Exhibit No. 2P

Ameren – Exhibit 2P
Ajay Arora
Surrebuttal Testimony
File No. EA-2022-0245

Exhibit No.:	002P
Issue(s):	Need for Project; Reliability and Feasibility; Risk of Inaction; Misc. Conditions; Project Cost
Witness:	Ajay K. Arora
Type of Exhibit:	Surrebuttal Testimony
Sponsoring Party:	Union Electric Company
File No.:	EA-2022-0245
Date Testimony Prepared:	January 18, 2023

MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. EA-2022-0245

SURREBUTTAL TESTIMONY

OF

AJAY K. ARORA

ON

BEHALF OF

UNION ELECTRIC COMPANY

d/b/a Ameren Missouri

St. Louis, Missouri
January, 2023

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SURREBUTTAL TESTIMONY

OF

AJAY K. ARORA

FILE NO. EA-2022-0245

Q. Please state your name and business address.

A. Ajay K. Arora, Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri" or "Company"), One Ameren Plaza, 1901 Chouteau Avenue, St. Louis, Missouri 63103.

Q. Are you the same Ajay K. Arora who filed Direct Testimony in this proceeding?

A. Yes, I am.

I. PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your Surrebuttal Testimony in this proceeding?

A. The purpose of my Surrebuttal Testimony is to provide the Company's overall response to Staff's recommendation to deny Ameren Missouri a certificate of convenience and necessity ("CCN") for the Boomtown Solar Project (the "Project"). Other Company witnesses, as outlined below, will also respond to certain aspects of the Staff's recommendation. I will also update the Commission on the expected Project cost and respond to certain miscellaneous conditions and concerns about the Project raised by Staff and the Office of the Public Counsel ("OPC").

Q. Please summarize your overall response to Staff's recommendation.

A. I am deeply concerned that Staff's continued adherence to an inappropriately narrow viewpoint of when new generation resources are needed will expose our customers to unnecessary risk, given changes that have already occurred and are continuing to occur to both

Ameren Missouri's resource mix and equally important, to the resource mix in MISO.[1] Ameren Missouri is retiring three of four aging coal plants in a staggered manner by 2030, including two of those plants by 2024-2025. These coal plants have provided baseload around-the-clock energy to Ameren Missouri customers for decades, and the energy from these plants needs to be replaced in order to ensure reliability. Renewable energy resources are the least cost means of replacing this energy.

Staff's position reflects a failure to acknowledge that circumstances in the industry generally, and for Ameren Missouri specifically, have changed in such a way that there is in fact a need for new renewable generation resources now. This need will grow in the years to come. Indeed, contrary to Staff's viewpoint, the responsible, prudent course of action for the Company is to proceed with the Company's planned transition from its old generating fleet – which apart from the Callaway Energy Center is almost entirely made up of aging fossil-fuel resources – to a new generating fleet that relies much more heavily on renewable sources of energy. The Company needs to ensure that projects needed to replace the energy from the retiring plants can be feasibly implemented, and that the reliability and resiliency of the system are not at risk as the transition occurs. At bottom, the Company is asking the Commission to support our transition from the old fleet to the new fleet by approving a CCN for the Boomtown Project, which is the first non-RES[2]-compliance renewable facility that the Company needs to build. The key points in my Surrebuttal Testimony can be summarized as follows:

1. Contrary to Staff's overly narrow viewpoint of what "need" means, Ameren Missouri has a clear, present, and ongoing need to add energy resources to its generation portfolio to address the dramatic shift in the Company's energy position that will occur

[1] Midcontinent Independent System Operator, Inc.
[2] Renewable Energy Standard, Revised Statutes of Missouri Sections 393.1025, 1030.

over the next several years. Ameren Missouri expects to experience an energy shortage as early as 2028 assuming normal loads and generation, a dramatic change from the 15-20% energy buffer from which customers have historically benefited. Such a shift could expose our customers to reliability challenges and high market price risk if the Company does not take proactive steps – now – to start adding new energy resources. The Boomtown Solar Project is the first of several resources that will be needed to address this energy shortfall and therefore is a "no regrets" addition to the Company's resource portfolio.

2. In order to ensure continued reliability for our customers, Ameren Missouri needs to overlap new resources – such as the Boomtown Solar Project – with existing coal-fired resources as the Company completes its planned transition to a new, cleaner generating fleet. In no way is the Company's planned transition "unprecedented," as Staff has suggested.[3] As Roland Berger industry expert Mike Granowski discusses in detail, that the transition is happening across the country, with the approval of other state regulatory commissions, is beyond dispute. This Commission should similarly recognize and support the Company's need to transition now and over the coming years. The sustained transition plan laid out in the Company's Preferred Resource Plan is the prudent way to do just that

3. Implementation of the new generating fleet, requiring the construction of up to 30 new solar and wind projects over the next twenty years, about half of which need to be implemented by 2030, faces numerous risks and challenges that Staff's rebuttal testimony chose to completely ignore. Although on the surface doing nothing may seem

[3] Brad Fortson Rebuttal Testimony, p. 4, l. 18.

like an appealing, low-risk approach, when it comes to the implementation of a new resources fleet the risk of inaction is very high, and waiting to execute the transition heightens both real reliability risks and costs for our customers. The best way to manage these risks and challenges is to execute a sustained transition over time, starting now.

Q. How have your organized your Surrebuttal Testimony?

A. First, I will discuss the Company's need for renewable generation resources due to the ongoing retirement of the majority of our coal-fired generation capacity by 2030. I will highlight how this enormous change is swinging Ameren Missouri's energy position from having an approximately 15-20% energy buffer to having an energy shortage within approximately five years, which could occur sooner depending on actual generation and loads. Myriad planning uncertainties, alongside a highly constrained MISO market, require the Company to act proactively to ensure it has the resources needed to reliably and affordably meet customer energy needs over the next few years, and ultimately over the next two decades.

Second, I will discuss the Company's need to transition in a way that preserves reliability and resiliency, and in a manner that can actually be implemented to meet our customers' needs. I will reiterate how the Company's planned approach to that transition is a prudent path to ensure our customers are adequately protected from risk during the transition itself.

Lastly, I address certain miscellaneous points related to the Boomtown Project raised in rebuttal testimony, including some of the conditions proposed by Staff or OPC, and provide an updated estimate on the Project cost driven by changing circumstances since the case was filed.

