Exhibit No.: _____
Issue(s): Cost Causation/Affordability/ Solar Grazing/SolSource Database
Witness/Type of Exhibit: Marke/Rebuttal
Sponsoring Party: Public Counsel
Case No.: EA-2025-0239

REBUTTAL TESTIMONY

OF

GEOFF MARKE

Submitted on Behalf of the Office of the Public Counsel

UNION ELECTRIC COMPANY
D/B/A AMEREN MISSOURI

CASE NO. EA-2025-0239

*** _____ ***
Denotes Highly Confidential Information that has been redacted

January 23, 2026

PUBLIC

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REBUTTAL TESTIMONY

OF

GEOFF MARKE

UNION ELECTRIC COMPANY
D/B/A AMEREN MISSOURI

CASE NO.: EA-2025-0239

I. INTRODUCTION

Q. Please state your name, title, and business address.

A. Geoff Marke, PhD, Chief Economist, Office of the Public Counsel (OPC or Public Counsel), P.O. Box 2230, Jefferson City, Missouri 65102.

Q. What are your qualifications and experience?

A. I have been in my present position with OPC since 2014 where I am responsible for economic analysis and policy research in electric, gas, water, and sewer utility operations.

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

A. Yes. A listing of the Commission cases in which I have previously filed testimony and/or comments is attached in Schedule GM-1.

Q. What is the purpose of your rebuttal testimony?

A. To provide a response to the direct testimony filed by Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri" or the "Company" witnesses including Steven M. Wills, Matt R. Michels, Ajay K. Arora, and Scott Wibbenmeyer.

Q. What are your recommendations in this case?

A. Given the approved parameters and rationale articulated by the Commission in recent cases, namely Case Nos. ET-2025-0184 (Ameren Missouri large load tariff docket), EO-2025-0154 (Evergy Metro, Inc. d/b/a Evergy Missouri Metro/Evergy Missouri West, Inc. d/b/a Evergy Missouri West (collectively "Evergy") large load tariff docket), and Ameren Missouri's response to my rebuttal testimony in EA-2025-0238, I am adopting conditional support of Ameren Missouri's procurement of the approximate 250 MW of utility-scale solar generation proposed in the Application to meet the speculative demand of the large

load hyperscale customer(s) Ameren Missouri is attempting to accommodate. With that in mind, my endorsement is dependent on several conditional recommendations:

First, I recommend that Ameren Missouri provide positive affirmation that the attendant costs of this application should be borne by the cost causer, in this case, specifically, the hyperscale users that demand it.

There is no need to procure additional generation to serve existing customers, especially in a cost-constrained environment, at a grossly inflated premium, with the uncertainty surrounding federal tax credits *unless* it is being used to meet the load demanded by data center buildout.

Even then, procuring solar generation to meet that demand is questionable at best given the lower accreditation value of solar resources in the Midcontinent Independent System Operator ("MISO") wholesale market and Missouri's relatively average to poor solar profile.[1]

Moreover, the Commission's recently approved Data Center tariff includes an optional rider titled the Renewable Solutions Program Rider (Rider RSP LLC). A feature designed specifically per the request of Ameren Missouri under the pretense that data centers are demanding renewable generation and Ameren Missouri needs this feature to attract data center clientele to the state of Missouri.

A declarative public notice in this docket affirming that assumption along with attached (confidential) signed and binding contracts verifying the demand needed for this clean but low-accredited service from the data centers would be consistent with Ameren Missouri's

[1] Daniel, I (2023) Understanding peak sun hours by state in the US. *IntegrateSun*. https://www.integratesun.com/post/understanding-peak-sun-hours-by-state-in-the-us#:~:text=Arizona:%20As%20mentioned%2C%20Arizona%20enjoys,north%2C%20offer%20excellent%20solar%20potential.; and US Energy Information Administration (2024) Solar Explained. https://www.eia.gov/energyexplained/solar/where-solar-is-found.php

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filed Direct Testimony, the legislative intent of the recently enacted Senate Bill 4 ("SB 4"), and the Commission-articulated directives at the recent "Special Agenda" in late November.

