

**UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION**

UNITED STATES OF AMERICA,

Plaintiff,

SIERRA CLUB,

Plaintiff-Intervenor,

v.

AMEREN MISSOURI,

Defendant.

Civil Action No. 4:11-cv-00077-RWS

AMEREN’S MOTION TO MODIFY REMEDY RULING

Ameren Missouri (“Ameren”) moves the Court to modify the remedy ruling reflected in its September 30, 2019 Judgment (ECF #1123) and October 22, 2019 Stay Order (ECF #1137) (collectively, the “Remedy Ruling”). In support of this motion, Ameren states as follows:

INTRODUCTION

Today, Ameren announced its intent to retire the Rush Island Energy Center early due to changed circumstances since the Remedy Ruling. Retiring Rush Island early will have a much more beneficial environmental impact, on a far shorter timeframe, than installing wet flue gas desulfurization (“FGD”) technology and continuing operations. Retiring Rush Island’s two 600 megawatt electric generating units, however, is not a simple matter. Potential grid stability and reliability impacts and other downstream effects must be evaluated, and those issues that are identified must be addressed. The system operator, the Midcontinent Independent System Operator, Inc. (“MISO”), has an established process for reviewing and approving the early

retirement of a generating source, which includes assessment of reliability impacts. MISO's review process for Rush Island's early retirement is already ongoing, and the results of MISO's initial assessment are expected in mid-January 2022.

BACKGROUND

The Court's Remedy Ruling requires Ameren to obtain a Prevention of Significant Deterioration ("PSD") permit and install FGD technology at Rush Island to achieve a sulfur dioxide (SO₂) emissions limit that is no less stringent than 0.05 lb SO₂/mmBTU on a thirty-day rolling average. (ECF #1123.) The September 30, 2019 Judgment set a compliance deadline of four and one half years (*i.e.*, by March 30, 2024). (*Id.*) The Court's Stay Order thereafter stayed actual construction pending the conclusion of Ameren's appeal in the Eighth Circuit, while requiring Ameren to perform initial engineering tasks and begin the permitting process with the Missouri Department of Natural Resources ("MDNR"). (ECF #1137.)

Ameren has determined that, in light of changes in circumstances since the April 2019 remedy trial, it is in the best interests of both Ameren's customers and other stakeholders to comply with the emission rate required by the Remedy Ruling by retiring Rush Island rather than installing an FGD and continuing operating the plant, with the precise timing of retirement driven by MISO's forthcoming reliability assessment. Ameren announced its determination to retire Rush Island today, December 14, 2021. (*See* December 14, 2021 Form 8-K of Ameren Corporation and Union Electric Company (Ex. A).) Changed circumstances driving the determination to retire Rush Island include changed forecasts in commodity (natural gas) pricing; the likelihood of future regulation of carbon emissions through a carbon "price;" recent legislative enactments of the Missouri General Assembly; and an increased emphasis on environmental, social, and governance considerations by a wide range of stakeholders. Retirement of Rush Island also will be in the best interest of the general public, as it will reduce emissions of all pollutants, including carbon

emissions, and reduce SO₂ emissions to a much greater extent and sooner than would FGD installation and continued operations, resulting in greater environmental benefit than additional decades of operating Rush Island with an FGD.

The early retirement of a generating asset such as Rush Island is a significant and complex undertaking, because, among other reasons, the plant is integral to the stability and reliability of the transmission network and its retirement requires the approval of MISO, which controls the dispatch of the units. To comply with this Court's Remedy Ruling, Ameren will retire both Rush Island units on a timeline to be determined in conjunction with MISO and, in any event, no later than the compliance deadline established by this Court. MISO must evaluate any potential reliability issues—a process that has already begun. MISO may determine that Rush Island is needed for some period as a System Support Resource ("SSR"), and require certain upgrades to the transmission grid to be completed before Rush Island can be retired. If MISO determines that Rush Island is *not* needed for grid reliability purposes, however, then the plant's retirement could occur much more quickly. A preliminary indication of MISO's reliability assessment will come as early as mid-January 2022.

MISO's preliminary study assessment of grid stability and reliability effects from Rush Island's retirement has already been initiated by Ameren's filing of a so-called Y-2 application with MISO on October 20, 2021.¹ Ameren filed this application after analyzing a variety of

¹ See Declaration of Justin Davies ("Davies Decl.") (Ex. B) at ¶ 5. The process before MISO entails two separate steps. An Attachment Y-2 filing triggers a confidential process and leads to a non-binding determination from MISO as to whether the generating asset is required for the reliability of the transmission system. (MISO Tariff §38.2.7(o) (effective Nov. 29, 2021), *available at* <https://www.misoenergy.org/legal/tariff/>). An Attachment Y filing must be filed by the resource owner at least 26 weeks prior to changing the status of the resource (*i.e.*, shut down) and triggers a Reliability Study to evaluate the need for the resource to be designated as an SSR. With respect to Rush Island, the underlying technical evaluations for both Attachment Y and Attachment Y-2 filings should be similar, if not identical. A Y-2 filing allowed Ameren to initiate MISO's evaluation prior to publicly announcing the retirement of Rush Island and to accelerate MISO's review period.

possible effects (transmission, voltage support, and grid reliability, among other issues) of Rush Island's retirement on the ability to reliably serve customers. Two potential reliability impacts have been identified by Ameren.

The first reliability issue concerns the regulation of voltage levels on the transmission grid in the St. Louis metropolitan area, an issue that is particularly important during the air-conditioning season. Rush Island provides voltage support to the grid as a transient voltage recovery ("TVR") resource that can help absorb and smooth out sudden voltage spikes that are caused by random transient events that impact the transmission grid. These include events like storms, lightning strikes, high winds, and falling trees that down power lines. Retiring Rush Island will eliminate the considerable amount of TVR support the facility provides; and it is likely that substitute TVR resources will be necessary to make up for the loss of Rush Island. Without adequate voltage support, these random transient events could cause voltage dips or surges that result in wide-spread system outages, in violation of reliability standards required by the North American Electric Reliability Corporation ("NERC"). (Davies Decl. (Ex. B) at ¶¶ 6-8, 10-12.) To avoid such power outages or disruptions, it is possible to install on the transmission grid other devices whose function is to provide TVR support. MISO could require such devices to be installed before it will allow Rush Island to shut down. Ameren preliminarily estimates these substitute TVR devices will cost approximately \$90 million. (*Id.* at ¶¶ 10, 14.)

The second reliability concern is to ensure grid stability during winter months to prevent cold-weather outages such as those recently experienced during Winter Storm Uri in February 2021. During that storm, unseasonably cold temperatures across the Midwest and South resulted in large outages and transmission emergencies for several system operators, including MISO. At the same time, such extreme cold events have the potential to freeze critical energy infrastructure

(as happened to numerous facilities in Texas). These impacts cause cascading failures, including loss of gas supply, inoperable generating units, and downed transmission lines. (Declaration of Tim Lafser (“Lafser Decl.”) (Ex. C) at ¶¶ 2-5; Davies Decl. (Ex. B) at ¶ 15.)

As a result of Winter Storm Uri, reliability standards set by NERC now require more robust generating capacity be made available during “local forecasted cold weather.” (Lafser Decl. (Ex. C) at ¶¶ 3-6; Davies Decl. (Ex. B) at ¶ 15.)² In order to mitigate the risk to the St. Louis metropolitan area from an extreme winter event, Ameren believes it is prudent, until Rush Island retires, to operate the plant during the winter months (December – February) to support the grid and to ensure that the units are available to respond instantaneously, should MISO issue a reliability directive to available generators. (Lafser Decl. (Ex. C) at ¶ 5.)³

MISO’s Y-2 assessment is expected to be completed in approximately one month. At that time, and subject to MISO’s input and approval, Ameren expects to determine the retirement date for Rush Island and if MISO identifies Rush Island to be an SSR and, if so, on the schedule for construction of new TVR resources to address the voltage support issue. If MISO deems them necessary, these TVR projects are expected to cost approximately \$90 million, and to take up to 30 months to complete following formal approval by MISO. (Davies Decl. (Ex. B) at ¶ 14.)⁴ While MISO’s modeling analysis incorporates discrete variables, such inputs do not

² See also FERC, NERC and Regional Entity Staff Report, *The February 2021 Cold Weather Outages in Texas and the South Central United States* (Nov. 16, 2021), available at <https://www.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and> (last accessed Dec. 13, 2021).

³ To operate properly during extreme winter events, the Rush Island units would need to be maintained at a minimum MW load level to ensure availability for instantaneous dispatch by MISO at full levels. (See Lafser Decl. (Ex. C) at ¶ 7.)

⁴ MISO has identified a process through which Ameren could seek expedited approval of the specific transmission upgrade projects by December 2022. (See MISO Tariff Attachment FF, available at <https://www.misoenergy.org/legal/tariff/>.)

necessarily encompass emergency events such as those presented by the unexpected cold temperatures experienced during Winter Storm Uri, and Ameren intends to raise such issues with MISO given that experience and the recent concerns raised by both NERC and the Federal Energy Regulatory Commission (“FERC”) regarding grid stability.

DISCUSSION

A. Rush Island’s Retirement Will Eliminate All Emissions and Will Be in the Best Interests of the Public and All Stakeholders.

Retirement of Rush Island would eliminate emissions of all pollutants—including carbon emissions—whereas installation of an FGD and continued operation of the plant for at least another 20 to 30 years would result in ongoing emissions. Circumstances bearing on the question of retirement versus FGD installation have changed in several important respects since the Court’s Remedy Ruling. For example, as discussed in recent filings in this case and in newspaper articles referenced in those filings, the State of Missouri enacted legislation in July of this year authorizing securitization financing in connection with coal-fired power plants. As reported by the St. Louis Post-Dispatch, this process “could help accelerate closures of financially imperiled coal plants while directing fresh investment toward renewable alternatives.”⁵ The Post-Dispatch previously reported that this securitization legislation “allows utilities to build renewable energy projects more quickly, generate cheaper electricity, and reduce rates charged to consumers,” and, in light of this legislation, environmental groups and other observers have been advocating for Ameren to retire Rush Island in lieu of installing an FGD and continuing to operate the plant.⁶ Plaintiff-

⁵ St. Louis Post-Dispatch, “Ameren Reports Earnings Boost from New Investments, Hot Summer Weather,” published November 4, 2021, *available at* ECF# 1180 at PageID #63801.

⁶ St. Louis Post-Dispatch, “Experts tell Ameren to dump the scrubbers, close the coal plant,” published August 29, 2021, *available at* https://www.stltoday.com/business/local/experts-tell-ameren-to-dump-the-scrubbers-close-the-coal-plant/article_5b7ec5b7-b70c-5973-8cd2-dcded9d1867b.html; St. Louis Post-Dispatch, “Bill looks to enable Missouri power utilities—and their customers—to shift away from coal costs,” published April 26, 2021, *available at* <https://www.stltoday.com/business/local/bill-looks-to->

Intervenor Sierra Club has urged Ameren to retire Rush Island instead of installing an FGD and continuing operation. (See Footnote 8 below.) Sierra Club very recently stated that retirement of Rush Island now “seems like the overwhelmingly sensible option from the economic perspective.”⁷

Ameren’s integrated resource planning necessarily entails ongoing evaluation of a variety of possible future scenarios, all of which take into account changing market conditions, technology advances, and other circumstances that are not static but instead are constantly changing. In recent months, Ameren has been assessing whether retiring Rush Island would better serve the interests of stakeholders than constructing an expensive FGD and operating Rush Island for decades longer. Ameren has determined that changed circumstances since the Court’s Remedy Ruling now mean that installing an FGD at Rush Island would render the plant uneconomical to operate.

During Ameren’s 2020 Integrated Resource Plan (“IRP”) process before the Missouri Public Service Commission (“PSC”), Ameren, at the PSC’s direction, conducted an economic analysis to determine whether it would be more cost-effective to retire Rush Island rather than

enable-missouri-power-utilities-and-their-customers-to-shift-away-from-coal/article_1dd4c3aa-90b6-5e8c-90bd-0989afeb8db8.html.