Q. Do you have any schedules supporting your Surrebuttal Testimony?

A. No.

Q. Are other Company witnesses filing Surrebuttal Testimony?

A. Yes, five other Company witnesses are filing Surrebuttal Testimony to address various aspects of Staff's, OPC's, Wal-Mart's and the Missouri Industrial Energy Consumers' rebuttal testimonies, as follows:

- Steve Wills addresses Staff's opposition to the CCN specifically in the context of the *Tartan* factors. He also addresses certain issues raised by Staff, Wal-Mart and OPC about the Renewable Solutions Program. Company witness Wills will address how Project cost changes may mean that utilization of the Investment Tax Credit ("ITC") instead of the Production Tax Credit ("PTC") may be in the best interest of our customers, although as witness Wills indicates, no action is needed from the Commission on that issue in this docket.
- Matt Michels details the Company's energy and capacity positions, risks posed by those positions, and how the Company's positions and positions in MISO generally interact. He also reiterates that the Company's Preferred Resource Plan is the least cost and addresses Staff's surprising claims that resource planning is nothing more than a mere "modeling exercise." As Company witness Michel's explains, it isn't; to the contrary, it is a critical component of planning and then implementing resources needed to reliably serve our customers.
- Lindsey Forsberg provides testimony addressing changes in the Project economics.
- Robert Dixon highlights the importance to the state as a whole of developing a generation fleet that relies much more heavily on renewables, given the associated economic development that it brings and the positive impact of such development not just on the state, but on our customers as well.

- Mike Granowski provides testimony that underscores why the Staff should not ignore the many risks his firm, Roland Berger, identified and in many cases quantified, in connection with the Company's June 2022 Notice of Change in Preferred Plan. Company witness Granowski also demonstrates that Staff's claim that its Preferred Resource Plan is "unprecedented" is simply incorrect, in that numerous similarly situated utilities, and their regulatory Commissions, recognize the need to transition their fleets for the same or similar reasons that Ameren Missouri needs to transition its fleet, starting now.

II. THE NEED TO ENSURE AN ADEQUATE ENERGY SUPPLY, AND TO HEDGE AGAINST OVERRELIANCE ON THE MARKET

Q. Please discuss the Company's need for energy resources and how the Boomtown Solar facility helps fulfill that need.

A. Ameren Missouri's coal facilities are reaching end of life, and three of the Company's four coal facilities will retire no later than 2030: the Meramec Energy Center in 2022, the Rush Island Energy Center by 2025 and the Sioux Energy Center by 2030. As illustrated in Company witness Michels' Surrebuttal Testimony, these retirements are triggering a dramatic swing in the Company's energy position over the next few years, from its current abundantly long position to having a shortage of energy starting in 2028 assuming normal generation and load. The shortage grows steadily thereafter. Staff has failed to grasp that this significant shift in the Company's energy position is already underway with the retirement of the Meramec Energy Center, and will continue to shift when the Rush Island Energy Center is retired.

More specifically, even under normalized planning conditions, Ameren Missouri becomes short by approximately 1 million megawatt-hours ("MWhs")[4] as early as 2028, increasing to approximately 2 million MWhs by 2029, approximately 6 million by 2031 and to approximately 14 million MWhs by 2037, if no new generation resources are added.[5] Shortages in 2028 and 2029 could be increased by an additional 3 million MWhs with recognition of a high price on carbon emissions, which would also mean there is no excess energy at all by 2026.[6] Boomtown, along with the other renewable energy resources we need to add, helps reduce this shortage.

Q. Historically, Ameren Missouri has benefited from an energy position approximately 15-20% above our retail customers' needs, shielding customers from adverse MISO market conditions and price spikes (price risk), and generating meaningful excess market revenues for the benefit of customers. Should the Company continue to maintain an energy buffer?

Yes, in my opinion it should do so to address those same reliability and price risks. Under normal conditions, the Preferred Resource Plan is expected to provide an energy buffer of at least 3 million MWhs annually (approximately 10%) to address uncertainties under various market conditions – for example under high carbon and high load scenarios.[7] Another benefit of the Preferred Resource Plan is that it mitigates the risk of energy shortfalls in the case of unexpected extended outages at Labadie, or the earlier retirement of the two units at Labadie currently slated for retirement in 2036.

[4] 1 TWh.
[5] See Matt Michels' Surrebuttal Testimony, Figure 1 Energy Position: No New Non-RES Resources.
[6] See Matt Michels' Surrebuttal Testimony, Figure 3 Energy Position: RES Only Plus CC in 2031 (High Carbon Prices).
[7] See Matt Michels Surrebuttal Testimony Figure 6, Renewable Transition – High Carbon Prices, and Figure 7, Renewable Transition – High Carbon Prices, High Load]

The point is that without adding energy resources now and into the future, the Company is in a very tight energy position and is expected to be short energy within the next 5 years. And the Boomtown Solar Project is only one of several renewable resources that will be needed to fill the gap given that, alone, it only covers a relatively small portion of the energy shortage.[8] The Company will need several more solar and wind projects by 2031 to provide the reliability and affordability that our customers have enjoyed historically.

Q. If Ameren Missouri has a need for energy in 2028 why can't the Company wait until 2028 to build new energy resources?

A. For a variety of reasons, simply waiting until the last minute to add energy resources is not a prudent approach. First, our planning positions are based on normal conditions, but reality will of course play out differently. If, due to operational or environmental risks that impact the dispatch of our fossil generation or other conditions that affect our loads, the Company's energy shortage occurs even sooner than 2028, the Boomtown Project will already be in a position to start providing much needed energy for our customers throughout the year.

Second, even if operational or environmental risks do not accelerate the energy need prior to 2028, the energy shortage in 2028 could be much higher than in the Company's base planning case. Under just one planning scenario the Company assessed – a high carbon price[9] – the expected energy shortage in 2028 increases by over 3 million megawatt-hours, which equates to an additional eight solar projects the size of the Boomtown Project. But numerous other system conditions could trigger a similar increase – for example, increased load due to economic activity

[8] Boomtown's expected annual average production is approximately 350,000 MWhs.
[9] See Matt Michels' Surrebuttal Testimony, Figure 3, Energy Position: RES Only Plus CC In 2031 (High Carbon Prices)..

in the region, or constraints on the Company's ability to achieve cost-effective energy efficiency savings.[10]

Thirdly, as I discussed in my Direct Testimony, there are numerous challenges to the development and construction of renewable energy projects, with good projects becoming increasingly difficult to find. Since we need numerous – possibly up to 14 – projects by 2031, it is vitally important to acquire advanced-stage renewable projects like the Boomtown Solar Project when they become available.

All of these uncertainties – the potential for an energy shortage sooner, a larger shortage in 2028, and the numerous implementation risks facing renewable project development – drive the need for a feasible, staggered implementation plan as the Company executes its transition to renewable energy resources. We firmly believe, as I will discuss at length below, that this is the only prudent approach to protect the reliability and affordability that our customers expect.

Q. Is that the only prudent approach, or could Ameren Missouri just lean on the MISO market more heavily to meet its near-term energy needs?

