacted]
	Mid	22	36.3	$36	$68	[redacted]	[redacted]	[redacted]
	Mid	23	45.3	$19	$32	[redacted]	[redacted]	[redacted]
	Mid	24	40.4	$16	$33	[redacted]	[redacted]	[redacted]
	Cap starts	22	30.3	$36	$69	[redacted]	[redacted]	[redacted]
	Cap starts	23	44.0	$19	$36	[redacted]	[redacted]	[redacted]
	Cap starts	24	31.8	$16	$34	[redacted]	[redacted]	[redacted]
Mullin Creek	Optimistic	22	17.0	$39	$31	[redacted]	[redacted]	[redacted]
	Optimistic	23	15.2	$22	$19	[redacted]	[redacted]	[redacted]
	Optimistic	24	13.6	$17	$18	[redacted]	[redacted]	[redacted]
	Mid	22	12.5	$39	$22	[redacted]	[redacted]	[redacted]
	Mid	23	8.1	$22	$13	[redacted]	[redacted]	[redacted]
	Mid	24	6.4	$17	$12	[redacted]	[redacted]	[redacted]
	Cap starts	22	13.0	$39	$29	[redacted]	[redacted]	[redacted]
	Cap starts	23	11.1	$22	$17	[redacted]	[redacted]	[redacted]
	Cap starts	24	9.6	$17	$17	[redacted]	[redacted]	[redacted]

Schedule MG-10 - CONFIDENTIAL

Confidential – Grid Strategies Starts Analysis

Scenario definitions
Optimistic: Assumes unlimited starts and Evergy's claimed startup cost

Mid: Assumes unlimited starts and $23,100 startup cost from EIA

[redacted]

Plant	Scenario	Year	Cold Starts	Warm Starts	[redacted]
McNew	Optimistic	2022	11	206	
	Optimistic	2023	9	171	
	Optimistic	2024	3	204	
	Mid	2022	21	152	
	Mid	2023	17	129	
	Mid	2024	11	157	
Viola	Optimistic	2022	10	216	
	Optimistic	2023	10	172	
	Optimistic	2024	4	203	
	Mid	2022	18	159	
	Mid	2023	17	130	
	Mid	2024	10	161	

Plant	Scenario	Year	Starts	[redacted]
Mullin Creek #1	Optimistic	2022	845	
	Optimistic	2023	701	
	Optimistic	2024	754	
	Mid	2022	301	
	Mid	2023	183	
	Mid	2024	176	

Schedule MG-11

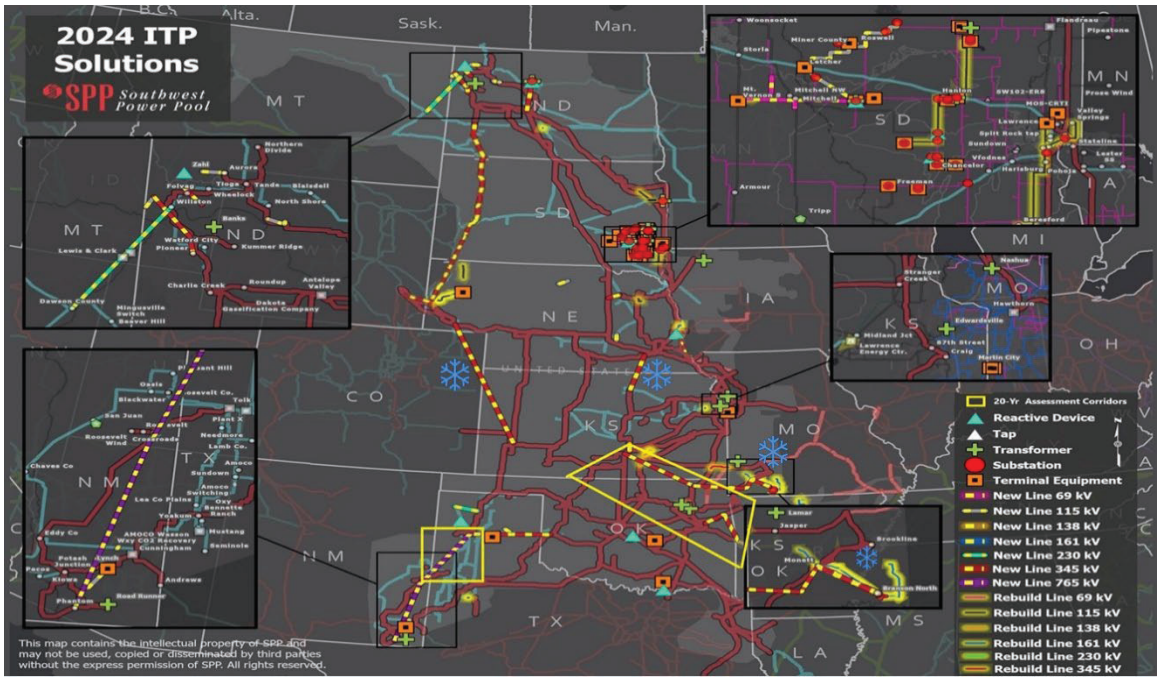
Grid Strategies Analysis - Comparison of economic dispatch results at Evergy's proposed gas generator sites relative to Kansas City load center