⁷ St. Louis Post-Dispatch, “Options dwindle for Ameren: Shuttering Rush Island coal plant ever more logical, experts say, published December 3, 2021, available at https://www.stltoday.com/business/local/options-dwindle-for-ameren-shuttering-rush-island-coal-plant-ever-more-logical-experts-say/article_9b74c21f-61a3-5ddb-bd45-99ee3f593207.html. See also *id.* (“The early retirement outcome may be all the more likely in the wake of recently passed state legislation that could help encourage such a shutdown, and stands to accelerate the shift away from coal power. The policy, called securitization, would cushion Ameren from losses associated with the plant by allowing it to reinvest any stranded costs into other forms of electricity generation—like wind or solar, that will be cheaper for customers and create savings.”).

install an FGD.⁸ Ameren's analysis, filed with a Highly Confidential designation pursuant to a Special Protective Order entered by the PSC, concluded that the fixed and operating costs of an FGD significantly exceeded the marginal benefit of operating the plant, rendering Rush Island uneconomical. This updated analysis differed from prior IRP analysis due primarily to shifts in market conditions. Specifically, Ameren projects that natural gas prices will be lower than assumed in prior IRPs, making gas-fired plants more competitive with coal-fired plants. In addition, there has been a steady and growing pressure for federal imposition of carbon pricing which would further negatively affect Rush Island's cost of operations. Lastly, public support for coal-fired generation of electricity has clearly shifted. In recognition of these ever-evolving market, regulatory, and stakeholder forces, Ameren recently announced an accelerated shift toward renewable sources and the de-carbonization of its generation fleet.⁹ Accordingly, in light of these changed circumstances, Ameren has decided to retire Rush Island.

B. Grid Reliability Must Be Ensured before Rush Island's Retirement.

Before retiring Rush Island, and disconnecting the facility from the transmission grid, Ameren is required to seek authorization from MISO. MISO's approval will be based on ensuring that any negative effects on grid reliability caused by the Rush Island retirement are mitigated year-round prior to the effective date of the retirement. Accordingly, upon receipt of the Eighth Circuit's ruling in August, and even though that ruling was subject to requests for rehearing

⁸ See Order of the Missouri Public Service Commission, No. EO-2020-0047 (Oct. 30, 2019) (Ex. D) at Sections I.D and I.O. During the IRP process, Sierra Club also suggested to the Missouri PSC that Ameren should analyze "whether ratepayers and shareholders are better off if Ameren retires rather than retrofits Rush Island [with FGD], particularly if Ameren utilizes securitization for the remaining unrecovered Rush Island capital balance." (Sierra Club Suggested Special Contemporary Issues, File No. EO-2022-0054 (Sept. 15, 2021) (Ex. E), pp. 1, 3.) The PSC's Staff asked Ameren to analyze securitization and detail its proposed plans. (Staff Suggestions re: File No. EO-2022-0054 (Sept. 15, 2021) (Ex. F), p. 2.)

⁹ As reflected in its 2020 IRP, Ameren proposes to retire all of Ameren's remaining coal-fired plants by 2042 and to achieve net-zero carbon emissions by 2050. (2020 IRP (Ex. G) at Ch. 1, pp. 1-3.)

(including EPA's request for rehearing, and its request for an extension of time to file its petition for rehearing), Ameren acted expeditiously to consider the current circumstances pertinent to the question of whether to retire Rush Island.

Generating units like Rush Island do more than supply energy (megawatts) to the grid; they also supply additional ancillary services necessary for stable and reliable grid operation, including the critical voltage regulation discussed above. The voltage regulation capability provided by Rush Island smooths out system disturbances that can arise following a sudden spike in system demand or a loss of load. (Davies Decl. (Ex. B) at ¶¶ 7-9.)

These are critical features provided by Rush Island that are needed to support the transmission grid and provide grid stability to the St. Louis metropolitan area. Rush Island serves as a TVR resource whose production is critical during high-temperature, summer air-conditioning season when load levels are highest. To date, because both Rush Island and the Meramec Energy Center are still in service and providing voltage support across the grid, Ameren has not experienced such TVR events or violations of the transmission reliability standards set by NERC. But Meramec is slated to retire in 2022, and now Rush Island will retire as well. Without installation of voltage support equipment on the transmission system to mitigate the loss of voltage support provided by Rush Island and Meramec, TVR events are likely to occur. (Davies Decl. (Ex. B) at ¶¶ 8-9.)

Not all generation resources can provide the local voltage support that coal plants such as Rush Island do for the St. Louis metropolitan area. This is because reactive power cannot be transferred over long distances. As such, it is not possible for other resources currently in service to provide reactive power to areas of the grid supported by Rush Island. As a greater portion of electricity generation comes from renewable power that is located far away from the demand for

that power (*e.g.*, wind farms in Kansas or Iowa), the issue of voltage support has become one of increasing concern.¹⁰

As required by NERC standards, Ameren’s transmission planning staff have run dynamic models to evaluate the effect of Rush Island’s retirement. These models intentionally introduce a “system fault” that simulates a hypothetical transient event occurring during a variety of grid loading conditions. (Davies Decl. (Ex. B) at ¶¶ 3, 6, 8.) Any number of random occurrences could trigger this kind of transient event, such as a lightning strike, a high-wind event, trees or branches falling on transmission lines, or a structure collapse. (*Id.* at ¶¶ 9, 11.)

Under local planning standards required by NERC, system recovery from a transient event must return to an 80% level in 2 seconds, and 90% in 10 seconds. (Davies Decl. (Ex. B) at ¶ 8.)¹¹ Ameren’s transmission planners conducted a series of modeling scenarios, evaluating transmission lines and locations across the Ameren Missouri system. Those modeling runs identified reliability risks to the St. Louis metropolitan area, including over 870 potential violations of NERC standards. In one worst-case scenario (involving a transmission line exiting the Labadie Energy Center), models predicted that over 4,000 megawatts of load could be lost. (*Id.* at ¶ 11.)

If MISO agrees that Rush Island’s retirement will cause grid reliability problems, then it will be necessary to replace Rush Island’s voltage support capacity. (Davies Decl. (Ex. B) at ¶ 10.) Ameren, as the local transmission provider, will need to employ a combination of technologies such as capacitors and reactors, or one or more static synchronous condenser units (“STATCOMs”) that—in terms of providing voltage support—function similar to a generator at a

¹⁰ See, *e.g.*, Renewable Energy World, “Grid inertia: why it matters in a renewable world,” published October 25, 2019, available at <https://www.renewableenergyworld.com/baseload/grid-inertia-why-it-matters-in-a-renewable-world/#gref> (last accessed December 13, 2021); Davies Decl. (Ex. B) at ¶¶ 7, 9.

¹¹ NERC Standard TPL-001-4 — Transmission System Planning Performance Requirements, Requirement R5, available at <https://www.nerc.com/files/TPL-001-4.pdf>.

power plant. (*Id.* at ¶ 12.) The type and number of voltage regulation resources needed to mitigate the retirement of Rush Island is subject to approval by MISO. (*Id.* at ¶ 13.)

Additionally, Ameren expects MISO to consider the need for Rush Island to remain available during cold-weather months. Recent experience demonstrates the key role Rush Island and similar large plants play keeping the grid stable and functioning when such cold weather strikes. Extreme cold in Texas during Winter Storm Uri froze critical energy infrastructure and resulted in a cascading series of events including loss of gas supply, inoperable generating units, and downed transmission lines. To address emergency energy conditions in Texas, multiple Regional Transmission Organizations (“RTOs”) moved power flow in the east and south through MISO’s region. This extraordinary flow of power caused an unprecedented amount of congestion on the transmission lines—an overabundance of energy for the infrastructure to manage. This congestion, if not carefully managed, can lead to an overload and a failure of transmission lines. (Lafser Decl. (Ex. C) at ¶¶ 2-3.) Ameren and MISO were able to manage Winter Storm Uri in large measure due to the availability of Rush Island. (*Id.* at ¶¶ 4-5.)

C. MISO Is Assessing Grid Reliability Issues from Rush Island’s Retirement.

In October 2021, after completing its own internal analysis of grid reliability, Ameren initiated discussions with MISO through a preliminary and confidential process known as the MISO “Y-2” process. Through its Y-2 process, MISO is currently running a variety of modeling scenarios to assess the reliability implications of retiring Rush Island. MISO is expected to complete its analysis by mid-January 2022. (Davies Decl. (Ex. B) at ¶¶ 5, 12.)

As part of the Attachment Y process,¹² if MISO determines that the retirement of Rush Island will cause transmission reliability issues, then MISO can designate Rush Island as an SSR,¹³ which will require the plant to stay online until appropriate mitigation measures are implemented. In that scenario, Ameren anticipates that MISO will need Rush Island to operate—and provide voltage support—during the May–September air-conditioning season. In preliminary discussions, MISO has indicated to Ameren that if MISO designates Rush Island as an SSR, then the TVR mitigation measures described above (*e.g.*, STATCOMs) could be expeditiously reviewed and formally approved by MISO in December 2022, with informal approval occurring earlier. In addition to the summer voltage regulation issue, reliability problems can arise during extreme cold weather events such as those experienced during Winter Storm Uri in February 2021. (Lafser Decl. (Ex. C) at ¶¶ 2-4.) Ameren strongly believes that it is in the public interest for Rush Island to be operationally available during the deep winter period should emergency events arise.

If required by MISO, continued operation of Rush Island serves the public interest by ensuring both adequate voltage support necessary for the St. Louis metropolitan area and winter grid reliability support. Transmission upgrades to address reliability concerns will take less time than it would take to install an FGD at Rush Island. In addition, the overall environmental benefit of eliminating all emissions from Rush Island that would have occurred during two or three

¹² As described in Footnote 1 above, the Attachment Y process is the formal process that a generator owner follows in order to officially seek retirement approval from MISO. Generators that initiate the retirement process under Y-2 follow up with an Attachment Y filing (a public process) through which they seek a final determination from MISO. Ameren will make an Attachment Y filing following the conclusion of the Y-2 process.

¹³ MISO, as the Transmission Provider, will enter into an SSR agreement with the market participant owning a generation or other resource needed for SSR purposes and will file the SSR Agreement with FERC for approval following the opportunity for comment by interested stakeholders after notice in the federal register. 18 C.F.R. §385.2009. Such public participation process is in addition to any notice by MISO to potentially affected parties and to the comment opportunity provided by MISO on alternative mitigation measures as part of MISO's public planning process. (MISO Tariff, Attachment FF, *available at* <https://www.misoenergy.org/legal/tariff/>.)

decades of future planned operation with an FGD far outweighs the effect of deferring—for a limited period—Rush Island’s retirement date.

Given the changed circumstances since the Court’s Remedy Ruling, the public interest is disserved by the installation of costly FGD controls and the continued operation of Rush Island. The public interest is far better served by Rush Island’s early retirement, which is also fully compliant with, and in fact exceeds the goals of, the Court’s Remedy Ruling. The public interest is also served by allowing MISO time to conduct its analysis of grid reliability issues before Rush Island’s retirement, and if reliability issues are identified, allowing for the installation of substitute TVR or other resources before Rush Island’s retirement.

CONCLUSION

For the reasons stated above, Ameren respectfully requests that the Court consider the following framework to address issues presented by Rush Island’s early retirement and that the Court modify its Remedy Ruling as set forth below:

1. Find that Ameren’s retirement of Rush Island in lieu of installing an FGD complies with the SO₂ emissions limit required by the Remedy Ruling, with Rush Island’s specific retirement date to be determined pursuant to MISO’s assessment.
2. Direct Ameren to promptly notify the Court and counsel for Plaintiff and Plaintiff-Intervenor of MISO’s Y-2 assessment when it is complete.
3. If MISO preliminarily determines, as part of its Y-2 process, that Rush Island is not needed to address reliability issues and that Rush Island is not an SSR, then Ameren will file an Attachment Y request with MISO and designate a retirement date.
4. If MISO preliminarily determines as part of its Y-2 process that Rush Island is needed to address reliability issues and that Rush Island is an SSR, Ameren will no later than March 1, 2022 file an Attachment Y request with MISO seeking a retirement date as soon as possible. If MISO confirms in the Attachment Y process that Rush Island is an SSR, its retirement date shall not be prior to the date that all transmission upgrade projects (or other measures) needed to remedy the reliability issues that arise from the retirement of Rush Island are constructed and placed in service.