A. It would not be prudent to rely on the MISO market more heavily for near-term energy needs. Just like Ameren Missouri, the entire MISO footprint is undergoing a transition from dispatchable fossil resources to a much greater reliance on renewable resources. Therefore, it has become more risky to rely on the MISO market in moments of system stress than it has been in the past. As detailed in the North American Reliability Corporation's ("NERC's") 2022 Long-Term Reliability Assessment, published just weeks ago, MISO's anticipated capacity reserves are alarmingly low and could fall below an acceptable level as early as this coming summer – the summer of 2023 – and energy risks are expected to increase starting in 2024, especially in June

[10] Historically the Company has only achieved 80% of the realistic achievable potential ("RAP") for these programs, but the Company's base energy and capacity positions assume 100% of RAP is achieved.

through August when MISO's demand peaks.[11] The NERC report lists MISO as a "high risk" region of the country in terms of resource adequacy, defined as an area that does not meet resource adequacy criteria, such as the 1-day-in-10 year load loss metric, during periods of the assessment horizon. Figure 1, below, highlights the regions considered high or elevated risk.

Figure 1

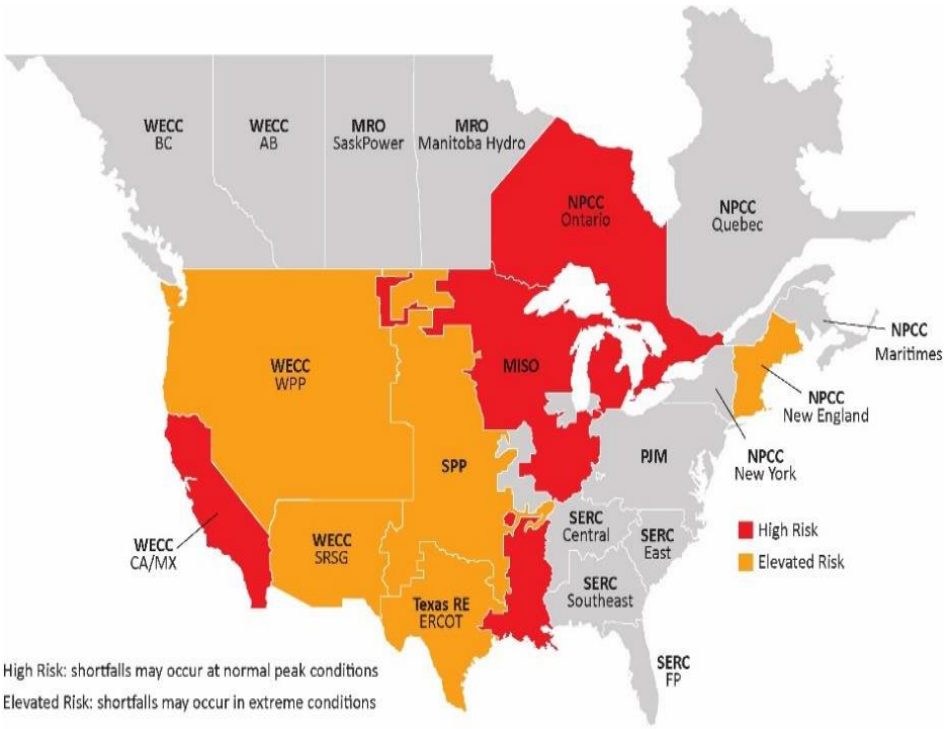

Figure 1. NERC Risk Area Summary, 2023-2027[12]

MISO's "high risk" status indicates that without a concerted effort to begin and sustain our plan to add replacement energy resources, Ameren Missouri and MISO will both be "skating on the edge" from an energy and capacity perspective, putting customer reliability and affordability at risk. Keep in mind that MISO's short position is based on normal conditions, but the risks of

[11] See page 9 of the NERC report attached to Matt Michels' Surrebuttal Testimony as Schedule MM-S2.
[12] *Id.*, p. 6

MISO being even more short grows under extreme weather conditions, which are increasing in frequency and intensity across all seasons. As NERC explains:

> The impact of wide-area and long-duration extreme weather events, such as the February 2021 South Central U.S. cold weather event and the August 2020 Western U.S. wide-area heat event, have underscored the need to consider extreme scenarios in resource planning…. Regulatory and policy-setting organizations should use their full suite of tools to manage the pace of retirements and ensure replacement infrastructure can be timely developed and placed in service.[13]

As Company witness Matt Michels points out, our Integrated Resource Planning process is a tremendous tool to develop a plan that ensures reliability and affordability for our customers. The successful implementation of our Preferred Resource Plan is therefore a critical element of ensuring reliability for our customers.

Q. Is there other pertinent information in the NERC report you reference above that should guide the Commission's thinking on Ameren Missouri's planned transition?

A. Yes. There are several items of serious consideration in the NERC report that factor into Ameren Missouri's transition planning and that the Commission should consider. For example, the reports says:

> "**Managing the Pace of Generation Retirements:** As new resources are introduced and older traditional generators retire, careful attention must be paid to power system and resource mix reliability attributes. Within the 10-year horizon, over 88 GW of generating capacity is confirmed for retirement through regional transmission planning and integrated processes. Effective regional transmission and integrated resource planning processes are the key to managing the retirement of older nuclear, coal-fired, and natural gas generators in a manner that prevents energy risks or the loss of necessary sources of system inertia and frequency stabilization that are essential for a reliable grid."[14]

This section of the report gets to the very essence of Ameren Missouri's planned transition approach from the "old fleet" to a "new fleet," which I will discuss more later, highlighting that it

[13] *Id.*, p. 13
[14] *Id.*, p. 7

is absolutely vital to have existing and/or future dispatchable resources to "wrap around" and provide the reliability services needed as we transition to a much greater reliance on renewable resources. Ameren Missouri's staged, thoughtful and flexible transition to renewable energy, implemented while some of its existing coal-fired generation is still operational, reflects prudent implementation of the precise concept highlighted in the NERC report.

The report also goes on to suggest that: "planning and operating the grid must increasingly account for different characteristics and performance in electricity resources as the energy transition continues," and indicates that resource adequacy evaluations must necessarily expand beyond simply assessing reserve margins at peak times – as considered by traditional assessments of capacity need at peak times.[15] This outdated "traditional assessment" is the approach Staff is still taking to assess need, but the Company's more holistic approach to resource planning and implementation is more aligned with NERC's recommendations.

Q. You noted that if the market is tight capacity or energy there could be reliability risks, but you also mentioned price risk. Please explain.

A. The Commission is well-aware of the impact on utility costs of extreme weather events from its experience with two of the other three electric utilities in the state,[16] who incurred huge purchased power costs when they were forced to buy large quantities of energy from the market at astronomically high prices when the market shot up during Winter Storm Uri. Ameren Missouri didn't see impacts of that magnitude on its purchased power costs during Winter Storm Uri because of the considerable length we had at that time, with both Meramec and Rush Island

[15] *Id.,* p. 7.
[16] The Empire District Electric Company and Evergy Missouri – West.

available at their full capacities.[17] However, if an event like that repeats itself, in either the winter or the summer, and certainly post the retirement of Rush Island, we could find ourselves in a very similar position – assuming the market, under its constrained resource adequacy conditions, can even supply all of the energy.