Tying expensive solar build-out to the data centers that demand the premium energy is consistent with the concept of "additionality" that most large net-zero companies have pledged to support and holds existing customers harmless for this cost.[2] Additionality ensures that investment in the lower accredited renewable would not get built but for the data centers financing of the project. Look no further than the solar farm being built in Henry County Missouri by Meta as a tangible example of how that should work.

If Ameren Missouri rejects the argument that Reform Solar is being undertaken to meet data center load but is instead being undertaken to purely accelerate generation investment, then I recommend the Commission reject this application on the grounds of not meeting the Tartan criteria based on 1.) need; 2.) economic feasibility; 3.) and public interest. This is especially true if the federal tax credits fail to materialize as a capital offset for this investment.

If Ameren Missouri provides a non-answered position to this condition (e.g., cost allocation issues are not germane to this docket and should be addressed in a future rate case), then this filed testimony serves as a public declaration of my position based on the available facts known to me at this time and OPC can litigate this issue in a future rate case proceeding with that documented support, if appropriate.

Second, I continue to request that Ameren Missouri file in surrebuttal testimony what more than $16 billion in planned capital expenditures ("CAPEX") in five years will mean to their existing customers' rates in the near future (five to eight-year timeframe). Restated, what

[2] Amazon Sustainability Exchange(2026) Renewable Energy https://sustainabilityexchange.amazon.com/focus-areas/carbon-free-energy/playbook/renewable-energy/chapter-2 ; Barua, P. (2018) As Apple, Google and Others Promote Renewable Power, What Is the Best Way to Evaluate Corporate Energy Leadership? World Resources Institute. https://www.wri.org/insights/apple-google-and-others-promote-renewable-power-what-best-way-evaluate-corporate-energy#:~:text=Not%20every%20corporation%20has%20the,ways%20customers%20can%20drive%20impact.

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can existing customers reasonably expect the percentage bill increase from their current bill to be moving forward for however many rate cases Ameren Missouri believes it will need to file and how much load they hope (or will need) to attract to recover the investments that more than double its existing rate base in such a short time frame. This "sanity check" request is also consistent with language embedded in SB 4 that requires utilities to provide rate impact projections for its top four preferred resource plans.[3]

Simply put, Ameren Missouri needs to provide greater insight than "annual rate increases of 4% **or above**" in attempting to answer my condition.[4]

To the extent that Ameren Missouri rejects this request like they did in the Big Hollow docket, I recommend that the Commission order Ameren Missouri to provide a reasonable range of answers so no one can be accused of being "caught off guard" by future rate relief requests. I am not requiring perfection here and would not consider this to be binding percentage estimates, but a reasonable range of outcomes and probabilities will at least afford all parties, the Commission, and customers an opportunity to plan and react accordingly to the investment being sought in this docket as well as the more than $16 billion of additional CAPEX spend over the next five years.

Third, I recommend that Ameren Missouri explore the possibility of integrating agrivoltaics/livestock grazing as an operations and maintenance ("O&M") feature for the solar site. This recommendation is based in part on the feasibility study conducted by Ameren Missouri and included in GM-2 which suggested that such a feature can be a cost-effective option depending on livestock availability, perimeter fencing, and access to on-site water.

Fourth, I recommend approval of this application be conditioned on Ameren Missouri committing to sharing land-use and conservation impact data with the non-profit Renewable Energy Wildlife Institute's ("REWI") SolSource Database for the duration of its operations.

[3] § 393.1900.3 (7) RSMo.
[4] Case No. EA-2025-0238 Surrebuttal Testimony of Steven M. Wills. p. 4, 15-19.

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This recommendation is consistent with the terms of the Commission-approved Evergy Missouri West Stipulation and Agreement from Case No EA-2024-0292 for the 65MW Sunflower and 100MW Foxtrot utility-scale solar farms approved in 2025.