5. If MISO designates Rush Island as an SSR necessary to maintain reliability, authorize Rush Island to operate pursuant to MISO's requirements and the terms of an SSR Agreement with MISO until the retirement date approved by MISO.

Dated: December 14, 2021

Respectfully submitted,

/s/ Matthew B. Mock

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CERTIFICATE OF SERVICE

I hereby certify that on December 14, 2021, I caused the foregoing document to be electronically filed with the Clerk of Court using the CM/ECF system, which will cause an electronic copy to be served on all counsel of record.

/s/ Matthew B. Mock

Matthew B. Mock

EXHIBIT A

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, D.C. 20549

FORM 8-K

**CURRENT REPORT
Pursuant to Section 13 or 15(d)
of the Securities Exchange Act of 1934**

Date of report (Date of earliest event reported): November 30, 2021

Commission File Number	Exact Name of Registrant as Specified in Charter; State of Incorporation; Address and Telephone Number	IRS Employer Identification Number
1-14756	Ameren Corporation (Missouri Corporation) 1901 Chouteau Avenue St. Louis, Missouri 63103 (314) 621-3222	43-1723446
1-2967	Union Electric Company (Missouri Corporation) 1901 Chouteau Avenue St. Louis, Missouri 63103 (314) 621-3222	43-0559760

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrants under any of the following provisions:

- ☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
- ☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
- ☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
- ☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, \$0.01 par value per share	AEE	New York Stock Exchange

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

Emerging Growth Company

Ameren Corporation
Union Electric Company

☐
☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Ameren Corporation

☐

Union Electric Company

☐

ITEM 8.01 Other Events.

Reference is made to Note 9 – Commitments and Contingencies to the financial statements under Part I, Item 1. Financial Statements; Outlook under Part I, Item 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations; and Part II, Item 1. Legal Proceedings, each in the Quarterly Report on Form 10-Q for the quarter ended September 30, 2021 (“Form 10-Q”); and to Glossary of Terms and Abbreviations; Part I, Item 3. Legal Proceedings; Outlook under Part II, Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations; and Note 14 – Commitments and Contingencies to our financial statements under Part II, Item 8. Financial Statements and Supplementary Data, each in the Annual Report on Form 10-K for the year ended December 31, 2020 (“Form 10-K”) of registrants Ameren Corporation (“Ameren”) and Union Electric Company, doing business as Ameren Missouri (“Ameren Missouri”), for a discussion of the August 2021 decision issued by a three-judge panel of the United States Court of Appeals for the Eighth Circuit (“Court of Appeals”) that affirmed the September 2019 remedy order issued by the United States District Court for the Eastern District of Missouri (“District Court”) as it related to the installation of a flue gas desulfurization system at the Rush Island Energy Center, but reversed the order as it related to the installation of a dry sorbent injection system at the Labadie Energy Center.

As previously reported, in October 2021, Ameren Missouri sought reconsideration of the Court of Appeals’ panel decision before the entire Court of Appeals, and the United States Department of Justice (“DOJ”) sought reconsideration of the panel’s decision rejecting the requirement to install a dry sorbent injection system at the Labadie Energy Center. On November 30, 2021, the Court of Appeals issued an order denying both Ameren Missouri’s and DOJ’s requests for reconsideration.

Based on its assessment of available legal, operational and regulatory alternatives, Ameren Missouri has determined not to further appeal the court rulings and will instead seek a modification from the District Court of its September 2019 order that would facilitate the accelerated retirement of the Rush Island Energy Center in lieu of installation of the flue gas desulfurization system. Ameren Missouri expects the retirement of the Rush Island Energy Center to occur on or before the compliance date established by the September 2019 order, which required installation of the flue gas desulfurization system within four and one-half years from the conclusion of the appeal process and entry of a final judgment. Ameren Missouri further expects that the ultimate retirement date and interim operating requirements will be based on an assessment of the impacts of the retirement to regional electric power system reliability and the expected timeframe for implementing any associated transmission upgrade projects that could be required. This assessment will include analysis of such considerations by the Midcontinent Independent System Operator, Inc. (“MISO”). MISO’s preliminary assessment is expected to be completed by mid-January 2022. The District Court is under no deadline to issue an order in this proceeding.

In connection with the planned accelerated retirement of the Rush Island Energy Center, Ameren Missouri expects to seek approval from the Missouri Public Service Commission (“MoPSC”) to finance the costs associated with the retirement, including the remaining unrecovered net plant balance associated with the facility, through the issuance of securitized utility tariff bonds pursuant to the Missouri securitization statute that became effective in August 2021. As of September 30, 2021, the Rush Island Energy Center had a net plant balance of approximately \$0.6 billion and a rate base of approximately \$0.4 billion. In addition, Ameren Missouri expects to file an updated Integrated Resource Plan with the MoPSC during the first half of 2022 to reflect the planned acceleration of the retirement of the Rush Island Energy Center from 2039, the year the facility is currently scheduled to retire as reflected in the company’s 2020 Integrated Resource Plan.

Ameren and Ameren Missouri are unable to predict the ultimate resolution of these matters.

Forward-Looking Statements

Statements in this report not based on historical facts are considered “forward-looking” and, accordingly, involve risks and uncertainties that could cause actual results to differ materially from those discussed. Although such forward-looking statements have been made in good faith and are based on reasonable assumptions, there is no assurance that the expected results will be achieved. These statements include (without limitation) statements as to future expectations, beliefs, plans, projections, strategies, targets, estimates, objectives, events, conditions, and financial performance. In connection with the “safe harbor” provisions of the Private Securities Litigation Reform Act of 1995, Ameren and Ameren Missouri are providing this cautionary statement to identify important factors that could cause actual results to differ materially from those anticipated. The following factors, in addition to those discussed under Risk Factors

in the Annual Report on Form 10-K for the year ended December 31, 2020, and elsewhere in this report and in Ameren's and Ameren Missouri's other filings with the Securities and Exchange Commission, could cause actual results to differ materially from management expectations suggested in such forward-looking statements:

- regulatory, judicial, or legislative actions, and any changes in regulatory policies and ratemaking determinations, that may change regulatory recovery mechanisms;
- the effects of changes in federal, state, or local laws and other governmental actions, including monetary, fiscal, and energy policies;
- the cost and availability of transmission capacity for the energy generated by Ameren Missouri's energy centers or required to satisfy Ameren Missouri's energy sales;
- business and economic conditions, which have been affected by, and will be affected by the length and severity of, the COVID-19 pandemic, including the impact of such conditions on interest rates and inflation;
- the impact of weather conditions and other natural phenomena on Ameren and Ameren Missouri and Ameren Missouri's customers, including the impact of system outages and the level of wind and solar resources;
- the performance and cost recovery of generation, transmission, and distribution assets;
- the effects of failures of electric generation, electric and natural gas transmission or distribution, which could result in unanticipated liabilities or unplanned outages;
- Ameren Missouri's ability to recover the remaining investment and decommissioning costs associated with the retirement of an energy center, as well as the ability to earn a return on that remaining investment and those decommissioning costs;
- the impact of current environmental laws and new, more stringent, or changing requirements, including those related to the New Source Review provisions of the Clean Air Act and carbon dioxide, other emissions and discharges, cooling water intake structures, and coal combustion residuals that could limit or terminate the operation of certain of Ameren Missouri's energy centers, increase its operating costs or investment requirements, result in an impairment of its assets, cause it to sell its assets, reduce its customers' demand for electricity or natural gas, or otherwise have a negative financial effect;
- the impact of a final judgment to be issued by the District Court regarding its September 2019 remedy order;
- the impact of negative opinions of Ameren and Ameren Missouri or Ameren Missouri's utility services that its customers, investors, legislators, or regulators may have or develop, which could result from a variety of factors, including failures in system reliability, failure to implement Ameren's and Ameren Missouri's investment plans or to protect sensitive customer information, increases in rates, negative media coverage, or concerns about environmental, social, and/or governance practices;
- the impact of adopting new accounting guidance;
- the effects of strategic initiatives, including mergers, acquisitions, and divestitures;
- legal and administrative proceedings; and
- acts of sabotage, war, terrorism, or other intentionally disruptive acts.

New factors emerge from time to time, and it is not possible for management to predict all of such factors, nor can it assess the impact of each such factor on the business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained or implied in any forward-looking statement. Given these uncertainties, undue reliance should not be placed on these forward-looking statements. Except to the extent required by the federal securities laws, Ameren and Ameren Missouri undertake no obligation to update or revise publicly any forward-looking statements to reflect new information or future events.

This combined Form 8-K is being filed separately by Ameren Corporation and Union Electric Company. Information contained herein relating to any individual registrant has been filed by such registrant on its own behalf. No registrant makes any representation as to information relating to any other registrant.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, each registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized. The signature for each undersigned company shall be deemed to relate only to matters having reference to such company or its subsidiaries.

AMEREN CORPORATION

(Registrant)

By: /s/ Michael L. Moehn
Name: Michael L. Moehn
Title: Executive Vice President and Chief Financial Officer

UNION ELECTRIC COMPANY

(Registrant)

By: /s/ Martin J. Lyons, Jr.
Name: Martin J. Lyons, Jr.
Title: Chairman and President

Date: December 14, 2021

EXHIBIT B

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION

UNITED STATES OF AMERICA,

Plaintiff,

SIERRA CLUB,

Plaintiff-Intervenor,

v.

AMEREN MISSOURI,

Defendant.

Civil Action No. 4:11-cv-00077-RWS

**DECLARATION OF JUSTIN DAVIES IN SUPPORT OF
AMEREN'S MOTION TO MODIFY REMEDY RULING**

I, Justin Davies, am over 18 years of age and make the following declaration pursuant to 18 U.S.C. § 1746:

1. This declaration is based on my personal knowledge, and information available to me at Ameren Missouri ("Ameren").

2. I have been employed by Ameren Services Company for approximately 20 years. Ameren Services provides business and administrative services to Ameren Corporation's family of companies including Ameren Missouri. I currently hold the position of Manager of Transmission Planning. Among our responsibilities, Transmission Planning interacts with regional transmission organizations and implements reliability guidelines and standards to prevent disruption of the transmission system and power outages. In performing our work, we use sophisticated models to evaluate system configurations and identify areas of low voltage with the

potential loss of load, lines or equipment that could become overloaded and systems where collapse could occur.

3. Ameren is a member of a Federal Energy Regulatory Commission (“FERC”) sanctioned regional grid operator, the Midcontinent Independent System Operator (“MISO”), which manages the regional transmission grid and operates energy markets within its multi-state region under authority delegated to MISO under the Federal Power Act. In addition to owning generating assets, Ameren owns and operates a transmission network in Missouri including the St. Louis metropolitan area. Ameren’s transmission network is interconnected with other transmission networks, all of which form an integrated transmission system needed to ensure the reliable delivery of power.

4. Ameren’s Transmission Planning group is responsible for evaluating the potential impact on Ameren’s transmission grid should Rush Island be removed from service, *i.e.*, retired. Specifically, my group has evaluated whether such retirement, without mitigation measures, could result in an adverse impact on local and/or regional grid stability.

5. In October 2021, Ameren submitted an Attachment Y-2 application to MISO and requested that MISO evaluate the impact of Rush Island’s retirement. An Attachment Y-2 filing triggers a confidential process and leads to a non-binding determination from MISO as to potential reliability issues should a generating asset be retired. The actual retirement of a generating source requires an Attachment Y filing, which is public and which triggers a binding commitment to retire along with a definitive retirement date.