As the Commission knows from the reports filed each month in File No. EO-2022-0215, and from testimony filed in the Company's pending rate review, the two Rush Island Units are now System Support Resources ("SSR") in the MISO market. This means they are only dispatched for reliability reasons under an "operating guide" issued by MISO. Consequently, these units run far less than they would if they were dispatched economically, and this means they provide far less energy. So, while it is true that for the next year or two those two units will be fully available to backstop reliability, we are, even today, exposed to greater market price risk when our energy needs spike given Rush Island's status as an SSR. We saw some of the impacts of this right before Christmas a few weeks ago, when over the four day period from Dec 22 – Dec 25th, 2022, Ameren Missouri was in fact short energy and purchased 15 gigawatt-hours ("GWhs") resulting in purchased power costs of $1.8 million for just a four-day period. Had Rush Island been completely unavailable, Ameren Missouri would have purchased 61 GWhs at a cost of approximately $7.1 million over just those four days.

Q. Are you suggesting that the Boomtown Project would have mitigated the impact of such an event?

A. Boomtown by itself would only mitigate that particular event, or a similar event that may occur in the summer, to a relatively small degree due to its relatively small size, but it is

[17] But we did experience some of those effects due to the forced outage of the Callaway Energy Center that was ongoing at that time. Fortunately, customers were largely insulated from the cost increases those impacts would have otherwise caused due to the existence of Nuclear Electric Insurance Limited's insurance that covered a significant portion of the higher purchased power costs.

a part of the overall needed addition of energy resources, wind and solar, that taken together would provide significant risk mitigation. The point is that when we had the entire old fleet in place, and were quite long energy and capacity, these kinds of events posed far less risk to reliability and far less exposure to large cost increases. But that old fleet has already changed significantly– and will continue to change – thus greatly increasing those reliability and price risks. We need to get started now to mitigate those risks.

Q. How do renewable resources help mitigate the risks related to price volatility?

A. As Staff pointed out, the addition of new renewable resources in the MISO market could increase price volatility over time. A look back at real-time on-peak monthly averages of locational marginal prices ("LMPs") in the Ameren Missouri load zone shows that that trend is already occurring, as depicted in Figure 2 below.

Figure 2

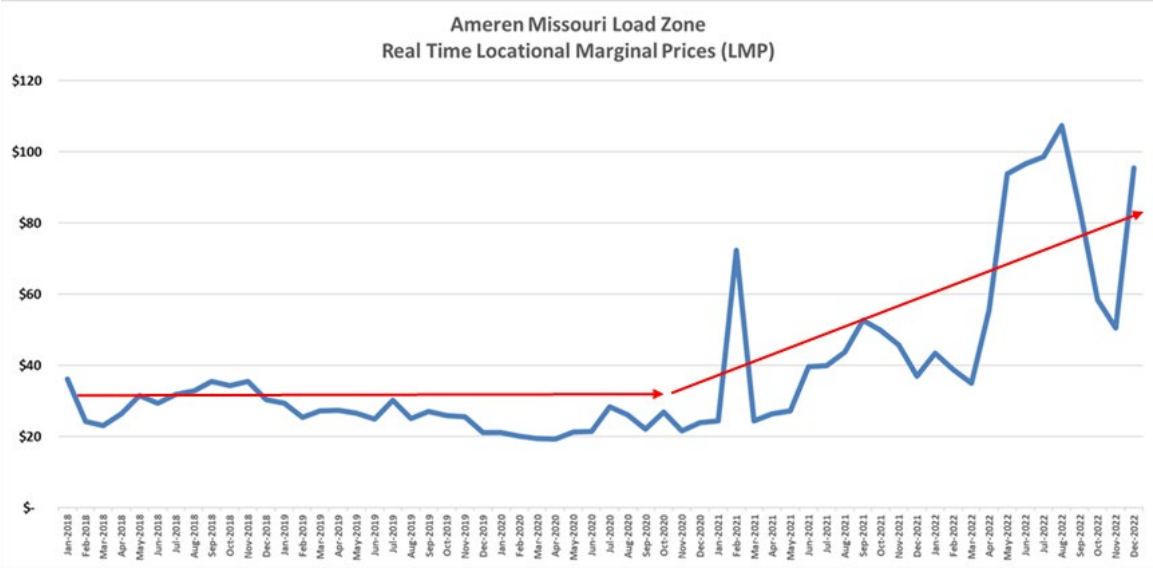

Figure 2. AMO Real Time LMPs 2018-2022

By adding energy resources to its fleet, Ameren Missouri can help mitigate the risk that customers will be exposed to extreme energy costs in moments of system stress. Solar resources can serve as an effective hedge against price spikes by producing energy that can offset the need

for purchases or create additional off-system sales, especially in the summer months when MISO is particularly tight energy and capacity, both of which benefit customers in the form of lower net energy costs. And despite not being generally thought of as a winter resource, solar may also provide some energy hedge even in the winter. Company witness Michels' Table 2 and his discussion of it reflects an example of exactly how these savings could materialize for Ameren Missouri customers. In fact, from Dec 22 – Dec 25th, 2022, when Ameren Missouri was short energy, our recently constructed Montgomery Community Solar Energy Center was generating at over 50% of its maximum capacity during several daytime hours when market prices were in the hundreds of dollars per MWh. While solar facilities generate more in the summer, including at the times loads peak, they can also provide needed energy in the winter.

Renewable resources are also inherently insulated from fuel price volatility risks because they do not require any fuel to operate. Once installed, these resources rely on free solar or wind resources to produce electricity.

Q. It is Staff's position that Ameren Missouri does not have a current energy or capacity need for the Boomtown Solar Project. Do you agree with this assessment?

A. No. Staff's position reflects a narrow view of need that focuses on capacity only, and added just in time. As I read Staff's testimony it does not appear to have considered the Company's near-term energy needs that are outlined in detail is Company witness Michels' Surrebuttal Testimony. Given the uncertainties and risks inherent in the system right now – from MISO's "high risk" status to possible generator outages due to the age of our existing coal-fired generation to increasingly extreme weather events – and the expectation that such risks are more likely to intensify than subside, the most prudent approach to address the Company's impending

energy shortage is to execute a sustained transition to cleaner resources as outlined in the Company's Preferred Resource Plan.

III. PRUDENCE OF AMEREN MISSOURI'S PLANNED TRANSITION APPROACH – THE NEED TO ENSURE RELIABILITY AND FEASIBILITY OF IMPLEMENTATION

A. Ensuring Reliability

Q. You've used the phrases "old fleet" and "new fleet" in your earlier responses. Would you please explain in greater detail what those phrases mean, as you are using them?

A. When I use the phrase "old fleet" I am primarily referring to Ameren Missouri's existing (and legacy) coal-fired generation resources. These resources have served as the backbone of Ameren Missouri's generation fleet for several decades but are now aging, with increasing maintenance challenges for key equipment (such as energy piping, boilers, and turbines). The Meramec Energy Center has already retired and, as noted, two other large units are retiring soon. When I use the phrase "new fleet" I am referring to our planned future resource portfolio, which includes a diverse mix of zero or low-carbon resources, primarily renewable resources like solar, wind and hydroelectric, supported by dispatchable energy storage, natural gas or hydrogen, and nuclear.