The following table indicates how much each result is lower at Evergy's proposed sites relative to if that generator were installed in the Kansas City load center. Each result is averaged across the three years and three scenarios of the analysis.

	Capacity factor	Average LMP	Energy market net revenue
McNew	-23.4%	-35.5%	-44.4%
Viola	-24.8%	-42.9%	-43.1%
Mullin Creek #1	-27.3%	-20.9%	-27.7%

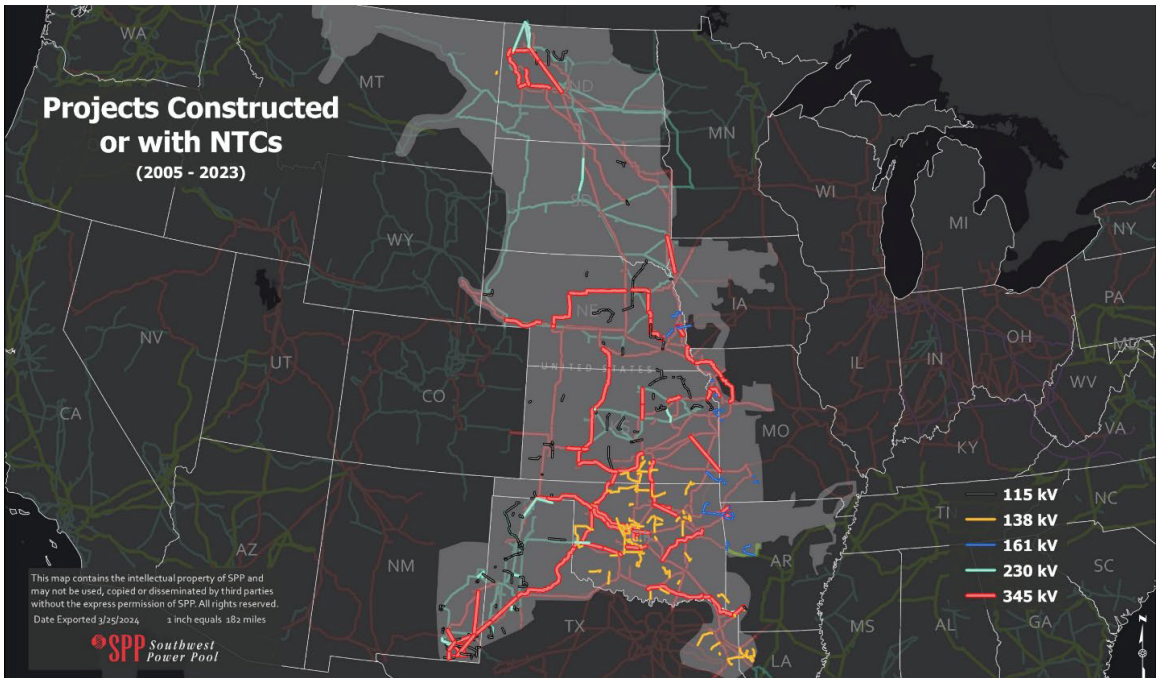
Schedule MG-12

SPP map showing planned transmission projects from the 2024 Integrated Transmission Plan From SPP, SPP 2024 ITP Education Session, https://www.spp.org/documents/72472/mopc%20education%20session_%202024%20itp%20presentation_20241004.pdf, at 22



Schedule MG-13

SPP map showing transmission projects constructed or with notice to construct, 2005-2023, From SPP's "Our Generational Challenge" report (Witness VandeVelde Direct, Schedule CV-1), page 18