Finally, the Commission and parties should note that my silence in regard to any issue not addressed from the aforementioned Company testimony should not be construed as an endorsement of Ameren Missouri's position.

II. COST-CAUSATION

Q. Does Ameren Missouri's testimony suggest that this planned investment is being used to serve speculative data centers?

A. Yes.

Q. Did Ameren Missouri stress the importance of renewables for its speculative data center clients in its data center tariff docket?

A. Yes.

Q. Has Ameren Missouri already recently received approval to build generation investment?

A. Yes. Above and beyond the risk-adjusted cost estimate of the Reform Solar project and switchyard of ***_____ ***. A list of approved and/or pending generation projects include the following:

- An estimated $900,000,000 for 800 MW of natural gas generating power units at the Castle Bluff site (Case No. EA-2024-0237);[5]
- An estimated ***_____*** for 400 MW of utility-scale storage and ***_____ *** for 800MW of simple cycle natural gas plant (Case No EA-2025-0238);[6]

[5] Case No. EA-2024-0237 Direct Testimony of Christopher A. Stumpf p. 7, 2.
[6] Case No EA-2025-0239 Direct Testimony of Mitchell Lansford p. 3, 21.

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- An estimated ***_____ *** for 300 MW of solar at its Split Rail site (Case No. EA-2023-0286);[7]
- An estimated ***_____ *** for 50 MW of solar at its Vandalia site (Case No. EA-2023-0286);[8] and
- An estimated ***_____ *** for 50 MW of solar at its Bowling Green site (Case No. EA-2023-0286).[9]

Q. Will the Company need to also make large-scale investments in distribution and transmission in the near future on top of these investments?

A. Yes, they will.

Q. Who is the cost causer for this solar investment?

A. There is no need to procure this solar today given existing resources and realized load especially under the current financially strained environment. The most compelling reason to move forward with this investment is to meet the request for carbon-free energy and additional generation to support the data center build-out in Ameren Missouri's service territory.

Q. Earlier in testimony you used the term "additionality." Can you please explain what you mean?

A. Additionality is a concept applied to the procurement of renewable generation and means that a renewable energy project wouldn't have been built or wouldn't have produced clean energy without a specific purchase or investment, ensuring the buyer's support creates genuinely new green power, rather than just claiming existing or required renewable energy.

Additionality is effectively a counter-factual test that compares the project's reality to a hypothetical "what if" scenario (business-as-usual) where the investment did not happen. If

[7] Case No. EA-2023-0286 Direct Testimony of Scott Wibbenmeyer p. 6,1.
[8] *Ibid*.
[9] *Ibid*.

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the solar project would still have been built regardless of the clean-energy buyer then it is not additional.

Q. Why is additionality important for corporate net-zero companies and large data centers?

A. Additionality is crucial for corporate buyers/data centers because it ensures their renewable energy purchases fund new clean energy projects (not just existing ones), verifying their climate claims, avoiding greenwashing accusations, and genuinely accelerating grid decarbonization, providing real-world impact and perceived market leadership beyond "business-as-usual". It validates that their investment directly incentivizes new wind or solar farms that wouldn't have otherwise been built, delivering tangible progress toward net-zero goals.

Q. Does the recently approved data center tariff contemplate such an action?

A. It does. Ameren Missouri's data center tariff includes the optional Renewable Solutions Program Rider (Rider RSP LLC) which would enable and justify the build out of this investment.

Q. Then this should be a straightforward case?

A. It should be.

Q. Are you concerned that this sentiment is not shared by Ameren Missouri?

A. I am. The Company's response in the Big Hollow docket is disappointing and my fear is that it will extend to this docket as well.

Q. Have any prominent figures opined on who should be responsible for the costs associated with data centers?

A. Yes. In a recent Truth Social post. President Donald Trump stated:

> Under Sleepy Joe Biden and the Radical Left Democrats, the average American Household's monthly Utility bills went up MASSIVELY — over 30%! I never want Americans to pay higher Electricity bills because of Data Centers.