Q. Would you please summarize what transitioning the fleet needs to look like over the next several years, and what the end state of the new fleet looks like?

A. Yes. Let's look ahead to what is planned through 2030. First, we need to steadily add renewables that, over time and as we gain experience operating them, will fulfill our near-term energy shortage. These new renewable resources will work in tandem with existing generation resources (Callaway, Osage, Keokuk, Taum Sauk, Sioux, and Labadie) in a manner that ensures

reliable system operations at the lowest cost reasonably possible. In parallel, we need to work towards the addition of a combined cycle gas plant by the end of 2030 –in effect to replace the Sioux Energy Center – and incorporate additional energy storage resources into the fleet. As we execute this transition towards replacement energy and capacity resources, our operations will include leaning on the market as needed, as we have always done, but not to such a degree that we are exposed to significant risks of extreme costs or the risk that we simply cannot get the energy we need to serve our customers when we need it. As discussed above, the fact that the MISO market does not have the resource excess it once did is clearly an important factor in us implementing a Preferred Resource Plan that ensures that we can shield our customers and maintain reliability during tight system conditions.

In the end, the new fleet will consist of a diverse (technologically and geographically), resilient resource portfolio featuring different renewable and low-carbon resources that complement each other and perform well under varied system conditions. A diverse portfolio of generating resources should deliver the most resilient and reliable energy for our customers over time. In fact, one could point to the lack of resource diversity in Ameren Missouri's existing resources portfolio, which has a majority of coal-fired resources that are aging, as a key factor heightening the urgency of our need to transition to the new fleet. Adding new resources in parallel with retiring the old coal plants starts to build that resource diversity gradually over time, while mitigating the risks increasingly facing coal-fired generating resources.

Q. The Company's plan to transition to the new fleet, featuring renewable and low-carbon resources, reflects some meaningful operating overlap with the old fleet resources. Why is that important to ensure reliability?

A. To put it simply, there are reliability risks during the transition period between the old fleet coming offline, and the new fleet being fully implemented. These risks are driven by myriad planning uncertainties, such as:

- Uncertainty in system load, including as industry and transportation electrify, and also driven by more frequent and intense severe weather, as I discussed earlier;
- Uncertainty in the energy or demand savings, or both, from planned energy efficiency and demand-response programs, which could meaningfully change both our capacity and energy positions;
- Uncertainty in whether and to what extent Ameren Missouri can expect to (or should) rely on the MISO market;
- Uncertainty in the reliability contribution of new renewable resources;
- Unplanned generation outages or other unanticipated events; and
- Material variances between our optimized generation forecasts or weather-normalized loads used for planning purposes and what happens in reality.

I will elaborate on several of these uncertainties below but taken as a whole, it is imprudent, unwise, and in my opinion reckless to wait until some predetermined amount of capacity of coal-fired generation retires to add corresponding capacity of renewables to plug the capacity gap, or to wait until that coal capacity can no longer provide any energy. Ameren Missouri needs to preserve system reliability while executing the transition to the new fleet, and transitioning in a

sustained manner over time – starting now – as the Company has proposed is the prudent way to do just that.

Q. Are there any concrete examples you can provide of the reliability risk of relying on an RTO/ISO market too much during the transition?

A. Two utilities that Ameren Missouri would consider peers, Duke Energy Corp. and the Tennessee Valley Authority (TVA), had to systematically shed load during the winter storm preceding the 2022 Christmas holiday for the first time in their histories. The short-term rolling blackouts were deemed necessary to prevent more widespread system failures. For Duke Energy specifically, the shortages were initially triggered by unexpected outages at several of their combined cycle and coal facilities.[18] In this moment of system stress, Duke's grid operators looked to the market as a backstop, but came up short. As Duke Energy North Carolina State President Kendal Bowman explained to the North Carolina regulators: "As we have for decades during times of high peak demand and as industry practice, we looked to purchase power from out-of-state entities, but in this case, the power that we purchased did not show up."[19]

Ameren Missouri has always had an operational and planning philosophy to not have energy shortages even in periods of extreme system stress because of the very real life impacts it can have on our customers during periods of extreme heat or extreme cold. The experiences of both Duke and TVA indicate that assuming market purchases will be available to backstop Ameren Missouri's own resources during extreme weather events is a high risk proposition.

[18] S&P Capital I.Q. Article, *Duke execs tell NC regulators rolling blackouts prevented broader grid failures, dated January 3, 2023.*
[19] Id, at page 1.

Q. Please elaborate on why transitioning over time can minimize risks associated with uncertainties in the reliability contribution of new renewable resources.

A. As I discussed in my Direct Testimony, Ameren Missouri needs to gain operational experience with renewable resources. As with all generation resources, whether they are coal, nuclear, natural gas, hydro, wind or solar, the first several years after construction and commissioning are spent learning about the intricacies of each particular resource. This learning includes potential maintenance needs, dispatch optimization solutions, and strong and weak points, in order to ensure a thorough understanding of how the resource will perform and what its contribution to reliability can be expected to be. We are in the process of doing just that at the High Prairie and Atchison Renewable Energy Centers, as well as at the small Montgomery Community Solar Energy Center. Unlike coal energy centers that generate significant amounts of energy from one location, renewable energy resources produce varied amounts of energy based on geographic location and weather conditions. Only by operating large renewable energy plants that are geographically and technologically diverse can Ameren Missouri gain the critical experience to know if, when, and where to add renewable energy resources over the intermediate- to long-term, and how to capitalize on and optimize investments in energy storage like batteries, to ensure reliability.

Q. What sort of unplanned outages or unexpected system events could have the greatest impact on reliability during the transition?

A. Many unplanned events could impact the existing old fleet, further shrinking an already low margin for error for both energy and capacity. The Sioux or Labadie Energy Centers could be forced to retire sooner than expected if a forced outage became too expensive to fix, or if federal or other environmental policy made coal-fired plant operations too expensive or infeasible.

Even if still online, the output from any existing facility could be restricted due to fuel supply challenges or a forced outage. While we have a long track record of running a high-quality baseload fleet, events can happen and circumstances can arise that are beyond our control. As our capacity and energy positions continue to tighten, the risks created by such events increase.

Q. Are such events or circumstances theoretical?

A. No, they are not. One need look no further than the extended 7-month forced Callaway outage in 2021, seasonal river water intake restrictions impacting both the Labadie and Callaway Energy Centers due to ice packs and extreme heat, the operating restrictions we have seen this winter at Osage due to low water conditions caused by increasingly common and severe droughts, and the coal conservation measures we were forced to take just this past summer.[20] As we've seen in the press, the railroads have not necessarily fixed their staffing challenges, which contributed heavily to their poor performance and led to coal conservation. And while the Missouri River is not currently in as extreme of a drought condition as it was last year, much of the state overall remains in a drought condition, a circumstance that has been more common in recent years. There have been other times when the state is not in a drought, but water restrictions in the northern United States have impacted water levels in the Missouri River. There is no guarantee that these kinds of events – or others – will not happen again.

