BEFORE THE PUBLIC SERVICE COMMISSION OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's 2023 Utility Resource Filing Pursuant to 20 CSR 4240 – Chapter 22	)))	Case No. EO-2024-0020

COMMENTS OF RENEW MISSOURI ADVOCATES

COMES NOW, Renew Missouri Advocates d/b/a Renew Missouri **(**"Renew Missouri") and, offers the below comments in response to the Triennial Integrated Resource Plan ("IRP") filing of Union Electric Company d/b/a Ameren Missouri (herein referred to as "Ameren Missouri," "Ameren," or "the Company").

The below comments were prepared by Renew Missouri staff, and reflect our organization's reactions to and opinions on the Company's most recent IRP. In addition, Renew Missouri would like to draw the Commission's attention to those comments submitted in this case on behalf of the Sierra Club, the Natural Resources Defense Council, Council for the New Energy Economics, Clean Grid Alliance, and Grain Belt Express, LLC.

All communications and inquiries regarding the below comments, and any other communications to Renew Missouri relevant to this case, should be directed to the following individuals:

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Renew Missouri appreciates the opportunity to share these comments, and welcomes further discussion.

I. Introduction

While Renew Missouri sees optimism with portions of Ameren Missouri's preferred Integrated Resource Plan ("IRP"), the tenor of our comments must be tempered by disappointment with the overall direction that Ameren Missouri proposes. Specifically, and in relation to the Company's 2021 IRP filing, the Company reduces the amount of wind and solar additions by 4,300 MW, and delays several coal unit retirements. Although this IRP continues a move towards a carbon-free generation fleet by 2045, this filing leaves significant gaps. This IRP fails to specify how 2,400 MW of "clean, dispatchable resources" will be produced in the 2040s while exposing ratepayers both to vulnerabilities and avoidable costs through its heavy reliance on new natural gas.

While Ameren scales back solar investments, it focuses on building new gas with Carbon Capture Usage and Storage ("CCUS") as well as Carbon Capture Storage ("CCS"). Instead, the Company should commit to greater investment in energy efficiency, new renewable facilities (i.e., solar and wind), grid-scale battery storage, and other demand-side resources and demand-side management programs to maximize what can be achieved prior to costly investments in new fossil fuel-burning generation plants.

However, despite certain weaknesses, Renew Missouri is heartened by the Company's commitment to energy efficiency and demand response programs, as well as an accelerated investment in grid-scale energy storage than previously planned. Renew Missouri continues to advocate for Ameren Missouri to proceed in making these investments, particularly as the energy landscape has evolved since the Company filed its 2021 IRP. Importantly, the 2022 Federal Inflation Reduction Act ("IRA") has made investments in new renewable generation and battery storage more attractive than ever before, in part through the improved and expanded Federal solar Investment Tax Credit ("ITC") and Production Tax Credits ("PTC"), but also through new programs that facilitate the transition to a clean energy economy. Ameren Missouri must do everything it can to deliver these energy cost savings and other benefits to its customers as soon as possible and before the provisions of the IRA expire.

Renew Missouri offers these comments to provide further detail for our positions, and to identify additional concerns the Company should address. Our comments primarily concern chapters 6-9 of the IRP. These are meant to aid the utility in developing a resource acquisition and management strategy that fulfills the objectives of Chapter 22.

CHAPTER SIX

III. New Supply Side Resources (with Emphasis on IRA and the EIR program)

Ameren Missouri has evaluated a wide range of different resources and technologies involving new supply-side resources. Renew Missouri is encouraged by the consideration and inclusion of the Federal PTC and ITC tax credits for new renewable energy resources. However, the Company's analysis for renewable energy projects does not take full advantage of the tax credits modeled. For example, the ITC model estimates savings of up to only thirty percent of the project's estimated value. While it is necessary to evaluate these tax credits for utility scale renewable resources, Ameren is missing an opportunity to evaluate smaller renewable projects – as well as other statutorily-authorized options that can qualify for far greater ITC values. The IRP should include analysis for projects utilizing the forty and fifty percent tax credit rate, such as those generating less than 5MW projects in Low-to-Moderate Income ("LMI") communities, qualified low-income residential building projects, as well as qualified low-income economic benefit projects. There are qualified communities and properties within Ameren Missouri's service territory that qualify for these larger tax credit amounts, which should be evaluated to fully-capture the true value offered by the IRA for investments in solar generation.

The IRA also includes increased funding for the Department of Energy's Loan Programs Office ("LPO") to support loan guarantees through the Energy Infrastructure Reinvestment program ("EIR").[1] The EIR is authorized to offer loan guarantees for energy infrastructure-related projects that replace existing fossil fuel electricity generation, repurpose existing fossil-based infrastructure, replace older renewable assets, or upgrade existing operations (including any site remediation).[2] This funding stream for such activities would expedite these developments and create synergies with any project located in LMI communities to earn a 40-50% ITC, in addition to other qualified low-income economic benefit efforts. Furthermore, the ITC includes adders of ten percent each for projects that utilize domestically-sourced material and that adhere to labor standards specified by the U.S. Department of Energy.