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> Therefore, my Administration is working with major American Technology Companies to secure their commitment to the American People, and we will have much to announce in the coming weeks. First up is Microsoft, who my team has been working with, and which will make major changes beginning this week to ensure that Americans don't "pick up the tab" for their POWER consumption, in the form of paying higher Utility bills. We are the "HOTTEST" Country in the World, and Number One in AI. Data Centers are key to that boom, and keeping Americans FREE and SECURE but, the big Technology Companies who build them must "pay their own way." Thank you, and congratulations to Microsoft. More to come soon! President DJT (emphasis added)[10]
>
> Jan 12, 2026, 5:38 PM

Q. Have any data centers publicly stated they will pay for their own energy?

A. Microsoft and OpenAI have.[11,12] I am not aware of any other announcements as of this writing.

III. AFFORDABILITY

Q. Did you make a similar request for Ameren Missouri to provide a ratepayer impact estimate in Case No. EA-2025-0238, the Big Hollow natural gas and battery investment?

A. I did.[13]

[10] Trump, D. (2026) Truth Social. https://truthsocial.com/@realDonaldTrump/posts/115884759090137876
[11] Hart, R. (2026) OpenAI says its data centers will pay for their own energy and limit water usage. *The Verge*. https://www.theverge.com/news/864798/openai-data-center-opposition-energy-bills
[12] Duffy, C. (2026) Microsoft has a plan to stop AI data centers from hiking up your electricity bill. *CNN*. https://www.cnn.com/2026/01/13/tech/microsoft-ai-data-centers-electricity-bills-plan
[13] See GM-3.

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Q. What was Ameren Missouri's response?

A. Ameren Missouri has taken the position that annualized rate impacts will likely be 3 to 5% annually with a higher end estimate of 4% **or above** per year and that individual rate filings are likely to include higher figures than the annualized rate impact. Those increases are largely in line with what customers have experienced from 2020 to 2024.[14] I would encourage Ameren Missouri to correct the record if this is not their position.

Q. Do you agree with those numbers?

A. I believe it will certainly be above 4% a year and I maintain an existential level of concern if the data center build-out does not materialize and/or cover the costs of the life of this and the other investments being contemplated or actively pursued. Simply put, the risk to existing ratepayers and frankly to Ameren Missouri is enormous if this expensive buildout to meet the speculative load doesn't go as planned.

Consider for a moment the last five years of realized capital expenditures for Ameren Missouri compared to the projected five-year capital investment plan seen in Tables 1 and 2 respectively.

[14] From 2020 to 2023 Ameren Missouri residential bills climbed roughly 20%. In 2025 rates were increased 12.5% based on an increase of $355 million to rate base.

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Table 1: Ameren Missouri's Actual Annual Capital Expenditures (2020-2024) in billions of dollars[15]

2020	2021	2022	2023	2024	2020-2024 average	2020-2024 Total
$1,100,421	$1,499,090	$1,571,417	$ 1,715,254	$1,789,704	$1,535,177 Billion	$7,675,886 Billion

Table 2: Ameren Missouri's Planned Annual Capital Expenditures (2025-2029)[16]

2025	2026	2027	2028	2029	2025-2029 average	2020-2024 Total
$2,312,129	$3,557,595	$3,382,421	$3,498,357	$3,464,068	$3,242,914 Billion	$16,214,570 Billion

Ameren Missouri's next five-year annual capital expenditure is set to increase 111% percent from its previous five-year investment cycle. What is even more concerning is that these projected numbers are almost certainly understated given the federal policy changes surrounding international trade, domestic energy, and expected tax code changes. Of course, the situation is exacerbated by fears of persistent inflationary trends and uncertainty surrounding domestic policy.

In my opinion, something has to give. In this case, the path forward for cost certainty and mitigation to existing ratepayers is easy to see. Approval of the solar project should be borne by the data centers that want this resource. To the extent that there is any resistance from Ameren Missouri over this it should give everyone immediate pause—including Ameren Missouri's shareholders in future rate case proceedings in which the Company will seek cost recovery.