6. Under MISO’s FERC-approved Attachment Y tariff, Ameren must first seek authorization from the grid operator before generating units can be disconnected from the

transmission grid, to ensure that the shutdown will not cause reliability issues for the grid. The tariff provides:

In collaboration with the affected Transmission Owners, the Transmission Provider will cause an evaluation to be performed of transmission system conditions (an Attachment Y Reliability Study) that result from the change in status of the unit(s) subject to Attachment Y notification requirements. The evaluation will consider the performance of the transmission system to determine if thermal or voltage violations of applicable NERC Standards and Transmission Owner planning criteria occur when the unit is offline compared to conditions when the unit is online. The scope of this evaluation will include a steady state analysis, and may require analyses of stability and import limitations for the particular study area. Study cases will be derived from approved MTEP models that are representative of the period of time for which the suspension of the unit(s) is requested, and will include models that represent near-term and/or longer-term scenarios as appropriate for the study period. Models that are developed to reflect both the online and offline status of the unit being evaluated will be analyzed to compare the differences in results to determine the impact of the unit on the transmission system.¹

7. Rush Island provides electrical resources necessary for stable and reliable grid operation, including voltage regulation. To explain briefly how that is accomplished, Rush Island's turbine/generator trains are what are known as "synchronous generators" -- they are connected to and produce voltage and current in sync with the transmission grid, using "excitation" systems. The plant's excitation systems enable the generator to control grid voltage, by constantly producing or absorbing Volt-Amps Reactive ("VARs") as needed under steady-state conditions. The excitation systems allow for "boosting," to produce additional VARs between 1.5 to 2 times the steady-state VARs, during transient system events and for system recovery after a fault. A "fault" is a service interruption that can occur following a storm event, high wind conditions, structure failures, etc.

¹ MISO Tariff, 38.2.7 Generation Suspension, Generation Retirement, and System Support Resources, para. c. (effective Nov. 29, 2021), available at <https://www.misoenergy.org/legal/tariff/>.

8. Transient Voltage Recovery (“TVR”) provided by Rush Island is particularly critical during air conditioning season when load levels are highest. TVR refers to how quickly and to what levels voltage recovers after a transient event. The North American Electric Reliability Council (“NERC”), to which reliability coordination authority has been delegated by FERC, sets standards requiring certain TVR criteria. For instance, for Ameren as a Transmission Owner and under the applicable NERC Transmission Planning Standard TPL-001-4, system voltage must recover from a transient event to an 80% level in 2 seconds, and to a 90% level in 10 seconds. Ameren’s Transmission Planning group has performed dynamic modeling that indicates such standards will not be met during specific conditions following the retirement of Rush Island unless certain transmission system upgrades are performed. The inability to meet these NERC standards is exacerbated by both the retirement of Rush Island and the Meramec Energy Center, which has a pending Attachment Y retirement date of December 2022.

9. With respect to reliability issues, coal plants such as Rush Island provide a unique value as their equipment allows such units to operate as “synchronous generators,” which can dampen transient system disturbances and create fault current that supports post-event frequency response. Unless mitigation measures are taken, removing synchronous generators from the grid can both increase the severity of a transient event and also limit recovery capability from such an event.

10. Based upon Ameren’s internal analysis, the removal of Ameren’s Meramec Energy Center (slated to retire at the end of 2022) and Rush Island will affect voltage regulation during certain transient conditions. To address such transient events, and to mitigate violations of local planning criteria required by NERC, transmission upgrades will need to occur.

11. As required by NERC's Standards for Transmission Planning, Ameren's transmission planning staff have run several dynamic models to evaluate the effect of Rush Island's retirement on the broader transmission system. These models simulate the occurrence of a system fault during a variety of transmission grid loading conditions. Any number of random occurrences, such as a lightning strike, high wind, or trees falling on transmission lines, could trigger this kind of transient event in real life. Transmission planners evaluated the potential impact to load across the Ameren Missouri and neighboring system. The various modeling runs projected more than 800 scenarios where TVR was insufficient to meet the governing criteria. In one scenario (modeling the fault on a transmission line exiting the Labadie Energy Center), over 4,000 MW of load from both Ameren and the neighboring system would be at risk.

12. Ameren has shared its observations with MISO, which is currently running power flow models under a variety of load conditions and contingencies including shoulder months, summer peak, summer low load, and winter peak. MISO's analysis is comprehensive and includes the expected addition of new generation resources as well as the removal of nearby generation slated for Attachment Y retirement. According to its Scoping Study, MISO is scheduled to complete its modeling analysis in December 2021, with a final report issued mid-January 2022.

13. To replace Rush Island's current voltage support capacity, Ameren, as the local Transmission Owner, would need to employ a combination of technologies. Some would be switchable static devices such as capacitors and reactors, and some would be dynamic in nature, closer in nature to the synchronous generators, such as Static VAR Compensators ("STATCOMs") and Synchronous Condenser Units ("Synch Cons"). Both STATCOM and synch cons are equivalent to a "cruise control" for the local transmission system and automatically regulates the voltage of the system, keeping it from being too high or too low. In addition, a Synch Con also

provides system inertia that dampens the effects of a transient event to keep the system stable. Ultimately, the type and number of voltage and current regulation resources needed to mitigate the retirement of Rush Island will be decided by MISO, with input from Ameren as the Transmission Owner.

14. If mitigation devices are needed, as Ameren expects, such equipment must be specifically fabricated and customized to the particular application and location for which they are intended. Ameren preliminarily estimates that the procurement and installation of such units could cost approximately \$90 million and take between 12 and 30 months following MISO's final approval.

15. In addition to the voltage issues described above, emergency events can create reliability concerns. For example, as referenced in the Declaration of Tim Lafser, Winter Storm Uri's extreme cold weather resulted in high electric demand and generation shortages in Texas, with repercussions felt throughout the Midwest and across Ameren's transmission system. (Ex. C, Lafser Decl., ¶¶ 3-6.) High power flows into and south of Ameren's system upset voltage levels, and many transmission lines were near overload conditions. The Coffeen-Roxford line tripped, which shifted power flows across other lines. In response, and to stabilize the grid, MISO shed load and ultimately declared a Transmission System Emergency, which cut firm sales through Ameren's system. MISO ordered offline hundreds of MWs of generation in Indiana, and the Southwest Power Pool ("SPP") shed approximately 3,000 MW of load. The loss of load resulted in power outages during some of the coldest days of the year. In my opinion, had Rush Island not been available and online, MISO's ability to move power across the grid to mitigate the emergency conditions would have been adversely impacted, and additional load shedding actions to protect

transmission lines and other infrastructure could have been necessary. In such a circumstance, the potential impact to the St. Louis metropolitan area could have been significant.

I declare that the foregoing is true and correct.

Executed on December 13, 2021

justin t davies

justin t davies (Dec 13, 2021 15:45 CST)

Justin Davies

EXHIBIT C

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION

UNITED STATES OF AMERICA,

Plaintiff,

SIERRA CLUB,

Plaintiff-Intervenor,

v.

AMEREN MISSOURI,

Defendant.

Civil Action No. 4:11-cv-00077-RWS

**DECLARATION OF TIM LAFSER IN SUPPORT OF
AMEREN'S MOTION TO MODIFY REMEDY RULING**

I, Tim Lafser, am over 18 years of age and make the following declaration pursuant to 18 U.S.C. § 1746:

1. I am employed by Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri" or "Company") as Vice President of Power Operations. I have worked in several different capacities during my career including Director of Rush Island Energy Center, Director of Meramec Energy Center, Director of Trade Floor Operations, and Director of Transmission Operations. In my current role I am responsible for the operations, maintenance, and engineering support of all Ameren Missouri's non-nuclear generation energy centers. This declaration is based on my personal knowledge, and information available to me.

2. In February 2021, arctic temperatures across the Midwest and South resulted in emergencies and alerts declared by RTOs. Temperatures fell between 15 and 35 degrees below

normal and large outages occurred in Texas and elsewhere. Winter Storm Uri created extraordinary stress on the transmission grids managed by ERCOT, SPP and MISO, creating emergency conditions in all three RTOs. Extreme cold froze critical energy infrastructure and resulted in cascading series of events including loss of gas supply, inoperable generating units, and downed transmission lines. To address emergency energy conditions in Texas, RTOs moved power from generators in PJM in the east to serve load in SPP and Texas in the south through MISO's transmission network causing unprecedented amount of congestion and an extraordinary flow of power across Ameren's transmission lines. Below is a map of the RTO regions.



3. In addition to multiple days of extreme cold and spiking load demand, the Company faced multiple operational challenges. A scheduled outage at the Callaway Energy Center required Ameren Missouri to import 1,000 MW of power to replace the energy produced on a daily basis by that facility. The Company's natural gas fleet was unavailable due to a lack of gas supplies. An ice jam in the Missouri River threatened the availability of the Labadie Energy Center. In addition, the flow of power caused multiple transmission emergencies, some of which

resulted in load shedding and manual generator re-dispatch to manage the transmission constraints. This was a significant occurrence, as without that emergency action, even greater widespread outages in the St Louis metropolitan region could have occurred.

4. I have reviewed the Declaration of Justin Davies where he describes the reliability function, including voltage support, provided by Rush Island. (Ex. B, Davies Decl., ¶¶7-15) Earlier this year Winter Storm Uri presented a significant challenge to Ameren Missouri's generating fleet. Ameren and MISO were able to manage the various emergency events from that storm in large measure due to the availability of Rush Island and its capacity to absorb and manage excess power flows across Ameren's transmission lines.

5. As a result of Winter Storm Uri, NERC reliability standards now require protection of cold-weather-critical components as well as ambient temperature and weather requirements. Generators must provide the Balancing Authority (in our case, MISO) with the total generating unit capacity available during "local forecasted cold weather."¹ Unlike a heated factory or commercial building, Rush Island's generating units are housed in an uninsulated metal-clad building. While the plant's oil-fired auxiliary boiler can be used to keep the boiler from freezing up, it cannot be used to maintain equipment systems. In fact, to keep critical components from being damaged by frozen water and temperatures, the boiler units must be operational to produce steam and hot water to protect equipment from freezing.² Rush Island had difficulty sustaining load during Uri as conveyor systems and the coal pile froze and "winterization" options are limited.

¹ FERC, NERC and Regional Entity Staff Report, *The February 2021 Cold Weather Outages in Texas and the South Central United States* (Nov. 16, 2021), Key Recommendation 1g at p. 190, available at <https://www.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and> (last accessed Dec. 12, 2021).

² During cold weather conditions, both units are kept online and operational in order to protect the plant from a unit unexpectedly tripping offline and exposing the plant to freezing conditions resulting in damaged equipment causing the plant to be unavailable for extended periods of time.

For example, there are thousands of boiler tubes in the units which cannot be drained of water and therefore are susceptible to freezing. While ruptured tubes can be visually identified after a freeze event, cracked and weakened tubes cannot and physical impairments will only become apparent as boiler pressure increases during startup. In addition, certain components, such as circulating water pumps, are specially designed and fabricated. Failures of such equipment could take months to a year to repair depending upon supply chain issues.³ For all these reasons, except for unplanned outages, the Company keeps both units operational during the peak winter months. If plant equipment is not properly maintained during the winter, the energy center's ability to respond to load demands in the summer is compromised.

I declare that the foregoing is true and correct.

Executed on December 13, 2021

Tim Lafser

Tim Lafser (Dec 13, 2021 11:37 CST)

Tim Lafser

³ Deterioration to facilities in an unheated environment occurs rapidly. Within 2-3 months of shutdown of the Meredosia and Hutsonville coal plants in Illinois, electrical equipment became damaged from roof leaks, water lines froze and burst, and fans, dampers, and bearings began rusting and degrading.

EXHIBIT D

**STATE OF MISSOURI
PUBLIC SERVICE COMMISSION**

At a session of the Public Service Commission held at its office in Jefferson City on the 30th day of October, 2019.