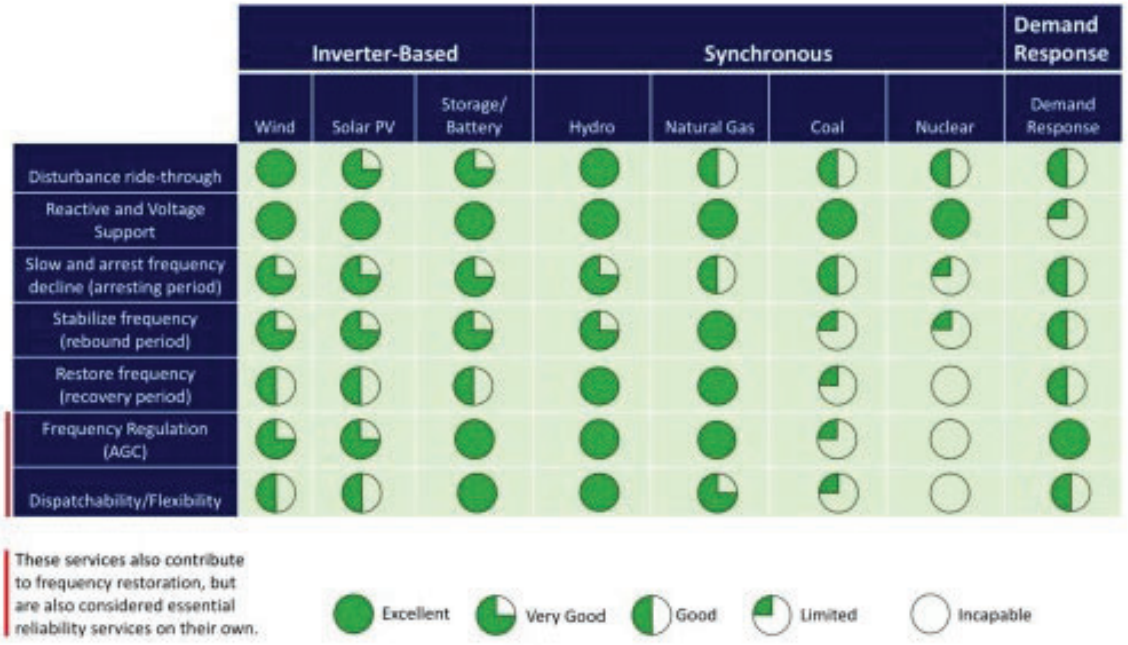
Schedule MG-14

SPP seasonal capacity value calculations for wind, solar, and battery storage, From SPP, 2024 ELCC Wind Solar and ESR Study Report, August 2024, available at https://www.spp.org/documents/72346/2024%20spp%20elcc%20wind%20solar%20&%20esr%20report.pdf, at 6-1.

	Wind	Solar	4-hour storage
Winter	25.1%	39.1%	100%
Summer	15.4%	62.2%	88.7%

Schedule MG-15

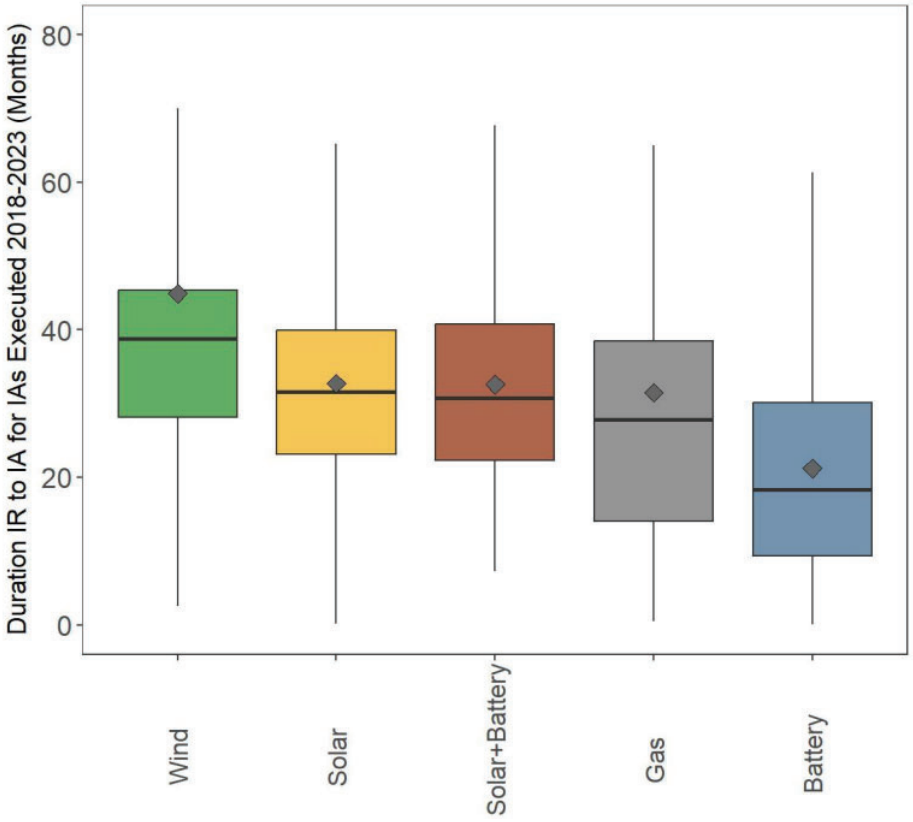
Reliability services table, from M. Milligan, "Sources of grid reliability services," *Electricity Journal*, (November 2018)
https://www.sciencedirect.com/science/article/pii/S104061901830215X