Another important factor to consider is the ability to fast track interconnection of renewable energy systems that are less than 5MW. FERC Order 792 specifically reforms the following:[3]

> [*P*]*ro forma* Large Generator Interconnection Procedures, *pro forma* Small Generator Interconnection Procedures, *pro forma* Large Generator Interconnection Agreement, and *pro forma* Small Generator Interconnection Agreement to address interconnection queue backlogs, improve certainty, and prevent undue discrimination for new technologies. The reforms are intended to

[1] See Section 1706 of the Inflation Reduction Act.
[2] In fact, this can be used to help reduce ratepayer cost for ongoing and future securitization dockets as the EIR can be used to use government-backed bonds to help utilities rid themselves of undepreciated assets off their books. But only in a limited fashion as this opportunity ends in 2026. All the more reason for Ameren to accelerate coal plant closures.
[3] Summary provided by the Federal Registry, dated November 6th of 2023. See also: https://www.federalregister.gov/documents/2023/09/06/2023-16628/improvements-to-generator-interconnection-procedures-and-agreements

ensure that the generator interconnection process is just, reasonable, and not unduly discriminatory or preferential.

The reforms under FERC Order 792 would make a 50% ITC-eligible project even more beneficial to the Company, as it would allow for fast-track approval under MISO and would make such a project operational sooner than previous regulations would allow.

In addition to expanding its analysis to take advantage of the full ITC potential and the new regulations for interconnection, the Company should consider new wind resources with a higher capacity factor, especially if the Company continues to consider wind projects located in Kansas (as they have historically). The value for Assumed Annual Capacity Factor percentages for wind as a resource in Ameren's "Chapter 6 Appendix A (Table 6A.2)" is conservatively estimated at 42%. That current value is consistent with the existing High Prairie Renewable Energy Center located *in Missouri*, but a wind capacity factor would be closer to 52% for future wind projects located *in Kansas* (as for the Atchison Renewable Energy Center).[4]

IV. Hydrogen

As a final comment on new supply side resources, Ameren Missouri modeled a role for hydrogen, as the Company anticipates "some combination of alternative fuels (e.g., hydrogen …)" beginning in 2035 and which is further discussed in chapter nine.[5] Here, the Company conducted an analysis of hydrogen and methane gas blends of 20% hydrogen.[6] However, hydrogen and methane gas blends of more than 15% hydrogen are deemed unsafe without major upgrades to pipelines and associated infrastructure due to the ability of hydrogen to embrittle steel pipelines, among other things.[7]

The cost of producing hydrogen, upgrading pipelines, and investing in associated infrastructure is likely to make hydrogen cost-prohibitive on a per MWh basis. We recommend the Company first pursue cost-effective wind and solar at scale, as well as the distributed energy resources discussed below, before seriously pursuing hydrogen as a generation resource.

[4] Draxl, C., B.M. Hodge, A. Clifton, and J. McCaa. 2015. *Overview and Meteorological Validation of the Wind Integration National Dataset Toolkit* (Technical Report, NREL/TP-5000-61740). Golden, CO: National Renewable Energy Laboratory.; Draxl, C., B.M. Hodge, A. Clifton, and J. McCaa. 2015. "The Wind Integration National Dataset (WIND) Toolkit." *Applied Energy* 151: 355366.; King, J., A. Clifton, and B.M. Hodge. 2014. *Validation of Power Output for the WIND Toolkit* (Technical Report, NREL/TP-5D00-61714). Golden, CO: National Renewable Energy Laboratory.
[5] Ameren's 2023 IRP. See Ch. 9, Integrated Resource Plan and Risk Analysis, p.15.
[6] Ameren's 2023 IRP. See Ch. 6, New Supply Side Resources, p.24.
[7] U.S. Dept. of Energy. Office of Energy Efficiency & Renewable Energy. "Hydrogen Pipelines." 2024. Accessed at: https://www.energy.gov/eere/fuelcells/hydrogen-pipelines

CHAPTER SEVEN

V. Distributed Battery Storage, Virtual Power Plants, and Distributed Solar.

a. Distributed battery storage.

Ameren Missouri has put forth a robust plan to expand transmission projects and to invest in associated infrastructure throughout their service territory, which Renew Missouri fully supports. Yet, despite the strong market and potential benefits for peak load management, Ameren's IRP lacks any residential and commercial battery storage programs that could help the utility avoid or defer infrastructure investments, including new generation.

Industry forecasts predict that behind-the-meter ("BTM") storage deployment will double that of grid-scale storage deployment over the next three to four years.[8] As submitted, the IRP only includes battery storage among a long list of other demand response measures in the base case analysis, noting vaguely that residential customer-sited batteries could be dispatched during "critical peak hours".[9] Regarding Ameren Missouri's Market Potential Study conducted for years 2024-2043, the Company should have explicitly studied the impact of BTM energy storage on the Company's peak load, and we encourage the Company to go back to the drawing board to do so.