In The Matter of a Determination of Special)
Contemporary Resource Planning Issues to be)
Addressed by Ameren Missouri in its Next)
Triennial Compliance Filing or Next)
Annual Update Report)

File No. EO-2020-0047

**ORDER ESTABLISHING SPECIAL CONTEMPORARY RESOURCE
PLANNING ISSUES**

Issue Date: October 30, 2019

Effective Date: November 9, 2019

A provision in the Commission's electric utility resource planning rule, 20 CSR 4240-22.080(4), requires Missouri's electric utilities to consider and analyze special contemporary issues in their integrated resource plan (IRP) triennial compliance filings or in their annual IRP update reports. The regulation provides that by September 15 of each year, the Commission's Staff, Public Counsel, and other interested stakeholders may file suggested issues for consideration. The regulation allows the utilities and other stakeholders until October 1 to file comments regarding the suggested issues. The Commission must then issue an order by November 1 of each year specifying the list of special contemporary issues that each electric utility must address.

The Commission's Staff, the Natural Resources Defense Council (NRDC), Sierra Club, and the Office of the Public Counsel filed suggested special contemporary issues for Union Electric Company d/b/a Ameren Missouri to analyze and respond to in its 2020

triennial IRP Filing. Ameren Missouri filed responses to those suggestions. The Commission must now determine what special contemporary issues Ameren Missouri should address.

This is not a contested case. The Commission does not need to hear evidence before reaching a decision and does not need to make findings of fact and conclusions of law in announcing that decision.¹ The Commission's rule gives the Commission broad discretion in determining what issues a utility should be required to address, indicating:

[t]he purpose of the contemporary issues lists is to ensure that evolving regulatory, economic, financial, environmental, energy, technical, or customer issues are adequately addressed by each utility in its electric resource planning. Each special contemporary issues list will identify new and evolving issues but may also include other issues such as unresolved deficiencies or concerns from the preceding triennial compliance filing.²

After considering these factors, the Commission will adopt the list of special contemporary issues set forth in this order. The Commission has chosen these issues because they are of particular interest and importance and should be addressed in Ameren Missouri's triennial IRP filing. Ameren Missouri may already plan to address these issues in its triennial IRP filing apart from their designation as special contemporary issues, or, it may believe it has already adequately addressed some of these issues in a previous IRP filing, or some other filing. If that is so, then it does not need to undertake any additional analysis because of this designation and may simply explain in its upcoming IRP filing exactly where the Commission can find that other analysis. The same approach is acceptable if Ameren Missouri intends to address any of these issues in its upcoming triennial IRP filing. In that instance, Ameren Missouri need not undertake duplicative analysis and may instead explain where the Commission will find analysis of the below issues. The Commission

¹ *State ex rel. Public Counsel v. Public Service Com'n*, 259 S.W.3d 23, 29 (Mo. App. W.D. 2008).

² 20 CSR 4240-22.080(4).

does not intend that a utility spend an unreasonable amount to address any special contemporary issue. If Ameren Missouri finds that the cost to address a special contemporary issue is excessive, it may explain its concerns in its next IRP filing, while addressing the issue to the extent reasonably possible.

To give Ameren Missouri as much time as possible to examine these issues before its next IRP filing, the Commission will make this order effective in ten days.

THE COMMISSION ORDERS THAT:

1. Union Electric Company d/b/a Ameren Missouri shall analyze and document the following special contemporary issues in its 2020 triennial IRP filing:

A. When complying with 20 CSR 4240-22.060(5)(M), include the following as uncertain factors that may be critical to the performance of alternative resource plans:

(i) Foreseeable demand response technologies, including, but not limited to, integrated energy management control systems, linking smart thermostats, lighting controls and other load-control technologies with smart end-use devices;

(ii) Foreseeable energy storage technologies; and

(iii) Foreseeable distributed energy resources, including, but not limited to, distributed solar generation, distributed wind generation, combined heat and power (CHP), and microgrid formation. Develop and provide a database of information on distributed generation (both utility owned and customer owned) and distributed energy storage (both utility owned and customer owned) for purposes of evaluating current penetration and planning

for future increases in the levels of distributed generation and energy storage.

B. When complying with 20 CSR 4240-22.060(5)(A), analyze and document the impact of electric vehicle adoption and charging station installations for the 20-year planning period upon the low-case, base-case and high-case load forecasts.

C. Analyze and document the cost of any transmission grid upgrades or additions needed to address transmission grid reliability, stability, or voltage support impacts that could result from the retirement of any existing coal-fired generating unit in the time period established in the IRP process.

D. Model scenarios related to environmental upgrades to the Rush Island and Labadie coal-fired plants as mandated by the federal courts.

E. In addition to the exercise prescribed in 4 CSR 24-22.045, analyze integrated distribution planning as a way to manage the distribution grid in a manner that reduces peaks and fills valleys in load profiles, and lowers overall system costs with a combination of energy efficiency, demand response, electric vehicles, distributed generation, storage, advanced metering, and pricing strategies such as time-of-use rates (TOU) and inclining block rates (IBR).

F. Analyze and assess the use of mechanisms such as green tariffs and community solar to increase the availability of distributed generation for large and small customers.

G. Analyze and document the prospects for using securitization to advance the retirement of coal generation assets, and channel the savings into

more economical investments such as demand-side management, building wind and solar generation, and storage. Securitization is essentially lower cost, long-term financing that that ratepayers take out and pledge to repay using a portion of their future electricity bills using a long-term, lower-cost bond that will save customers money, some of which can be used as new capital.

H. Analyze and assess the benefits of supporting the development and funding of a High Performance Building Hub to address information and financing (including bridge financing for project development) for building owners – especially affordable housing. Look at Building Energy Exchange (an informational resource for the building industry in New York) and NYC Energy Efficiency Corporation (a specialty financing corporation) as possible models.

I. Staff's report in EW-2019-0370 regarding its investigation of utility self-scheduling practices in the RTO market concluded that ratepayers were not being "actively harmed" by the practice of self-scheduling, but admitted that Staff lacked the data and resources to answer the fundamental questions of whether Missouri utilities are bidding into the markets at below production costs or otherwise harming ratepayers through "increased outage rates, decreased off-system sales revenue, increased operations and maintenance costs, shortened life of assets, increased outage frequency, decreased reliability, increased LMPs at the load node, and/or generally increased energy prices across the RTO's footprint" (Staff Report at 13). Ameren Missouri shall address these issues in its IRP since only it possesses the necessary bid formulation and production cost data.

J. Analyze and screen electric vehicle charging infrastructure as a candidate resource option.

K. Analyze and develop as candidate resource options the satisfaction of municipal and corporate renewable energy goals, particularly the plan of the St. Louis Board of Aldermen to have the City's electricity sector be met entirely by efficiency and renewable resources by 2035, which, when enacted into law by ordinance, may become a legal mandate within the meaning of 20 CSR 4240-22.060(3)(A).

L. Analyze and document the costs of putting flue gas desulfurization (scrubbers) on Labadie and Rush Island.

M. Analyze and document the future capital and operating costs faced by each Ameren Missouri coal-fired generating unit in order to comply with all existing, pending, or potential environmental standards, including until they have been finally withdrawn or replaced:

- (1) Clean Air Act New Source Review provisions;
- (2) 1-hour Sulfur-Dioxide National Ambient Air Quality Standard;
- (3) National Ambient Air Quality Standards for ozone and fine particulate matter;
- (4) Cross-State Air Pollution Rule;
- (5) Clean Air Interstate Rule;
- (6) Mercury and Air Toxics Standards;
- (7) Clean Water Act Section 316(b) Cooling Water Intake Standards;

- (8) Clean Water Act Steam Electric Effluent Limitation Guidelines;
- (9) Coal Combustion Waste rules using cost of removal as well as cap-and-cover; and
- (10) Clean Air Act Regional Haze requirements.

N. Analyze and document the criteria by which units are assigned various operational designations (e.g. “must run”) for use in all Company economic modeling and resource planning.

O. Analyze and document on a unit-by-unit basis the net present value revenue requirement of the relative economics of continuing to operate each Ameren Missouri coal-fired generating unit versus retiring and replacing each such unit in light of all of the environmental, capital, fuel, and O&M expenses needed to keep each such unit operating as compared to the cost of other demand-side and supply side resources.

P. Analyze and document the technical, maximum achievable, and realistic achievable energy and demand savings from demand-side management, and incorporate each level of savings into Ameren Missouri’s resource planning process.

Q. Analyze and document the levels of achievable combined heat and power and incorporate such achievable CHP into Ameren Missouri’s evaluation of demand side management.

R. Analyze and document cost and performance information sufficient to fairly analyze and compare utility scale wind and solar resources, included distributed generation, to other supply side alternatives.

2. This order shall become effective on November 9, 2019.

BY THE COMMISSION



A handwritten signature in cursive script that reads "Morris L. Woodruff".

Morris L. Woodruff
Secretary

Silvey, Chm., Kenney, Hall, Rupp, and
Coleman, CC., concur.

Woodruff, Chief Regulatory Law Judge

EXHIBIT E

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of a Determination of Special)
Contemporary Resource Planning Issues to be)
Addressed by Ameren Missouri in its Next)
Triennial Compliance Filing or Next Annual)
Update Report)

File No. EO-2022-0054

SIERRA CLUB’S LIST OF SUGGESTED SPECIAL CONTEMPORARY ISSUES

Pursuant to 20 CSR 4240-22.080(4), Sierra Club hereby recommends the following as special contemporary issues for consideration, analysis, and documentation by Ameren Missouri (the “Company”):

1. On August 20, 2021, the 8th Circuit Court of Appeals affirmed the district court’s judgment regarding Clean Air Act violations at the Company’s Rush Island coal-fired power plant in all respects except as to injunctive relief entered against the Company’s Labadie plant. Accordingly, Ameren must bring Rush Island into compliance with the law by obtaining a permit and significantly reducing its sulfur dioxide pollution from Rush Island. Sierra Club requests that the Commission order Ameren to analyze and document all feasible options to comply with the latest court order including, but not limited to:
 - a. whether ratepayers and shareholders are better off if Ameren retires rather than retrofits Rush Island, particularly if Ameren utilizes securitization for the remaining unrecovered Rush Island capital balance;
 - b. issuing an all-source request for proposals to obtain robust market data for capacity and energy to replace Rush Island;

- c. analyze and document the cost of any transmission grid upgrades or additions needed to address transmission grid reliability, stability, or voltage support impacts that could result from the retirement of Rush Island.
2. Analyze the comparative public health impacts of each of the alternative resource plans considered by the Company.
 - a. At a minimum, Ameren should quantify the public health impacts of each generating unit by evaluating the cost that each generating unit's emissions have on public health, including consideration of, but not limited to, sulfur dioxide, nitrogen oxides, particulate matter, and mercury, using publicly available resources and data (such as EPA's BenMAP-CE, EPA's EJSCREEN, and Missouri Department of Natural Resources Air Quality Reports). Ameren has previously stated that public health impacts are "not a part of utility resource planning."¹ However, compliance with Missouri IRP Rules requires consideration of pollutants, including air emissions,² and the "fundamental objective" of the IRP process is "to provide the public with energy services that are safe . . . and in a manner that serves the public interest."³ Thus, Ameren should document the quantified health impacts of each portfolio in its IRP as public health is an aspect of the general public interest.
3. Analyze and document whether inclusion of all-source procurement (e.g., an all-source request for proposals or request for information) into Ameren's IRP process could have

¹ Ameren Missouri's Comments on the Proposed List of Special Contemporary Issues, Attachment A at 5-6, File No. EO-2021-0069 (Oct. 15, 2020).

² 20 CSR 4240-22.060(4)(B)(7).

³ 20 CSR 4240-22.010(2).

benefits for customers by providing robust market data on available supply- and demand-side resources and by allowing the Company to efficiently contract with advantageous offers received.