Q. Are there other future events or circumstances that you worry about that also necessitate that the old fleet and new fleet overlap to preserve reliability?

A. In addition to the possibility that baseload generation like Sioux might not "live" as long as currently planned, there is a meaningful risk that the Company could be delayed in the planned combined cycle plant online by 2031. While we believe that plant is necessary for long-

[20] Due to the inability of the railroads to timely transport the coal our plants needed to dispatch as expected.

term reliability, the Company obviously needs the Commission's permission as well as construction and environmental permits to build it at all. We don't take for granted that such permission will be forthcoming. The point is that the future is uncertain, and if we don't overlap the old and the new fleets we are taking on unnecessary reliability risks for our customers, including those I have discussed above.

B. Ensuring Feasibility

Q. Why is feasibility an important consideration in planning the Company's prudent transition to a new generating fleet?

A. Simply put, because a plan that cannot be implemented in a timely manner in the real world does not ensure the reliability our customers expect and that I have little doubt the Commission expects as well. Staff recommends rejecting the Boomtown Project CCN and dismisses the Company's Preferred Resource Plan, but provides no alternative implementation plan beyond a vague suggestion that resources should be added at most optimal times. The acquisition, development, and construction of up to thirty new solar and wind resources is no small feat. In my Direct Testimony, I outlined seven key project implementation risks, listed below for reference:

- Land (i.e., renewable site) availability
- Project permitting and construction
- Supply chain constraints
- Transmission interconnection
- Technology costs
- Financing costs
- Financing constraints

Renewable project development requires finding a good site, gaining local community support, addressing environmental challenges, ensuring reliable and affordable transmission access, completing financial diligence to obtain federal tax credits for customers, and ensuring a good renewable energy resource like solar or wind. It should come as no surprise that good projects are challenging to find and execute on. Ameren Missouri's Preferred Resource Plan outlines the sustained construction of new renewable energy projects over time, to manage the risks and challenges of project development and acquire the best projects as they become available. Simply hoping that low risk projects are available and can be implemented just when we literally reach a planning reserve margin shortfall would reflect poor and risky planning on the Company's part.

Staff's recommendation chose to completely ignore these seven implementation risks. Unfortunately, ignoring risks will not make them go away, just as ignoring a leaking roof on one's house won't cause the roof to repair itself. The reality is that waiting to add renewable energy projects until a capacity shortfall exists ("just in time") or until a theoretical "perfect project" appears could easily lead to reliability issues, shortage of energy, lack of operational experience, and exposure to extremely high market prices. There is a high risk of inaction from an implementation perspective alone. Standing still, as Staff recommends, increases the risk that the Company's necessary transition becomes infeasible to implement, or comes at an extremely high cost and risk to customers. Several of the risks of a delayed transition were assessed and quantified by consultant Roland Berger, as discussed in the Surrebuttal Testimony of Mike Granowski.

Q. Can you provide some "real world" illustrations or experiences with how those risks and challenges manifest themselves?

A. Yes, in fact many of the renewable projects Ameren Missouri has recently constructed – along with others that have been pursued or considered through the request for proposal ("RFP")

process – have experienced delays or full cancelation due to supply chain challenges, transmission interconnection, competition, and land risks.

As discussed in my Direct Testimony, supply chain constraints can occur due to labor shortages, political disruption, commodity supply and price changes, and transportation challenges, all of which can lead to significant project delays. For example, Ameren Missouri's recently constructed wind facilities, the Atchison and High Prairie Renewable Energy Centers, experienced months of delay due to railroad, labor, turbine blade, and other equipment shortages. In addition, Ameren Missouri experienced both manufacturing and shipping delays for racking equipment and solar panels from a multitude of vendors and countries, causing 50% more time to be added to the construction schedule to complete the much smaller Montgomery Community Solar Center project successfully. These real supply chain challenges and delays should alarm all parties when considering the significant delays that could impact larger projects. Supply chain risk for solar may only grow greater as the demand for solar equipment and labor continues to grow.

Ameren Missouri also has first-hand experience with transmission interconnection risk. The Brickyard Hills Wind Project, for which the Commission granted Ameren Missouri a CCN in 2019 and which had been under development for nearly a decade, ultimately had to be terminated due to unacceptably high transmission interconnection costs. This is just one example of many in which the Company – or a developer – has spent years or even a decade pursuing a project that is ultimately canceled, causing the parties to lose years of effort. Such interconnection risks have and continue to grow as more renewable projects enter the MISO queue process, delaying interconnection results and projects by up to 4 years.

Finally, the Company continues to experience the loss of good projects due to project constructability issues, or competition for renewable projects with large technology firms from

outside its service territory that are eager to find the best available projects. As discussed in the Direct Testimony of Company witness Scott Wibbenmeyer, the Company conducted an RFP for renewable projects in 2020, which identified 51 projects. However, after screening the projects for technical, commercial, and economic criteria, only nine projects were available for further consideration and diligence. The other 42 projects were considered unacceptably risky – due to unknown or high interconnection costs, constructability or environmental issues – or were purchased by competing companies and became unavailable. As those nine projects were pursued by the Company, two additional solar projects were pulled off the market and placed under contract with others, two were rejected by the Company as there was a significant risk they would not qualify for available tax credits, and one was pulled off the market many months later after the developer discovered constructability risk related to the underground mines located under part of the project. In the end, after more than two years and a review of 51 total projects proposed only four were considered viable candidates, one of which is the Boomtown Solar Project.

Q. Speaking of feasibility, how will resource planning and implementation interact as Ameren Missouri seeks to build out its new fleet of generating resources?

A. Staff witness Fortson suggests that a resource plan that changes over time is an indication that it is meaningless and should be dismissed as a "modeling exercise"[21]. In fact, the opposite is true. In a transition of this magnitude, a changing resource plan is an indication of learning and improvement over time as we implement. We plan, thoughtfully implement, learn, adjust our plans, and implement again. We fully expect the market and general real-world conditions to continue to change – it's essentially certain that they will – which is precisely why we are not asking for approval to just go build 5,400 MWhs of renewable capacity that our current

[21] Brad Fortson Rebuttal Testimony, p. 10, l. 9.

planning processes indicate are warranted to meet all of our needs long-term. We could need more, or less, over the next couple of decades and as we continue to learn and plan, we will adjust. But we know we will need significant solar resources, and more wind resources, and eventually energy storage systems (i.e., batteries). And, for the reasons discussed above, we know we need some of those resources now and in the near- to intermediate-term. This case is about getting started with a high-quality solar project from an experienced, reputable developer, so we can begin learning in earnest and tackling implementation challenges one at a time while beginning to build up the new fleet.