Residential customer battery storage programs are cropping up across the nation. For example, the Energy Storage Solutions program in Connecticut, launched through the state's Green Bank in 2022, provides commercial, industrial, and up-front residential incentives for battery storage systems that customers can pair with the 30% Federal ITC.[10] The storage system incentives are also available to low-income customers and underserved communities, including to renters in multi-family affordable housing properties.

Duke Energy received recent approval to offer the "PowerPair" program for solar-plus-storage projects, including a $9,000 rebate only available to residential customers that have both solar and battery storage systems installed. In exchange for their use of the storage systems, program participants allow Duke to remotely call on the batteries for up to 80% of their charge, which gives Duke flexibility to dispatch power from these batteries as needed for the broader system. A control event can be called eighteen times during the winter, nine times during the summer, and

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[8] Wood Mackenzie Power & Renewables/American Clean Power Association. "U.S. Energy Storage Monitor: Q4 2023 Executive Summary." (December 2023). Accessed at: https://www.woodmac.com/industry/power-and-renewables/us-energy-storage-monitor/

[9] Ameren's 2023 IRP. See Table 8.10: Demand Response Options, Base Case 2023 MPS, p. 29. Other measures studied included: residential and commercial energy efficiency, demand response peak load reduction, distributed energy resources, and sensitivity and scenario analyses.

[10] (i) See Kavya Balaraman. Utility Dive. "Connecticut Beefs Up Energy Storage Incentives to Meet 1 GW Goal by 2030". (January 23, 2023). Accessed at: https://www.utilitydive.com/news/connecticut-energy-storage-battery-incentives-eversource-united-illuminating-pura/705273/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202024-01-24%20Utility%20Dive%20Newsletter%20%5Bissue:58444%5D&utm_term=Utility%20Dive (ii) See Connecticut Public Utilities Regulatory Authority Docket No. 23-08-05. Annual Energy Storage Solutions Program Review – Year 3. (November 29, 2023).

nine times total in the fall and spring. Participating customers receive an additional incentive on their monthly bill for the battery control components. Ameren should consider a similar program approach to incentivize the coupling of home storage systems with residential solar systems.

Closer to home, Evergy Missouri received Commission approval in 2022 to implement a residential battery storage pilot program to install fifty residential storage systems for 800 kWh of total storage capability.[11] Customers participating in the Home Battery Storage Pilot must pay a monthly fee of $10 and allow Evergy to monitor and control the system for the duration of the pilot, which ends in 2026.[12] Participants have the option to purchase the battery at its depreciated value once the pilot ends, to maintain home use of the battery in exchange for allowing Evergy to continue monitoring usage data and controlling the system, or to have the system removed.

The increased deployment of electric vehicles will provide a future opportunity for vehicle-to-grid bidirectional use. This will allow electric utilities to dispatch power from the EV batteries of fleet vehicles and residential EVs during specific periods of the day. Thus, the Company should also prepare to offer a dispatchable EV battery program in the near future.

b. Virtual Power Plants.

As technology continues to advance, new opportunities will proliferate for electric providers to interact with customer-owned home battery storage systems and the battery systems associated with electric vehicles. Utilities across the United States are evaluating how to integrate these technologies into new or existing programs, which create new virtual power plant ("VPP") opportunities. VPPs can support the Company's resource adequacy imperative by integrating solar-plus-battery storage programs that shift demand to better align with supply availability. For example, VPPs can increase transmission and distribution efficiency by smoothing out peaks when dispatchable batteries from across the system are strategically deployed to defer investments in specific parts of the Company's transmission system. Therefore, VPPs provide affordability benefits to ratepayers by allowing utilities to defer future transmission and distribution upgrades and avoid fuel costs, while compensating customers for participation in demand-side or Time-Of-Use ("TOU") programs. VPPs will ultimately create increased reliability and resiliency by integrating dispatchable battery storage programs with existing demand-side generating activities.

However, VPPs are not limited to storage applications and should be evaluated in a few other ways. The more readily available application of VPPs is for smart thermostats to pre-heat or pre-cool buildings and homes during off-peak hours to reduce demand surges over periods of two to four hours. Similarly, smart water heaters or heat pumps can be controlled remotely to pre-heat water during peak demand periods. Both programs should be viable after the Company finishes deploying smart meters to all residential customers.

Towards the ultimate end of integrating VPPs into its system, Ameren Missouri must evaluate how VPPs will operate in its existing customer base. As noted above, the Company's Smart

[11] Missouri Public Service Commission Case No. ER-2022-0130. Filed January 7, 2022.
[12] Evergy Missouri. Battery Storage Pilot Program. 2024. Accessed at: https://www.evergy.com/ways-to-save/programs-link/battery-storage-program

Energy Plan indicates all Ameren Missouri customers will have a smart meter installed by the end of 2024. These devices will facilitate the integration of demand-side resources, including EVs and home battery storage systems, into the Company's operations.