4. Given the recent passage of House Bill 734, analyze and quantify how securitization can be used to support cost-effective accelerated retirement of coal generation assets while also channeling the savings into cost-effective investments such as demand-side management, wind and solar generation, and storage. At a minimum, the Company should quantify how securitization could be used for the planned and potential retirements of Sioux, Rush Island, and Labadie.
5. In order to address the cost of environmental compliance at Labadie and the ongoing value of these units to customers, the Company should analyze and evaluate:
 - a. the net present value of operating each Labadie unit compared to the replacement of such unit.
 - b. analyze and document the costs of installing flue gas desulfurization or dry sorbent injection technology on its Labadie coal-fired power units in order to comply with the Environmental Protection Agency's Regional Haze Rule.
 - c. analyze and document the costs of installing cooling towers at Labadie in order to control thermal pollution.
6. Analyze and document the criteria by which generating units are assigned "must run" status in the MISO energy market.
7. Analyze and develop as candidate resource options the satisfaction of municipal and corporate renewable energy goals, including through Ameren's green tariff program(s).

- a. Only two plans in Ameren's 2020 IRP (Plan V and Plan W), included renewable subscription in addition to renewable expansion,⁴ however, Ameren explained that the original subscription plan, Renewable Choice, was never implemented.⁵ By early 2021, Ameren was supposed to file a new subscription plan in a separate case but has neglected to do so, and any description or documentation of this new renewable subscription plan is absent from Ameren's preferred ARP. We cannot disentangle it from Renewables Expansion generally, and renewable subscription, being funded differently from other resource options, merits being assessed as a candidate resource option in itself.⁶ Accordingly, Ameren should develop some candidate ARPs that would achieve 100% clean energy by 2030 and 2035.
8. Generate, analyze, and evaluate plans using a capacity expansion model that prioritizes economic optimization.
 - a. Ameren's 2020 IRP included an assessment of hard-coded plans with pre-determined retirement dates and renewable energy buildouts, instead of optimizing each plan based on future outlook using capacity expansion modeling. The Commission has previously ordered Ameren to compare the continued operation of its coal units—accounting for all future costs—to their replacement.⁷

⁴ Ameren 2020 IRP, Chapter 10, p. 5.

⁵ Ameren 2020 IRP, Chapter 6, p. 12.

⁶ 20 CSR 4240-222.040(1).

⁷ Revised Order Establishing Special Contemporary Resource Planning Issues, File No. EO-2020-0047, at Issue O (issued Dec. 3, 2019), ("Analyze and document on a unit-by-unit basis the net present value revenue requirement of the relative economics of continuing to operate each Ameren Missouri coal-fired generating unit versus retiring and replacing each such unit in light of all of the environmental, capital, fuel, and O&M expenses needed to keep each such unit operating as compared to the cost of other demand-side and supply side resources.").

Although Ameren's 2020 IRP, on a superficial level, followed the Commission's order, the Company's modeling failed to rigorously examine the economic retirement of existing units. The Company should incrementally test a series of retirement years moving forward from 2022 or 2023, rather than only testing a few selected, fixed dates for retirement. If only conducting the latter, it would be unclear whether the year chosen was optimal for electric customers because the decision set was too limited. The same is true for renewable energy buildouts: If the Company did not prescribe when renewable energy resources (e.g., solar and wind) will be added to its portfolio, then the model would be able to freely choose renewable energy additions on an economic basis.

Respectfully submitted,

/s/ Sarah Rubenstein
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Attorney for Sierra Club

CERTIFICATE OF SERVICE

I hereby certify that a true and correct PDF version of the foregoing was filed on EFIS and sent by email on this 15th day of September, 2021, to all counsel of record.

/s/ Sarah Rubenstein
Sarah Rubenstein

EXHIBIT F

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

In The Matter of a Determination of Special)	
Contemporary Resource Planning Issues to be)	
Addressed by Ameren Missouri in Its Next)	<u>File No. EO-2022-0054</u>
Triennial Compliance Filing or Next Annual)	
Update Report)	

**STAFF SUGGESTIONS FOR SPECIAL CONTEMPORARY
RESOURCE PLANNING ISSUES**

COMES NOW, Staff of the Missouri Public Service Commission, by and through the undersigned counsel, and for its response to the Commission's August 26, 2021, *Order Opening A File Regarding Special Contemporary Resource Planning Issues And Offering An Opportunity To File Suggestions*, respectfully states:

1. Union Electric Company d/b/a Ameren Missouri is to host an annual update workshop on or about October 1, 2021.¹ Ameren Missouri's next triennial compliance filing is scheduled for October 1, 2023.²
2. The Commission is to issue an order containing a list of special contemporary issues for Ameren Missouri to analyze and document in its next triennial compliance filing or next annual update report.³

¹ 20 CSR 4240-22.080(3) states, "...on or about April 1 of every year in which the utility is not required to submit a triennial compliance filing, each electric utility shall host an annual update workshop..." 20 CSR 4240-22.080(3)(B) states, "The utility shall prepare an annual update report...and shall file the annual update reports with the commission no less than twenty (20) days prior to the annual update workshop..." However, because the Commission, at Ameren Missouri's request, moved Ameren Missouri's triennial filing date to October rather than April, the annual update was also moved to October.

² 20 CSR 4240-22.080(1)(C) requires Ameren Missouri to submit its triennial compliance filing on April 1 every third year, beginning in 2014. However, the Commission, at Ameren Missouri's request, moved Ameren Missouri's triennial filing date to October rather than April.

³ 20 CSR 4240-22.080(4).

3. The purpose of the special contemporary issues lists is to ensure that evolving regulatory, economic, financial, environmental, energy, technical, or customer issues are adequately addressed by each utility in its electric resource planning.⁴

4. Pursuant to Commission Rule 20 CSR 4240-22.080(4)(A), Staff suggests Ameren Missouri include and address the following special contemporary issues in its next annual update report:

- A. The Company shall provide details of its plans to utilize securitization. Details shall include but are not limited to: 1) type of items to be securitized; 2) explanation for need of securitization for each item; 3) how it plans to utilize securitization for each item; 4) estimated costs of securitized items; 5) comparison of ratepayer costs and benefits.
- B. Given the recent COVID pandemic and the Winter Storm Uri weather event, the Company shall provide details of its plan for handling future emergency events such as these. The details provided shall give a clear plan for maintaining supply-side resource generation and public welfare during emergency events.

WHEREFORE, Staff suggests Ameren Missouri address in its next annual update report the special contemporary issues set forth above. However, since Ameren Missouri's next annual update report is to be submitted in October 2021, Staff suggests the Commission allow until December 15, 2021, for Ameren Missouri to update its annual update report with Staff's listed special contemporary issues.

⁴ *Id.*

Respectfully submitted,

/s/ Casi Aslin

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**Attorney for the Staff of the
Missouri Public Service Commission**

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing have been mailed, hand-delivered, transmitted by facsimile, or electronically mailed to all parties and/or counsel of record on this 15th day of September 2021.

/s/ Casi Aslin

EXHIBIT G

1. Executive Summary

Ameren Missouri's Generation Transformation

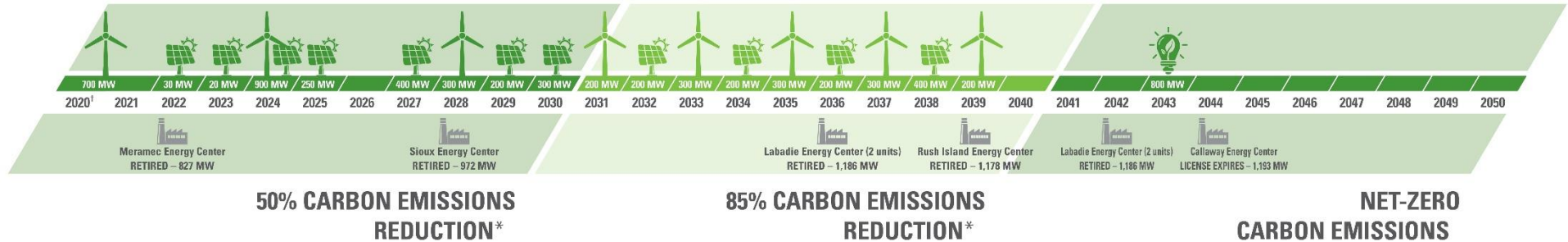
Transformation – this is the driving force behind Ameren Missouri's plan for meeting our customers' future energy needs, significantly increasing investment in renewable wind and solar generation, advancing the retirement of our coal-fired energy centers, and putting us on a path to net-zero carbon dioxide ("CO₂") emissions by 2050. Our 2020 Integrated Resource Plan ("IRP") represents a step change in the execution and realization of the generation strategy that has guided our resource planning for most of the last decade, with its stated objectives being to:

- 1) Operate our energy centers safely, economically, and in an environmentally responsible fashion while transitioning the generation fleet
- 2) Create and capitalize on investment opportunities that are beneficial to customers, investors, our communities, and the environment
- 3) Maintain financial, technical, regulatory, and environmental flexibility

Three years ago, we announced an evolution in our plan to execute our generation strategy and further these objectives, including being among the first in our industry to establish commitments to significant long-term reductions in CO₂ emissions. That plan included the addition of 700 megawatts ("MW") of new wind generation in Missouri, and by early next year that wind generation will be in operation and providing clean energy to our customers. Ameren Missouri's innovative new plan goes significantly further, setting forth a transformation of our generation portfolio that is expected to include 5,400 MW of wind and solar generation by 2040, see the retirement of all of our remaining coal-fired generation by 2042, and achieve net-zero CO₂ emissions by 2050. In doing so, we will also support the decarbonization of our region's economy through efficient electrification of transportation and other sectors that currently require fossil fuels. The timeline on page 2 highlights the key elements of our plan.¹

¹ In-service dates are approximate and could change based on a number of factors. Assumes the addition of 800 MW of unspecified carbon-free generation in 2043 and extension of Callaway operating license beyond 2050.

Ameren Missouri's Generation Transformation Timeline



* Reductions are presented as of the end of the period indicated and based off of 2005 levels. Wind and solar additions, energy center retirements by end of indicated year.

† Projects expected to be substantially complete in 2020, fully in service in early 2021.

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Our plan represents a carefully considered balance of customer affordability, reliability, and environmental stewardship. It relies on the significant investments we are making to modernize our electric grid through our Smart Energy Plan to enhance reliability and unlock opportunities for customer energy efficiency, as well as greater levels of renewable energy and other distributed energy resources. Our goal of achieving net-zero CO₂ emissions also means that we will be actively supporting increased public and private investment in research and development of new energy technologies, such as hydrogen fuel and improved battery technologies, as well as constructive energy policies that support investment and allow us to continue to appropriately balance affordability, reliability, and environmental stewardship. Our plan will allow us to meet our customers' long-term energy needs in a way that is consistent with the objectives of the Paris Agreement and limiting global temperature rise to 1.5 degrees Celsius and do so at the least cost to customers.

Embarking on this transformation now is particularly important. Not only does it begin to provide customers with even more energy from cleaner generation sources, it also mitigates risks associated with the kinds of clean energy policies we expect to be implemented in the next five years. At the same time, our plan allows us to maximize the value of our existing generating assets and ensure reliable service to our customers. Our current fleet of low-cost coal, gas, hydroelectric, and nuclear generators is foundational to our ability to provide reliable and affordable energy as we add greater and greater levels of renewable generation resources to our portfolio, with coal serving as a bridge to cleaner energy sources. Through our investments in grid modernization, clean renewable energy and the focused management of our existing portfolio, our plan delivers cleaner energy to our customers while ensuring continued reliability, and it does so at the least cost of any of the alternative pathways assessed.

The transformation of our generation portfolio will be achieved not only through actions Ameren Missouri takes, but through actions our customers take as well. Customers and communities have increasingly expressed interest in service options that allow them to manage their energy use, save money, and achieve their own clean energy goals. Experience with Commission-approved renewable subscription programs combined with our latest market research indicate significant customer demand exists for near-term access to renewable energy. Moreover, advancing investments in renewables to meet customer interest can reduce costs for all customers. To that end, our plan includes customer offerings of renewable energy, which will enable communities and customers to meet all or a portion of their energy needs with renewable energy resources. We will also continue to offer and expand on the popular energy efficiency programs that our customers have been using for years to save money and better manage their energy needs while enjoying the comfort and convenience they desire.