Staff witness Fortson also suggests that as Ameren Missouri's resource plan evolves and changes over time, the Company's stated need for approximately 30 new solar and wind projects could change over time, leading to projects in rate base that are not needed.[22] He suggests this is a reason for the Commission to deny a CCN for the very first project. However, a projected need for nearly 30 projects should instead give the Commission comfort that the addition of this single Project, the first of thirty, is a no-regrets move. The Company's IRP will evolve and change over time as we implement, operate, and learn, but the likelihood that our renewable resource needs could somehow go from a projected need for 30 projects to a need for zero projects is negligible.

IV. MISCELLANEOUS ISSUES RAISED IN REBUTTAL TESTIMONY

Q. Staff suggests that adding a wind resource, instead of a solar resources, would be more optimal to address Ameren Missouri's current needs. Do you disagree?

A. I do not disagree that a wind resource could possibly more optimally address the Company's peak winter capacity needs. However, as should be clear by this point, it is imperative for the Company to begin building the new fleet – and this new fleet needs a diverse set of resources

[22] Brad Fortson Rebuttal Testimony p. 8

(technologically and geographically) to meet energy needs in all hours across all seasons. We should always pick the best available projects, such as Boomtown Solar, when we can access them if they fit into the overall needs of the new fleet. Through the 2020 RFP, and a subsequent "refreshed" RFP issued in 2022, the Company found that the availability of suitable wind projects in the MISO region is challenged from numerous development perspectives – including transmission constraints and possible environmental issues. As a result, we focused on acquiring available, high-quality regional solar projects – like Boomtown Solar – because we need such projects too. We are, however, digging deeper into options to acquire or develop future wind resources and will continue to do so. Over time, we do intend to add a balanced mix of solar and wind resources to build out a diverse, resilient new generating fleet.

Q. Should the "liabilities" as they are characterized in the rebuttal testimony of OPC witness Geoff Marke[23] prevent Ameren Missouri from receiving a CCN?

A. No. The issues he raises related to vegetation, habitat, storm water management, Uyghur forced labor, and end of life management have all been addressed by the Company and are being managed as the Project progresses to completion. I will discuss each in more detail below.

Q. What actions has Ameren Missouri taken to ensure proper vegetation and habitat management for the Boomtown Solar Farm?

A. Ameren Missouri has worked closely with the project developer, Invenergy, resulting in an enhanced Scope of Work for this project to ensure proper vegetation and habitat management.[24] The Scope of Work includes ***_____

[23] Geoff Marke, Ph.D. Rebuttal Testimony, pp. 4-8.
[24] *See* Exhibit A to Build Transfer Agreement (Scope of Work), attached as Schedule SW-D2 to the Direct Testimony of Company witness Scott Wibbenmeyer.

[redacted][25]

[redacted]***[26] Consequently, there is little risk of "liability" arising from improper habitat or vegetation management.

Q. What actions have been taken to minimize the impact on local and migratory birds from the Boomtown Solar Project?

A. During the initial site review process, project developer Invenergy contracted with outside consultants to perform a review of the proposed site regarding threatened and endangered ("T&E") species, general wildlife, and birds. Subsequently, Invenergy utilized the consultant's Site Characterization Study to design the solar facility as to not materially affect local and migratory bird populations. The purpose of the Site Characterization Study was to perform a Tier 1 Preliminary Site Evaluation and Tier 2 Site Characterization Survey ("SCS") of the proposed project areas. The objective of the SCS was to identify biological resources present within the Area, which included a field reconnaissance effort for land cover verification, eagle and non-eagle raptor nest locations, habitat suitability assessments for state and federally listed species, and

[25] *Id.*
[26] *Id.*

wetlands and waterbodies review; associated reports; and consultation with applicable regulatory agencies. Approximately 53,117 acres were reviewed as part of this SCS Report.

The Illinois Department of Natural Resources ("ILDNR") developed the Ecological Compliance Assessment Tool ("EcoCAT"), which was used to obtain both an informal and a formal query of threatened or endangered plant and animal species within the Study Area. The informal query was submitted on November 9, 2020 which indicated that an Illinois Natural Area Inventory ("INAI") site, Little Wabash River INAI, is within the vicinity of the Project. The formal EcoCAT consultation was submitted on January 21, 2021 and also indicated that the Little Wabash River INAI is within the vicinity of the Project. The ILDNR responded to the Boomtown Project on January 25, 2021 indicating that as long as Boomtown implements erosion and sediment control practices during construction, impacts would not be expected. No other resources such as state listed species or INAI sites were identified by IDNR staff, therefore, the EcoCAT consultation is considered complete.

Through these efforts, there is little risk of adverse impacts from the facility, or any "liabilities" arising from it.

Q. What actions have been taken to ensure proper storm water run-off management of its Boomtown Solar Project?

A. Project developer Invenergy hired Westwood, a third party consultant, to complete a preliminary hydrology study for the Project, which supported the conclusion that the site is suitable for the planned development. In addition, the Scope of Work included in the Build Transfer Agreement ("BTA") for the Boomtown acquisition requires the Project ***____

_____

_____

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]***[27] These efforts properly address any risk of liability that could arise from stormwater-related issues.

Q. What actions, have been taken to ensure that the solar panels that are being utilized for the Boomtown Solar Project were not sourced (in whole or in part) from the work of forced Uyghur labor camps in China?

A. The Uyghur Forced Labor Prevention Act ("UFLPA") was signed into law by President Biden on December 23, 2021 and took effect on June 21, 2022. The purpose of the Act is to ban imports of solar modules produced through forced labor practices in the Xinjiang Uyghur Autonomous Region of the People's Republic of China.

The UFLPA establishes a rebuttable presumption that all goods mined, produced, or manufactured "wholly or in part" in Xinjiang or by entities listed on the U.S. Department of Homelands Security's entity list are made using forced labor. Such goods are therefore denied entry into the U.S. unless an importer can "clearly and convincingly" prove that its imports are outside the scope of the UFLPA, or within the scope but eligible for an exception.

With the implementation of the UFLPA, Ameren Missouri does not anticipate receiving solar panels from an importer that does not meet the UFLPA. Furthermore, it is not reasonable to

[27] *Id.*

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expect that the Boomtown Project site would be able to receive delivery of modules that do not meet the UFLPA requirements as they would not be allowed through customs.

Q. What actions have been taken regarding the planned end-of-life decommissioning of the solar panels at its planned Boomtown Solar Project?

A. Ameren Missouri will meet the requirements of the local county for decommissioning. Project developer Invenergy utilized a third party to develop and file a decommissioning plan with White County for the Project. Ameren Missouri expects the decommissioning plan to be updated as the Project progresses and will work with the county to follow the local county requirements per the plan and would work to meet any additional requirements (local/state/federal) that might be imposed between now and decommissioning.

Ameren Missouri participates in specific programs through the Electric Power Research Institute ("EPRI") regarding end-of-life decommissioning of solar facilities. EPRI continues to work in this area to ensure future decommissioning activities will include the potential for panel recycling, repurposing, etc. They are also researching disposal methods and the potential for hazardous material handling, if applicable. Ameren Missouri will continue to participate in the research within this field and utilize the knowledge gained as end-of-life gets closer and a detailed plan is developed for decommissioning.