Finally, it is also important to note FERC Order 2222 can help with the deployment of VPPs. While specifically targeting the proliferation of distributed energy resources ("DERs"), FERC Order 2222 will allow VPPs to compete with conventional resources in wholesale markets, and the Order motivates the creation of more programs and incentives to encourage VPP project development. In areas served by vertically integrated utilities without trading options, as is the case with Ameren Missouri, there is less incentive to support VPP project development. In other words, allowing participation in wholesale markets motivates more VPP programs because it allows the resources to interact with the grid in more ways and to earn revenue by doing so.[13]

c. Distributed solar.

Regarding customer-owned solar, Renew Missouri would like to reiterate here the argument that all rate design options be offered to all customers. This necessarily includes making TOU rates available to net-metered solar customers, as the Net-Metering and Easy Connection Act requires that utilities offer the same rates and rate structures as if they were non-net metered customers. (see §386.890.3, RSMo.) Renew Missouri submitted testimony through its witness and its Executive Director James Owen in File No. ER-2022-0337 explaining the reasoning behind this position. In that case, the Commission ordered Ameren Missouri to conduct a study on how to integrate TOU rates and distributed generation technologies. Ameren has expressed a willingness to accomplish this integration if some of the perceived technical, billing, and legal barriers can be overcome. We hope to continue working in this area with the Company, and we await the above-referenced study prior to the Company's next general rate case.

We would like to refer Ameren Missouri and other interested parties to Evergy's recent study (stemming from rate case language similar to that in the Commission's Order), which essentially concluded that there are no technical or billing barriers to integrating TOU rates and net metered solar systems, but rather that Evergy considers only the legal question to be a barrier. This specific legal issue (i.e. whether the Net Metering and Easy Connection Act, §386.890, RSMo., allows TOU rates and net metered solar to coexist), has been briefed in File No. ER-2022-0337, but did not receive a final Commission determination. Perhaps the best way to resolve this common issue across Missouri's electric utilities is to seek a legal determination from the Commission.

Beyond this legal argument, we reiterate the need for Ameren Missouri to model the potential for integrated solar and storage programs to aid with existing transmission and distribution needs, and to defer or replace investments planned for in this IRP. We argue that Ameren should develop both residential and commercial demand-side offerings for retail customers, including incentives for DERS, adding battery storage and solar to the Company's Pay-As-You-Save ("PAYS") financing options, and seeking Commission approval for battery storage and EV pilot programs.

[13] "Virtual Power Plants and Energy Justice" by Brittany Speetles, Eric Lockhart, and Adam Warren. National Renewable Energy Laboratory. Technical Report 7A40-86607 October 2023

CHAPTER EIGHT

VI. Demand-Side Resources and Management

Renew Missouri applauds Ameren for more than a decade of successfully delivering energy efficiency resources to its residential and C&I customers. Since 2013, Ameren's portfolios of programs approved pursuant to the Missouri Energy Efficiency Investment Act (MEEIA) have captured many GWh of energy savings, as well as demand reductions equivalent to multiple power plants. Ratepayers will experience these investments long-term, and participating customers have homes and business that cost less to operate and are worth more.

We encourage Ameren to continue modeling aggressive energy efficiency and demand response programs as part of the IRP process. The Company's most recent Market Potential Study identified more than 6,000 GWh of potential energy savings and about 2.5 GW of potential demand reduction through 2043. Renew Missouri believes the Maximum Achievable Potential ("MAP") scenario is a worthy goal for the Company to pursue long-term. While the Realistic Achievable Potential ("RAP") scenario may appear a more accurate portfolio given market and regulatory constraints, we feel that RAP underestimates potential.

To begin, new technologies could unlock significantly more potential than is currently estimated. We have not yet begun to realize the potential advanced smart meters offer. Given the proper software tools and sufficient market data, it may become possible to target individual businesses and homeowners for HVAC, insulation, and appliance replacement, reinventing how demand-side management ("DSM") is marketed and delivered. The next two decades will see a dramatic spike in the applications of artificial intelligence, which could revolutionize building science, industrial processes, and data analytics. There is a role for utilities to incentivize more efficient options as businesses retool their operations and as new buildings are constructed. Many states and IOUs are developing approaches for the next era of DSM, and Missouri's electric utilities should be ready to implement successful models as they are proven.

In addition, market conditions are likely to change in a direction that supports more DSM potential. Rising utility costs will cause more measures to become cost-effective, enable higher incentives, and create more customer awareness and interest in energy savings options.