Integrated Resource Plan Highlights

- Ameren Missouri is transforming its generation fleet to a cleaner and more diverse portfolio in a responsible fashion, with a plan that best balances affordability, reliability, and environmental stewardship while addressing future risks.
- By 2030, Ameren Missouri plans to add 3,100 MW of wind and solar generation, representing an investment of approximately \$4.5 billion.² Wind and solar generation additions after 2030 will bring that total to 5,400 MW. These renewable resources will displace fossil-fueled generation across the region even as our own efficient and low-cost generation continues to provide reliable and affordable energy.
- The 2020 IRP includes the planned retirement of all of Ameren Missouri's coal-fired generating capacity by 2042. This includes retirement of the Meramec Energy Center by the end of 2022, the Sioux Energy Center by the end of 2028, two units at the Labadie Energy Center by the end of 2036, both units at the Rush Island Energy Center by the end of 2039, and the remaining two units at the Labadie Energy Center by the end of 2042. The collective result of these changes in retirements is a methodical drawdown of fossil fueled generation that ensures a stable transition to a cleaner energy future.
- The plan reflects our assumption that the operating license for our Callaway nuclear facility is extended beyond 2050, ensuring its ability to continue providing carbon-free electric energy around the clock.
- Ameren Missouri is targeting reductions in CO₂ emissions of 50 percent by 2030 and 85 percent by 2040 (based on 2005 levels), with a goal of achieving net-zero CO₂ emission by 2050. This represents a significant acceleration from the 2017 IRP, in which carbon dioxide emission reduction plans were 35 percent by 2030, 50 percent by 2040, and 80 percent by 2050, and more significantly mitigates near-to intermediate-term carbon regulation risks. Even as we achieve these more aggressive reductions in carbon emissions across our own fleet, our planned renewable resource additions will result in significant additional carbon emission reductions across the region.
- Ameren Missouri believes the cleanest and cheapest form of energy is the energy you do not have to produce in the first place. This is why the plan continues to include robust and cost-effective customer energy efficiency and demand response programs to help customers better control consumption and reduce their electric bills. By 2040, these programs are expected to result in nearly 2,000 MW of peak demand savings.

² Includes 700 MW of wind generation projects expected to be substantially complete in 2020 and fully in service in early 2021.

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- Ameren Missouri has also included in its plan electrification of transportation and other sectors. This is expected to result in significant reductions in CO₂ emissions in transportation and other sectors of our region's economy in addition to the emission reductions we will achieve with the transformation of our generation fleet.
- The plan provides for the continued development and deployment of smart grid, communications and other advanced technologies through our Smart Energy Plan, along with investments in transmission infrastructure, to enhance grid reliability, enable new products and services, and achieve greater operational efficiencies and greater access to cleaner sources of energy.
- The plan drives the creation of thousands of clean energy jobs in our region.

Ameren Missouri will continue to ensure that customers' long-term electric energy needs are met in a safe, reliable, affordable, and environmentally responsible manner. The company's IRP, filed every three years with the Missouri Public Service Commission, provides an assessment of the future electric energy needs of customers for the coming 20 years and the preferred plan for meeting those needs. Ameren Missouri's 2020 IRP represents a step change from the plan published three years ago, focusing on the transformation of our generation fleet to a cleaner and more fuel diverse portfolio in a responsible fashion, supporting customers' wants and needs.

Transformation Benefits

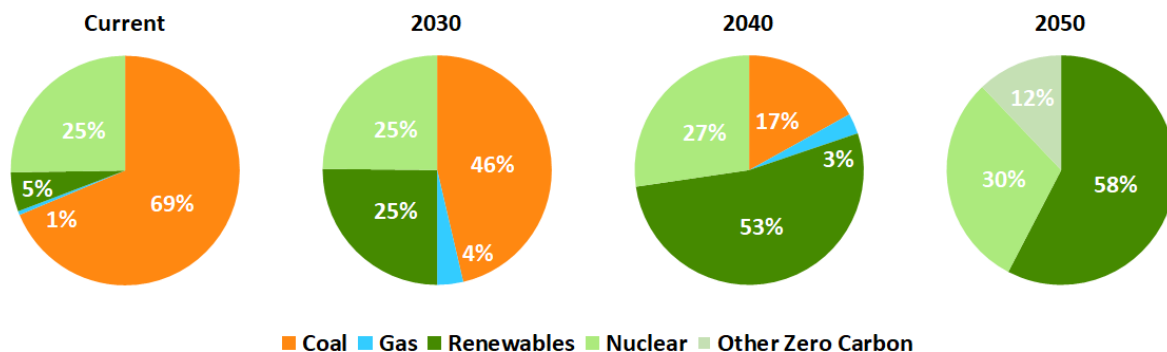
We have created this transformation plan through careful consideration of several key objectives we want to achieve on behalf of our customers, communities, investors, and the environment. Specifically, we evaluate each of a number of alternative resource plans based on:

- **Minimizing Long-term Customer Costs** – We measure the long-term costs to customers based on the present value of revenue requirements ("PVRP"), or the costs to be included in determining customer rates in the future expressed in today's dollars. Focusing on long-term costs helps us to ensure long-term affordability for customers.
- **Ensuring Customer Satisfaction** – This includes a number of factors such as rates, reliability, availability of energy efficiency programs, and access to cleaner energy sources.
- **Spurring Economic Development** – We assess economic development benefits based on the direct impact of our resource decisions on jobs in our region. To be sure, these are not the only benefits of our plan to economic development – thousands of indirect jobs are expected to be created as well – but they provide a strong indication of the relative benefits of our various alternatives.

- **Addressing Financial and Regulatory Risks** – Our ability to deliver benefits to customers is dependent in large measure on our access to low-cost sources of capital for investment. Therefore, we assess potential risks to our ability to access low-cost sources of capital.
- **Driving Portfolio Transition** – Assessing the relative benefits to our environment as we transition our generation portfolio includes consideration of air emissions, deployment of clean energy sources such as wind and solar, and other environmental factors.

As one might imagine, achieving such objectives requires careful balancing. Ameren Missouri uses a scorecard approach in selecting its preferred resource plan, evaluating each option based on its expected performance in achieving these objectives. Our transformation plan ensures reliable and affordable energy for our customers today, tomorrow and for decades to come.

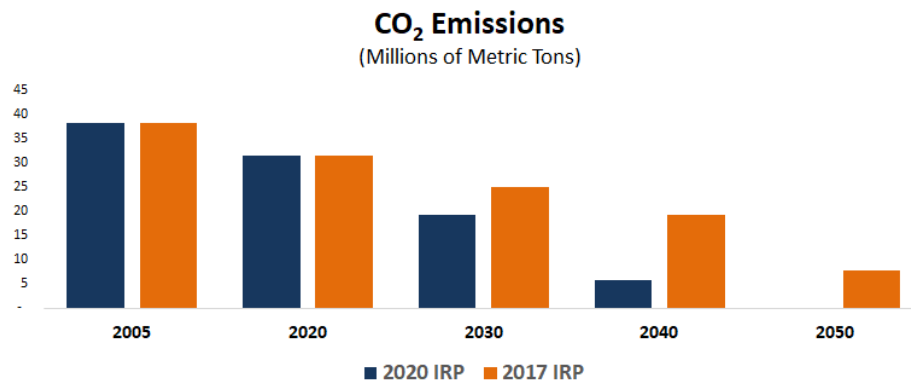
The deployment of new wind and solar resources allows us to take advantage of the continuously improving costs and efficiencies of these zero emission technologies. We are also able to take advantage of the availability of federal tax credits. At the same time, our existing fleet of generation resources continues to provide affordable energy to customers and ensure reliable energy is available around the clock as we add the renewable resources that will satisfy more and more of our customers' energy needs. Recent events in California, where a shortage of reliable capacity resulted in disruptions in service to customers, serve to highlight the need to be thoughtful about how we ensure the reliability of our generation fleet for our customers as we execute on our transformation plan. While an integrated resource plan typically focuses on the next twenty years, we are looking beyond that to ensure the plans we pursue will support our goal of achieving net-zero emissions by 2050. The figure below illustrates the transition of our portfolio over the next 30 years, with half the energy we generate coming from zero carbon sources by 2030.



As the figure above illustrates, we are executing on a transformation that will steadily replace fossil fuels with cleaner sources of energy. Beyond the obvious benefits to our

1. Executive Summary**Ameren Missouri**

environment, this also allows us to manage the costs and risks associated with expected future climate policy. Climate policy may take any number of forms, whether it be through a federal Clean Energy Standard, caps on CO₂ emissions, or a price on CO₂ emissions (e.g., a "carbon tax"). We expect that some form of climate policy will be enacted in the next five years. While we cannot know the exact timing or form of such a policy today, our transformation plan positions us to address potential costs and risks associated with potential policies that may be enacted. The figure below shows the reductions in CO₂ emissions achieved by our current plan compared to those achieved by our 2017 IRP.³



It is important to recognize that even as we manage the drawdown of coal-fired generators in our portfolio, these very assets, along with our existing gas, hydroelectric and nuclear generation, provide the foundation of reliable energy supply that allows us to expand our portfolio of renewable wind and solar generation. In that respect, our coal-fired generators serve as a bridge to the other technologies we will depend on in the future to ensure reliable and affordable energy supply.

Adding significant levels of wind and solar resources over the next decade provides significant benefits as the challenges for traditional generation sources increase. We also add flexibility to our portfolio, yielding options for how we manage the continued operation of our existing coal-fired energy centers to the benefit of our customers. This added flexibility not only helps to mitigate the risk of future climate policy, but also the risk of other factors that affect the economic performance of our generators, such as fuel prices and environmental regulations.

Near-term Implementation

As mentioned previously, the transformation of our portfolio will involve actions taken by Ameren Missouri and its customers. For example, Ameren Missouri has already initiated a request for proposal ("RFP") to solicit bids for new wind and solar energy. This RFP process will help us to identify wind and solar resources to produce energy for both

³ Plan emissions compared to 2005 Ameren baseline.

program subscribers and for all of Ameren Missouri's customers. Another way we will accomplish this transformation is by offering our customers and communities options to satisfy more of their energy needs with specifically renewable energy. A new renewable subscription program will build on the success of our subscriber and community solar programs and offer more options to customers and communities seeking to achieve their own clean energy goals.

In addition, Ameren Missouri recently received approval to extend its popular energy efficiency and demand response programs through 2022. That extension continues many existing programs for residential and business customers, while also expanding program offerings that address financial barriers to participation and ensure a more equitable distribution of demand side resources. This includes the launch in 2021 of a new Pay-As-You-Save ("PAYS") program, which will provide immediate access to holistic energy efficiency measures funded through on-bill payments, greatly reducing financing or capital constraints for customers. Through 2022, these programs are expected to save customers more than 3.6 million net MWh and create more than \$1.9 billion in benefits.

As Ameren Missouri's coal-fired energy centers approach the end of their useful lives, a key step in retiring the units is the assessment of resultant transmission infrastructure needs and the construction of that infrastructure. Our Meramec Energy Center will be retired by the end of 2022, and the process of putting new transmission system infrastructure in place to support grid reliability needs is underway. With the acceleration of the retirement of our Sioux Energy Center, we will now begin a similar process to support its retirement by the end of 2028. Continued expansion of transmission infrastructure will also be key to integrating renewable wind and solar generation as we transform our portfolio over the next thirty years.

As we implement these key steps in our portfolio transformation, we will also continue to monitor conditions that may affect our longer-term plans. This includes continually assessing the power market conditions that affect the economics of our planned generation portfolio, such as prices for coal, natural gas, nuclear fuel, and electric power. Similarly, it also includes monitoring expected customer demand and the adequacy and reliability of our portfolio resources to meet our customers' needs. It also includes advocating for constructive energy policies, including those that address investment in energy infrastructure, climate change, incentives for clean energy technologies, and environmental regulations. New technologies will be critical to achieving our goal of net-zero CO₂ emission by 2050, so we will be actively participating in efforts to help advance the development of technologies such as carbon capture and sequestration ("CCS"), the use of hydrogen fuel for electric production and energy storage, next generation nuclear, and large-scale long-cycle battery energy storage.