Schedule MG-16

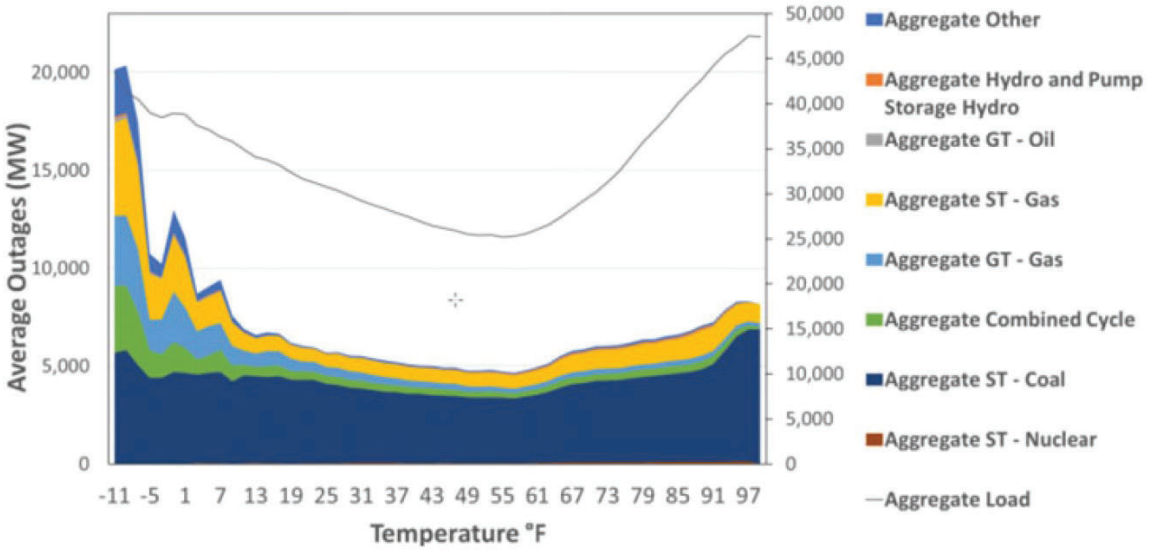
Lawrence Berkeley National Laboratory chart showing months between submitting an interconnection request and signing an interconnection agreement

J. Rand *et al.*, *Queued Up: 2024 Edition*, *Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2023*, Lawrence Berkely National Laboratory (Apr. 2024), https://emp.lbl.gov/sites/default/files/2024-04/Queued%20Up%202024%20Edition_1.pdf, at 36. Page 32 provides the following key for the ranges indicated in the chart: "The boxes represent the interquartile range (IQR), with the central horizontal line being the median. Gray diamonds are the mean. Whiskers (vertical lines) are 1.5 times the IQR."



Schedule MG-17

SPP chart showing forced outages by resource type as a function of temperature
From 2023 SPP Loss of Load Expectation Report, Figure 10, page 20, at
https://www.spp.org/documents/71904/2023%20spp%20lole%20study%20report.pdf.



Schedule MG-18

Data presented by SPP on availability of gas, coal, and wind as a share of accredited capacity during Winter Storms Uri, Elliott, and Gerri; From Garrett Crowson, System Operations, January 2024 Winter Storm Gerri, Operating Reliability Working Group presentation (Feb. 8, 2024), available at https://www.spp.org/Documents/71037/ORWG%20Meeting%20Materials%2020240208.zip (file 11 Winter storm Gerri MOPC ORWG.pptx, slides 21-23)

	Uri load shed	Elliott average	Gerri average
Gas	43%	82%	82%
Coal	77%	66%	69%
Wind	100%	350%	235%

Schedule MG-11

Grid Strategies Analysis - Comparison of economic dispatch results at Evergy's proposed gas generator sites relative to Kansas City load center

The following table indicates how much each result is lower at Evergy's proposed sites relative to if that generator were installed in the Kansas City load center. Each result is averaged across the three years and three scenarios of the analysis.

	Capacity factor	Average LMP	Energy market net revenue
McNew	-23.4%	-35.5%	-44.4%
Viola	-24.8%	-42.9%	-43.1%
Mullin Creek #1	-27.3%	-20.9%	-27.7%