Next, given current scientific projections, Missouri is likely to see warmer winters and hotter summers in the coming decades. Coupling that with an increase in electrified appliances and electric vehicles ("EVs") will result in higher demand. These conditions are more favorable to the installation of air source heat pumps, which work best in climates that don't have significant periods below freezing. As the Federal government continues to encourage electrification, we may see more electric products and appliances in new construction or remodeling projects. We are likely facing an historic opportunity to incentivize the higher-efficiency electric heating option in heat pumps.

Finally, as prices decline and the market matures for distributed technologies like battery storage and EVs, it may become possible to achieve widespread participation in demand response

programs and analogous approaches to reducing demand. (see below: Residential Rate Design and Distributed Generation.)

With respect to the IRA, Missouri stakeholders are discussing whether MEEIA should continue in the same form. Some claim the IRA's incentives for homes and businesses obviate the need for utility-sponsored DSM portfolios. Some take issue with attributing savings to utility programs if they were to be used in combination with Federal incentives. Renew Missouri wishes to state its position that MEEIA should continue regardless.

Alarmingly, the money promised by IRA is far from guaranteed. The State's Division of Energy ("DE") will need to apply for each pot of available funds from the Federal Department of Energy. Funding applications are due in January 2025. Given current progress, it is possible DE will be unable to meet this deadline.

Additionally, the political situation may drastically change within the year, given that a new Governor and potentially a new President will be sworn in at the same time this application is due. The political situation may require a new plan from DE or even a significant rollback of the IRA. In short, it is far from certain that IRA funding for home energy rebates will ever reach Missouri, and if they do, they may not be available for Missourians to apply for until 2026.

Even assuming the existence of the IRA, Renew Missouri maintains that Missouri's electric utilities are essential to the delivery of energy efficiency programs. Utilities are often the first entities customers turn to when considering how to lower their bills. Without a role for utilities in the delivery of energy efficiency, it is unlikely the IRA's hundreds of millions that are allocated to Missouri will be spent. Especially in the case of low-income programs, the combination of IRA incentives and utility programs should be uncontroversial. The MEEIA statute specifically states that programs targeted to low-income customers need not adhere to the same cost-effectiveness requirements, so there should be less concern about attribution.[14] Also, using both incentives in combination could allow the hardest-to-reach customers to finally experience the full benefits of MEEIA by avoiding some or even all of the upfront cost of measures.

It is also worth reminding the Commission the IRA is temporary. In the 2030s, there will remain significant energy and demand savings potential. Ameren Missouri has spent a decade and a half hiring an energy efficiency team, building a brand, learning about the market, and developing trade ally networks. This represents energy efficiency delivery infrastructure that could very well be squandered if MEEIA is discontinued or diminished.

VII. Low-Income Energy Efficiency Program Marketing

Effective marketing and outreach on Ameren's energy efficiency offerings is vital for customer and low-income program participation. According to a 2023 report from the American Council for an Energy Efficient Economy, Ameren allocates only 11.99% of its energy efficiency spending for low-income programs, significantly less than the 25% spent by the nation's highest

[14] Section 393.1075, RSMo.

achieving utilities.[15] Given that Ameren provides fewer energy efficiency resources to its low-income customers than its peers, targeted community engagement, especially with low-income groups, is even more essential to achieving higher participation rates in the programs that do exist. This under-resourcing is particularly evident in certain geographic areas and neighborhoods within the St. Louis Metropolitan Area. Given certain zip codes have higher percentages of energy burden households, Ameren should develop a marketing and outreach strategy specifically targeting these high-energy burdened neighborhoods, incorporating the community engagement strategies listed below. Thusly, Ameren should conduct regular reviews of their energy efficiency portfolio to specifically look at LI and LMI participation rates. These reviews should inform marketing strategies to increase participation.

Renew Missouri is worried eligible customers are not being effectively reached with Ameren's current strategies. For example, many low-income renters may not be exposed to trade allies, creating a marketing and education gap this large sub-sect group of Ameren customers. We recognize Ameren's efforts in creating relationships with community-based organizations (CBOs) through their Community Voices Workshops. However, Renew Missouri proposes Ameren continue to grow their targeted and bi-directional marketing approach for their outreach and communications efforts. Specifically, we encourage Ameren to strengthen and expand their existing relationships with CBOs to ensure active community representation. Some suggested activities include:

- Hosting meetings at easily accessible locations for low-income community members (e.g., churches and libraries);
- Compensating low-income community members for their participation;
- Providing funding or support to municipal, nonprofit, or CBOs to facilitate equitable energy efficiency program delivery;
- Inviting CBO representatives to co-run meetings or participate as panelists or advisory board members;
- Utilizing an independent monitor to ensure adequate representation of low-income community members;
- Leveraging CBOs with existing relationships with low-income community members to enhance participation; and
- Partnering with CBOs that cater to non-English speaking populations to assist with program education.