Q. Does Ameren Missouri anticipate impacts from other projects affecting the generator interconnection cost as discussed by Staff witness Shawn Lange's Rebuttal?

A. No. One advantage of the Boomtown Project is that it has a completed Large Generator Interconnection Agreement ("LGIA") to interconnect the project to the MISO transmission system. The LGIA sets forth the requirements for the interconnection, and defines the transmission upgrades and estimated cost necessary to interconnect the Project. These

upgrades, once complete, provide the Project with transmission rights for both capacity (NRIS) and energy (ERIS) as described in Staff's rebuttal testimony. Staff witness Lange provides reference to Exhibit A10 of the Boomtown LGIA with the following quote "Higher queue and/or same Definite Planning (DPP) group study Interconnection Requests may create contingencies pursuant to Article 11.3.1." Although this statement is true, a closer look at the LGIA, Table 10-1 of Exhibit A10 reveals there were no transmission assumptions modeled in the studies that were deemed necessary to allow for the interconnection of the Boomtown Project. While this does not absolutely ensure the Project cannot ever be impacted by earlier queue or similar queue projects, it does demonstrate that the transmission upgrades required for the Boomtown Project are not materially dependent on other projects. Furthermore, if a higher or similar queue project assumption were to be modified by MISO, MISO would be required to follow its own requirements and complete an impact study, which could place the cost on the changing project without impacting others – including Boomtown. One can also conclude there is a low risk of impacts from other projects by evaluating the upgrades necessary for the Project itself. If we look at the Boomtown LGIA, the network upgrades required to interconnect the Boomtown Project are exclusively related to interconnecting the Project itself, which includes upgrades to the Crossville West substation to accommodate the physical connection of the Project.

Q. Staff witness Lange recommends an economic analysis be completed and listed as a condition of the CCN if the upgrade cost exceeds those outlined in the GIA more than 15%. Should such a condition be placed on the Boomtown CCN?

A. No, because it is not necessary. As described earlier, the chance of a higher or similar queue project impacting the Boomtown Project is negligible, and the LGIA clearly shows there were no transmission additions deemed necessary to allow for the interconnection of the

Boomtown Project. In fact, the necessary Network Upgrades required to be installed by the transmission owner pursuant the terms of the LGIA have already been completed. On December 20, 2022 Ameren Illinois Company completed the necessary network upgrades and interconnection facilities required under the LGIA at the Crossville West substation, except for final terminations, testing and commissioning. The actual cost of the work as of December 31, 2022 was approximately $542,000 and $346,000 as compared to the LGIA estimates of $730,000 and $736,000 for the network and interconnection upgrades respectively.

Q. Staff witness Lange recommends the Boomtown CCN be conditioned on Ameren Missouri meeting the IEEE standard P2800.[28] What is the Company's position on this recommendation?

A. The Company does not object to the Staff's recommended condition because the condition recognizes that neither Ameren Missouri nor anyone else can, at this time, guarantee a project like the Boomtown Project will meet the requirements of IEEE 2800 because the standard remains under development.

Q. If the Commission grants the CCN, does Ameren Missouri agree with Staff's recommendation to require as-built drawings for the Project no later than 60 days after the site is commercially operational?

A. No. A 60-day timeline for as-builts after a facility reaches commercial operation is not practical for a project of this magnitude. For example, the Boomtown Project is expected to be completed in late fall of 2024, but final seeding and other site restoration may not occur until the spring of 2025 – well after commercial operation – to allow for the appropriate weather conditions for seed to grow. This final site restoration work could prevent certain final as-builts from being

[28] Shawn Lange Rebuttal Testimony, at p. 20, ll. 12 – 16.

completed. For a project of this magnitude, Ameren Missouri recommends as-built drawings for the Project to be supplied within 100 days of "Final Completion." Specifically, Ameren Missouri would recommend the following conditional language, which is the same condition recommended by Ameren Missouri and the Staff in File No. EA-2022-0244:

> "Ameren Missouri shall file with the Commission as-built drawings for the Project within 100 days after "Final Completion," as provided for in the BTA, provided, that if Invenergy is excused under the terms of the BTA from providing certain as-built drawings within said 90-day period Ameren Missouri will file such as-built drawings within 10 days after receipt thereof from Invenergy. Ameren Missouri will notify the Staff within 10-days after expiration of the 90-day period if there are any as-built drawings for which Invenergy was excused from delivering within the 90-day period."

Q. Does Ameren Missouri support the recommended conditions that the in-service criteria, as referenced by Staff as confidential attachment SEL-3 and confidential attachment SEL-4, are appropriate for use in a future case to determine whether the Boomtown Project is in-service?

A. Yes. Ameren Missouri agrees the in-service criteria provided in the confidential attachments are reasonable and consistent with past practice.

Q. If the Commission were to grant a CCN for the Boomtown Project, are there other conditions proposed by Staff that should be addressed?

A. Yes. Ameren Missouri is agreeable to the following conditions reflected in Staff's Rebuttal Testimony:

- Ameren Missouri shall file with the Commission the final version of the plans for restoration of safe and adequate service no later than 60 days after the site is commercially operational.

- Ameren Missouri shall file with the Commission quarterly progress reports on the plans and specifications for the Project, and the first report shall be due on the first date of the first calendar quarter beginning after the CCN is issued.

V. PROJECT COST UPDATE

Q. Company witness Forsberg updated the economic modeling submitted with the Company's direct case given reliance on what to some extent appears to be outdated information in others' rebuttal testimony, and she indicated that the estimated Project costs have changed. What is the Company's current estimated cost for the Project?

A. Approximately ***_____***.

Q. What is driving the roughly 20% increase as compared to the risk-adjusted case discussed in the Company's direct filing?

A. The updated project cost estimates for the Boomtown Project reflect changes in labor costs (specifically the use of union labor), inflation-related price increases on key balance of plant equipment, increased demand and therefore higher prices for solar panels driven in part by the Inflation Reduction Act tax incentives and by the possibility of tariffs on solar panels in the future, and other generally inflation-driven project construction cost increases as well. As indicated in the Surrebuttal Testimony of Company witness Forsberg, given the enhanced tax credits we expect to be available for the Project, the overall Project economics have only changed by approximately 8-10%.

VI. CONCLUSION

Q. Does this conclude your Surrebuttal Testimony?

A. Yes it does.

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BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Approval of a Subscription-Based Renewable Energy Program	)))	File No.: EA-2022-0245

AFFIDAVIT OF AJAY K. ARORA

STATE OF MISSOURI)
) ss
CITY OF ST. LOUIS)

Ajay K. Arora, being first duly sworn on his oath, states:

My name is Ajay K. Arora, and hereby declare on oath that I am of sound mind and lawful age; that I have prepared the foregoing *Surrebuttal Testimony*; and further, under the penalty of perjury, that the same is true and correct to the best of my knowledge and belief.

\s\ Ajay K. Arora
Ajay K. Arora

Sworn to me this 18th day of January, 2023.