Key Considerations That Influence Our Planning

The development of our transformation plan was influenced by a host of factors and other considerations, with significant input from a broad and diverse group of stakeholders representing our customers, industry, and advocates for environmental justice, among others. Customer and investor interest in cleaner energy sources and reductions in CO₂ emission has continued to increase. Customers have expressed interest in cleaner energy options, with some seeking to achieve their own clean energy targets. At the same time, there is an increasing focus by energy investors on Environmental, Social, and Governance ("ESG") investing. This places additional focus and priority on transitioning to cleaner forms of energy in a responsible fashion, ensuring reliability, affordability, sustainability and environmental justice, and establishing supportive corporate governance mechanisms.

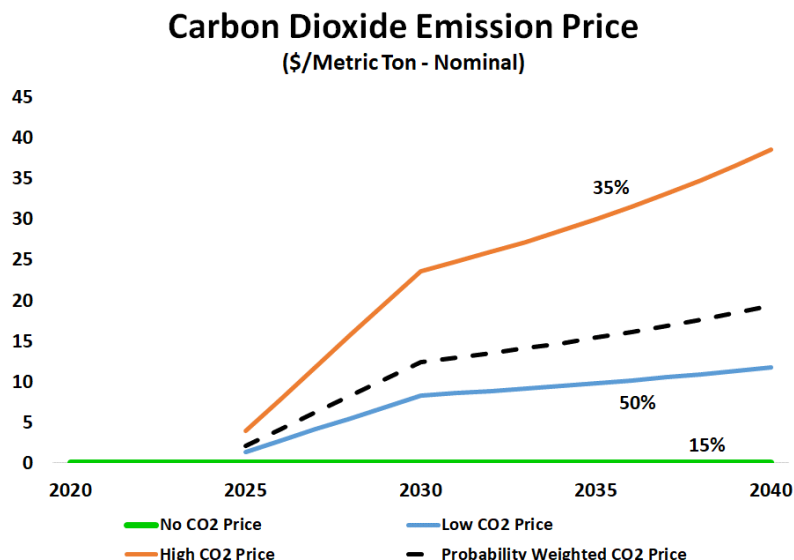
An increasing focus on cleaner energy also extends to sectors outside the power sector. Clean electrification has begun to transform the transportation sector, with more and more electric vehicle models to choose from and conversions of industrial forklifts and other off-road vehicles to electric options. Uses of fossil fuel in other sectors of the economy will see the potential for electrification as well, including cooking, space heating, and industrial processes. The electric utility industry will play an indispensable role in the decarbonization of a number of sectors of the economy through electrification and electric customers will benefit from a larger base of sales to support current and future investments needed to serve our customers for the next twenty years and beyond.

Cleaner energy technologies will clearly play a pivotal role in supporting these trends in customer and investor needs. We have witnessed a rapid decline in the cost of wind and solar technologies, and we expect the costs of those technologies will continue to decline in real terms. We are also seeing rapidly improving costs for battery storage technologies and improvements in efficiency and performance. While battery storage technologies are still relatively costly today, we expect they will increasingly play a role in the integration of intermittent renewable energy resources as wind and solar are added to the grid and older fossil-fired generation is retired.

Trends in customer demand will continue to drive our outlook for the need for generation resources. This includes the electrification trends mentioned earlier along with continuing improvements in energy efficiency. Underlying economic trends are expected to produce modest increases in demand, and while the current pandemic is expected to continue to have significant short-term impacts on customer demand, the longer term impacts are not known.

In addition to the trends in customer and investor attitudes and preferences, we must also consider the potential for changes in energy policy. One of the areas of great potential impact related to energy policy is that of addressing the risks of climate change. While we

do not know what form climate policy will ultimately take, we can represent the expected economic impacts using a price on CO₂ emissions. The CO₂ prices shown in the chart below are those we have utilized in our planning analysis to represent the effects of potential future climate policy, including our assumption for the probability of each of three price scenarios and the probability-weighted price represented by the dashed line.

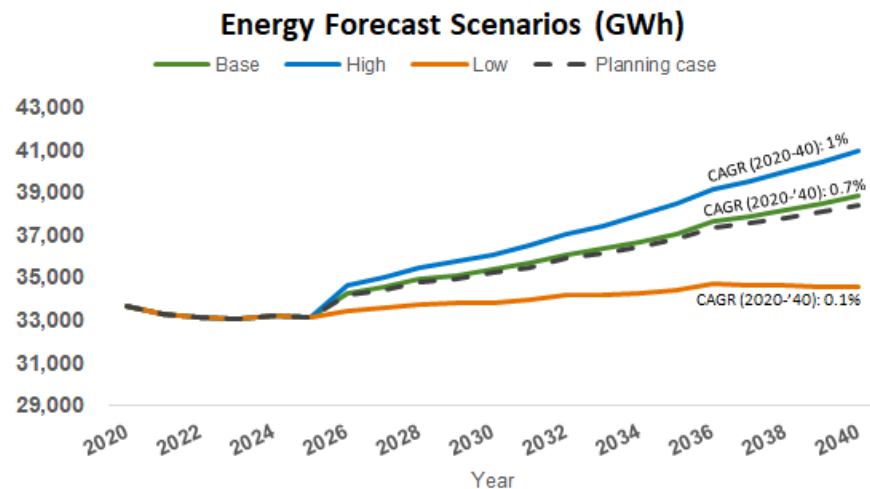


Other policies that could affect our planning include more stringent regulation of hydraulic fracking used to extract natural gas and policies promoting electrification of transportation and other uses of fossil fuels. They also include policies to incentivize the deployment of clean energy, such as production tax credits, investment tax credits, and potential changes in regulation of power plant emissions, water use and waste handling. We also consider potential changes to Missouri's renewable energy standard ("RES"), which was passed in 2008 and called for utilities to generate or acquire renewable energy equal to 15% of its customer usage by 2021. With the completion of the 700 MW of wind generation called for in our 2017 IRP, we will achieve this goal. With the continued reductions in the cost of renewable energy sources and increasing demand for cleaner energy sources, there is potential for a change in the RES to achieve even higher levels of renewable energy.

A number of future market conditions also have an influence on our planning, and we have examined ranges of possibilities for such factors to test their potential to impact our planning decisions. These factors include prices for natural gas, electric power, and the cost for debt and equity capital to fund necessary electric infrastructure investments. The cost and reliability of our existing fleet of generation resources is also important as we consider the specific actions necessary to implement our transformation. We will also continue to evaluate the potential need for, and cost of, transmission infrastructure necessary to deliver greater and greater amounts of renewable energy to our customers.

Our Customers' Future Energy Needs

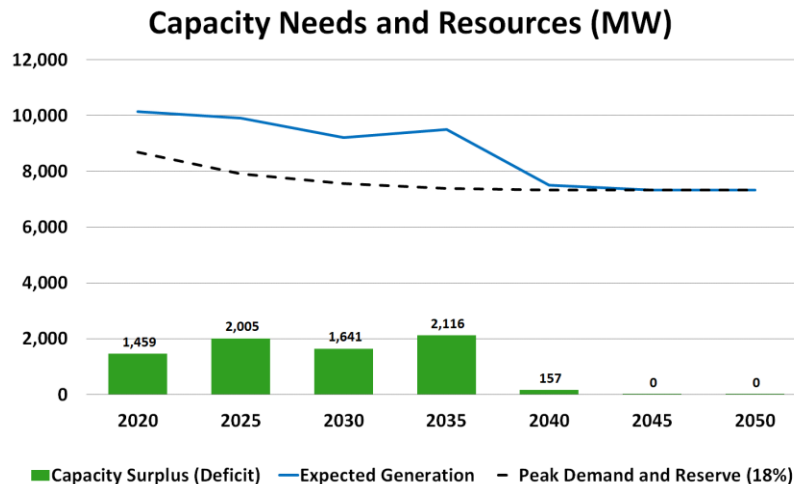
We expect base customer demand to grow over the next twenty years at an annual growth rate of 0.1 percent to 1 percent, before the inclusion of savings from our energy efficiency programs. This includes consideration of customer-owned distributed energy resources ("DER") like rooftop solar, growth in electric vehicles, and other efficient electrification. We have examined future demand under three different scenarios representing different assumptions for economic conditions, electrification, and customer adoption of DER. The chart below shows the range of customer demand we have analyzed in assessing future resource needs and costs.⁴



To ensure reliability, we must have sufficient resource capacity to meet our customers' peak demand, generally on the hottest day of the year, plus a reserve margin to account for uncertainty. The figure below shows our planned generation capacity, load, and reserve margin requirement.⁵ It includes peak demand savings from energy efficiency and demand response programs. Any capacity beyond our load and reserve margin is assumed to be sold, with the revenues offsetting costs on customer bills. Our capacity length throughout most of the next twenty years provides us with significant and important flexibility to respond to emerging trends, changes in market conditions and changes in energy policy. This flexibility allows us to carefully consider all options and execute on those that are most beneficial to our customers. Without that flexibility, our options at any given time will be more limited. In the future, we will also assess the need to add capacity in 2040 and beyond should greater flexibility be needed.

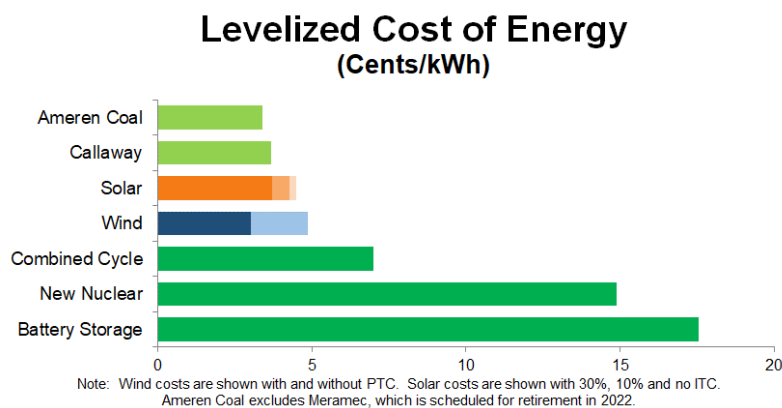
⁴ For each customer demand scenario the compound annual growth rate ("CAGR") is shown.

⁵ Reflects market purchases of capacity in 2045 and 2050, each less than 300 MW.



Options for Meeting Our Customers' Needs

We examine a number of options for meeting customer's future needs as existing resources are retired. These include renewable wind and solar, energy storage, gas-fired, and nuclear resources. One measure of the long-term cost of various generation resources is the levelized cost of energy ("LCOE"). The LCOE for the key resource options we have considered is shown in the chart below as compared to the cost of our existing coal and nuclear generation resources.



The LCOE includes all the costs of ownership and operation of a particular resource over its expected operating life per unit of energy produced. While LCOE does not capture all of the relative strengths of each generating technology, it provides a useful indication of the relative cost of energy. We test each of these options through more rigorous analysis that captures all of the costs and benefits of each resource type. We do this by evaluating various alternative resource plans that rely on different combinations of these resources. Using those results and our plan selection scorecard, we are able to consider each of the plans based on its performance against the objectives in our scorecard.

Conclusion

Our plan meets our customers' needs reliably and affordably, maximizing the value of our existing resources as we incorporate cleaner renewable energy aggressively to transform our portfolio in a forward-thinking manner. Our plan to transform our portfolio over the next thirty years will drive significant investment in renewable energy, significantly reducing carbon emissions until ultimately reaching net-zero CO₂ emission by 2050, and create thousands of good-paying jobs while continuing to ensure that the energy we deliver is reliable and affordable for our customers. It is an innovative plan that looks to deploy cutting edge clean energy technologies in the future. In addition, the plan provides much needed flexibility to address changes in the energy marketplace. Further, our plan also positions us to help drive the decarbonization of the broader economy in our region, adding clean renewable resources that can replace the fossil fuels currently used for transportation, and other applications. The utility industry will play a vital role in transforming how energy is used, and Ameren Missouri is taking action to make that a reality for our customers, our shareholders, the communities we serve, and the environment.