Renew Missouri also encourages Ameren to develop and expand bilingual communications in their marketing plans. It is important for the utility to identify the languages needed in their service territory and take action to expand multi-language access. In Ameren's service territory, two to four percent[16] of the population may have limited English proficiency and the lack of bilingual communications poses a barrier for these customers in making well-informed decisions about participating in energy efficiency programs or understanding billing information.

[15] American Council for an Energy Efficient Economy. 2023 Utility Energy Efficiency Scorecard. (2023). P.58. Accessed at: https://www.aceee.org/sites/default/files/pdfs/U2304.pdf

[16] Missouri Language Diversity. 2023. Missouri Economic Research and Information Center Accessed at: https://meric.mo.gov/data/many-languages-missouri

CHAPTER NINE

VIII. Planned Investments in New Natural Gas Generation

As stated in our introduction, Renew Missouri is alarmed by the reductions in new renewable energy generation and simultaneous investments in new natural gas plants included in Ameren's Preferred Plan. Investment in new gas plants is risky from economic, environmental, and societal perspectives. Of course, reliable and dispatchable resources like grid-scale energy storage are of critical importance and we applaud the Company's plan to add 800 MW of storage by 2035. As with many new clean energy investments, project timing will be a critical factor in securing the best outcome for the Company's customers with IRA financing now available.

Ameren's analysis includes different scenarios for investments in new natural gas generation assets over the next two decades. The plans include simple cycle natural gas ("SCNG") for peaking capacity, as well as combined cycle natural gas ("CCNG") projects both with and without carbon capture technologies. All of the twenty-three different alternative resource plans include an investment in 800 MW of SCNG in 2027, which the Company attributes to reliability concerns.[17] Many of the plans include between 1,200 MW and 6,600 MW of the more expensive CCNG for baseload purposes, from as early as 2028 through the 2040s. Ameren's Executive Summary (Ch. 1) states:[18]

> New dispatchable resources include 800 MW of simple cycle gas-fired combustion turbine generators by 2027, 1,200 MW of efficient gas-fired combined cycle generation by 2032, and 1,200 MW of as-yet-unspecified clean dispatchable generation in each of 2040 and 2043.

Renew Missouri has serious concerns about these potential generation additions, particularly those alternative resource plans that include thousands of MW of CCNG capacity. Our concerns include the devastating environmental and climate-related impacts associated with burning so much extracted natural gas. While natural gas proponents often tout that it emits 50% less carbon than coal, this only considers the end-use combustion of the fuel. In reality, natural gas emits methane and other greenhouse gases as well as CO_2 throughout its life cycle, from extraction through transportation and eventual use in homes and power plants. Natural gas is much closer to coal in terms of its emissions profile, and likely far worse; methane has over 80 times more climate warming potency than CO_2, a fact which is now coming into stark relief in the industry.[19] Methane is responsible for thirty percent of the rise in global temperatures since the Industrial Revolution and the energy sector accounts for nearly forty percent of those emissions.[20] Furthermore, even after more than fifty years of research and development, carbon capture has never been effective in reducing greenhouse gas emissions by more than a few percentage

[17] File No. EO-2024-0020, Ameren Missouri 2023 Integrated Resource Plan and Risk Analysis, Chapter 9, pg. 15.
[18] File No. EO-2024-0020, Ameren Missouri 2023 Integrated Resource Plan Executive Summary, Chapter 1, pg. 4.
[19] Rocky Mountain Institute, "Coal vs. Natural Gas," Available at: https://coalvsnaturalgas.org/
[20] Deborah Gordon, Frances Reuland, Daniel J Jacob, John R Worden, Drew Shindell, and Mark Dyson, "Evaluating net life-cycle greenhouse gas emissions intensities from gas and coal at varying methane leakage rates." 17 July 2023, Environmental Research Letters, Volume 18, No. 8. Available at: https://iopscience.iop.org/article/10.1088/1748-9326/ace3db

points.[21] Uncaptured combustion emissions from the gas used to power the capture technology and upstream emissions resulting from the continued extraction, processing, and transportation of natural gas contribute to a low rate of capture compared to the emissions produced.[22] If Ameren is serious about meeting its stated 2045 net-zero carbon emission goal, it cannot proceed with *any* of these combined cycle investments.

Renew Missouri's concerns are economic in nature as well. CCNG, as a more efficient baseload technology, has a far lower Levelized Cost of Energy than simple cycle. However, this assumes a full life cycle for the plants, which is far from certain. The changing pace and price of technology creates tremendous uncertainty when looking twenty years out. In particular, utility-scale battery storage and solar-plus storage are on steeply declining price curves (see "Grid-Scale Battery Storage" section below). If these technologies become widely adopted and deployed throughout the country for both baseload and peaking capacity, there is a strong possibility natural gas generation may not be able to compete and plants in service may become stranded assets. Natural gas is a volatile fuel when compared to the relatively predictable price declines for renewables and storage. The Company should not begin planning for thousands of MW of CCNG generation until it has no other viable options.

Renew Missouri and other clean energy advocates may be forced to accept certain realities about utilities' short-term obligations to maintain enough capacity to meet demand. However, Ameren's planned amounts of natural gas plant investments exceed the short-term need. Ameren Missouri's forecasted shortfalls in capacity increase significantly around 2036 or 2037, when the summer capacity shortfall is around 1,000 MW and the winter capacity shortfall is about 2,500 MW.[23] Prior to this jump, capacity remains fairly steady, with a shortfall of around 1,000 MW for the winter and less than 300 MW for the summer. This provides the Company more than a decade to model and prepare for better alternatives to risky investments in CCNG plants.

IX. Grid-Scale Battery Storage

As in its previous IRP, Ameren's Preferred Plan also includes 800 MW of incremental grid-scale energy storage additions, with the total planned capacity to be placed in service by 2035. This is an accelerated timeline for deployment of storage compared to the Company's previous IRP, apparently to take advantage of the ITC for energy storage that steps down in 2034 and again in 2035, expiring thereafter.[24] Grid-scale energy storage costs are generally decreasing, due partially to greater availability of raw materials and increased market interest. For example, in

[21] Bruce Robertson and Milad Mousavian. Institute for Energy Economics and Financial Analysis. "The Carbon Capture Crux: Lessons Learned". (September 2022). Accessed at: https://ieefa.org/sites/default/files/2022-09/The%20Carbon%20Capture%20Crux.pdf

[22] Mark Jacobson. Energy and Environmental Science, Issue 12. "The Health and Climate Impacts of Carbon Capture and Direct Air Capture". October 21, 2019. Accessed at: https://doi.org/10.1039/C9EE02709B

[23] Id. Figures 9.2 and 9.3, pg. 3-4.

[24] 2022 Inflation Reduction Act. Section 48 created an ITC for standalone energy storage projects that begin construction by January 1, 2025. The base rate of the ITC is 6% and the bonus rate of the ITC is 30% (if certain prevailing wage and domestic content criteria are met). The IRA also established the new section 48E ITC, which applies to energy storage projects placed in service after December 1, 2024. Section 48E follows the same base/bonus rate structure as Section 48. The maximum bonus will drop to a credit of 22.5% in 2034 and to a credit of only 15% in 2035. Projects will only qualify for the bonus rate if (a) the prevailing wage and apprenticeship criteria are met, or (b) they are less than 1 MW.

the fourth quarter of 2023, lithium carbonate spot prices were at their lowest in two years and are forecast to correlate with decreased prices for lithium-ion storage systems going forward, a key market trend given Ameren's projection that lithium-ion based batteries are the "most likely candidate".[25] The U.S. Energy Information Administration predicts, furthermore, that grid-scale energy storage deployment will double by 2026, which could lower prices further.[26]

Nevertheless, in order for the Company to develop least-cost energy storage resources, Ameren intends to seek the "full ITC."[27] Achieving the greatest energy storage ITC savings possible will hinge on three factors: when the grid-scale energy storage facilities are placed in service, where the facilities are located, and whether the projects meet prevailing wage and apprenticeship criteria. As with the ITC for other clean energy resources, the ITC for energy storage can be stacked with up to ten percent in additional tax credits each for projects located in "energy communities" as well as for projects paired with eligible wind or solar facilities and located in low-income communities, and that are less than 5 MW total capacity. Further, it will apply to projects greater than 1 MW that meet domestic content requirements.[28] Critically, both the base and bonus rates for the ITC are reduced to 75% of their full amount in 2034 and to 50% of their full amount in 2035 (for maximum credits of 22.5% and 15%, respectively). Therefore, it would greatly behoove Ameren to prioritize development of the 400 MW of storage planned for the 2030-2035 timeframe so that this capacity is placed in service before the ITC is reduced in 2034.

This IRP assumes that at least a portion of the grid-scale energy storage will be co-located and paired with wind and solar facilities and/or installed at the site of the retired power plants, Meramec and Rush Island.[29] In addition to seeking the energy storage ITC adder for storage facilities at these locations, Renew Missouri also encourages the Company to creatively site and size additional energy storage facilities to obtain the maximum ITC bonus and adders available. Importantly, storage projects that are less than 1 MW are automatically eligible for the maximum ITC bonus rate (which is 30% through 2033), and eligible for fast-tracked interconnection per

[25] (i) See Wood Mackenzie Power & Renewables/American Clean Power Association. "U.S. Energy Storage Monitor: Q4 2023 Executive Summary." (ii) See Ameren Missouri's 2023 Integrated Resource Plan. Missouri Public Service Commission Case No. EO-2024-0020. Filed September 26, 2023. See Ch. 10, Appendix D, p. 4.

[26] U.S. Energy Information Administration. "Short-Term Energy Outlook." (January 9, 2024). Accessed at: https://www.eia.gov/outlooks/steo/report/elec_coal_renew.php

[27] Per Ameren Missouri's 2023 IRP. See Ch. 9, Integrated Resource Plan and Risk Analysis, p. 8: "Ameren Missouri assumed … full ITC for battery storage resources that go in service by 2023, and reduced the tax credits as prescribed in the IRA for resources that go in service in later years."

[28] (1) Regarding "energy communities", these are defined as those that include (i) a brownfield site; (ii) a census tract or any adjoining tract in which a coal mine closed after Dec. 31, 1999, or a coal-fired electric power plant was retired after Dec. 31, 2009; and (iii) an area that has (or, at any time during the period beginning after Dec. 31, 1999, had) significant employment or local tax revenue related to the extraction, processing, transport or storage of coal, oil or natural gas. (2) Regarding the credit for storage paired with wind and/or solar facilities in low-income communities, the total project capacity must be less than 5 MW to qualify. (3) Regarding the credit for domestic content, the credit increases through 2026 to account for greater availability of domestic materials in future units.

[29] Ameren Missouri's 2023 IRP. See Ch. 9, p. 8: "Ameren Missouri assumes some of these batteries would be placed at retiring energy centers; the rest can be stand alone or placed with wind or solar additions …" More specifics are found in Ch. 10, Appendix D, pp. 3-4. The Company's Preferred Plan includes modeling for 200 MW storage facilities (the "likely size" for storage that could be located at Meramec or Rush Island) and includes a scenario where these would qualify for the ITC energy community adder.

FERC Order No. 792 as previously discussed.[30] Ameren should consider the development of smaller-scale storage projects to capitalize on the bonus rate opportunity for at least a portion of the total planned 800 MW of storage. Such smaller-scale projects could conceivably be distributed in low-income communities and paired with community solar projects, thus making them eligible for the ITC low-income community adder. Such projects could even be located in areas of Ameren's footprint where energy resiliency is of more concern — and energy storage therefore of greater value to the community — such as at sites of critical infrastructure (e.g., hospitals, emergency response stations).

As the map below shows, there are currently no operational battery storage facilities in the MISO footprint of Missouri, meaning that the facilities planned by Ameren in this IRP present an important opportunity for the company to contribute to both the adoption of the technology and to greater energy resiliency in the region.

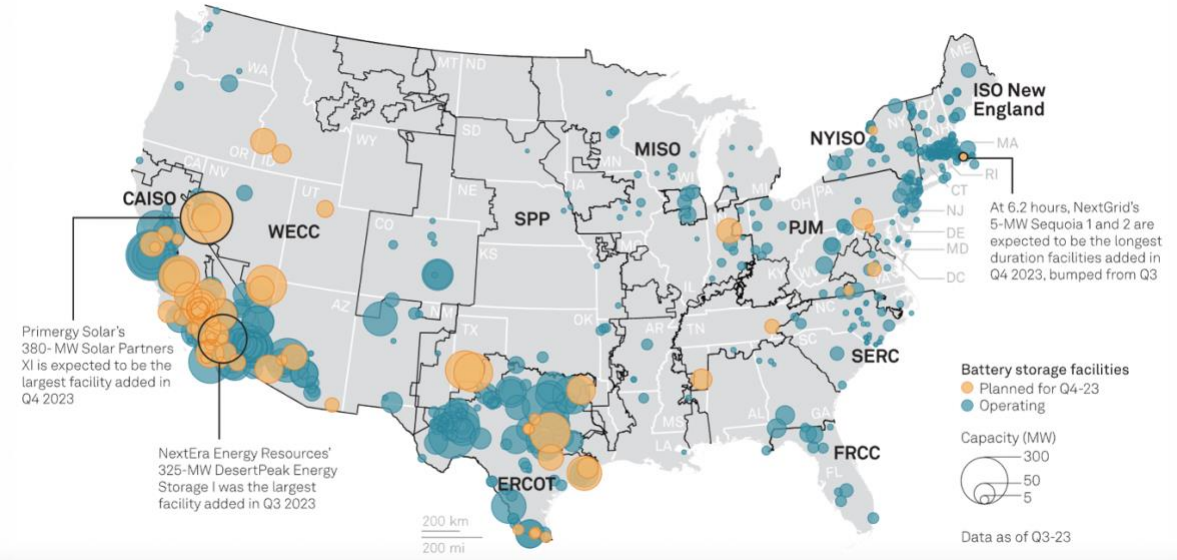

Figure 1. US battery storage capacity and additions in Q3, 2023. Source: S&P Global Commodity Insights, US government filings. 2023. Accessed at: https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/electric-power/111423-us-battery-storage-capacity-surpasses-146-gw-in-q3-35-gw-planned-in-q4

[30] Federal Energy Regulatory Commission. Final Rule. *Small Generator Interconnection Agreements and Procedures.* Order No. 792. Issued November 12, 2013. Accessed at: https://www.ferc.gov/electric-transmission/generator-interconnection/standard-interconnection-agreements-and-procedures