[15] Figures based on Ameren Missouri's Capital Investment Reports 2019-2024 filed in Case No. EO-2019-0044.
[16] Figures based on Ameren Missouri's Capital Investment Report 2025 filed in Case No. EO-2019-0044.

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Q. Has the market value of solar changed since the Company filed this application?

A. Yes, and in a hurry. Cost uncertainty related to supply chain constraints, increased international trade tariffs, and uncertainty surrounding federal solar subsidies, are all either being realized or likely to occur in the near future.[17] As a result, the estimated costs of this project have increased (as of August 2025) by more than 142% in two years according to Ameren Missouri witness Scott Wibbenmeyer.[18]

Q. Would you still support the project if costs greatly exceed the filed amount?

A. In a vacuum, the lower capacity accreditation and inflated costs make the investment highly questionable and makes little sense from a resource adequacy perspective to meet existing customers needs.

Approving this investment conditioned on data center customer adoption of the optional Rider RSP LLC would pacify my concern and is in line with planned actions undertaken by Evergy Missouri West to mitigate rate shock to its existing customers with recently announced solar projects funded entirely by Google and Meta.

Q. Is there an all-in cost estimate that you would consider too much?

A. Not if the data centers pay for all of it. Absent that, I believe the estimated costs have already exceeded the prudency threshold.

IV. SOLAR GRAZING

Q. Do you have any recommendations regarding future operations and management of vegetation?

A. Yes. I recommend that the Company investigate the feasibility of solar grazing with local sheep (or other similar livestock) for its solar site.

[17] Bopray, A. & A. Langone (2025) Trump's new tariffs could disrupt the U.S. solar market—again. *Energysage*. https://www.energysage.com/news/how-new-trump-tariffs-could-affect-the-solar-industry/
[18] Case No. EA-2025-0239 Direct Testimony of Scott Wibbenmeyer p. 9, 12-21 thru p. 10, 13.

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Q. What is solar grazing?

A. Per the 2024 Ameren Missouri Feasibility Analysis Report on Agrivoltaics/Livestock Grazing:

> Solar grazing is a type of agrivoltaics that incorporates livestock and solar energy generation and is one of the few agrivoltaics practices that is being successfully employed at the utility-scale (> 5 MW) in the United States (EPRI 2024). When site characteristics allow, solar grazing can be implemented as an alternate vegetation management strategy over traditional options such as mowing and herbicide application and has been reported to reduce operations and maintenance (O&M) costs (Abdullah Al Mamun et al. 2022, Gerke 2024).
>
> In addition to potential O&M savings, use of livestock grazing in place of mowing to manage vegetation at solar sites can provide supportive ecosystem services such as habitat for pollinators and other wildlife, increased soil health and carbon sequestration, and improved fire suppression (Kochendoerfer and Thonney 2021, Towner et al. 2022, ASGA 2024b, EPRI 2024).
>
> Grazing is considered more beneficial for pollinators and other wildlife than mowing because plants can "rebound faster than they would following a mowing event," and depending on the mowing regime, rotational management of pastures may allow for more gradual or staggered bloom periods (ASGA 2024b). Employing livestock for vegetation management may be of particular benefit at sites that present challenges for mowing, such as those with rocky terrain or in areas of high rainfall (Gerke 2024, EPRI 2024).
>
> Additionally, use of livestock grazing may reduce or eliminate damage to panels and other site equipment, such as collisions and rocks/debris kicked up during mowing (Grasby et al. 2021, McCall et al. 2023). Beyond these benefits, solar grazing has the potential to improve community support for solar projects, in turn facilitating successful project deployment (EPRI 2023, EPRI 2024, SETO n.d., Guarino and Swanson 2022). For instance, an 800 MW solar project in Ohio that had been met with

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local opposition received approval partly due to its incorporation of agrivoltaics, including 1,000 sheep (Gilbert 2024).[19]

For all of the reasons referenced above as well as the possibility of goodwill in marketing future solar expansion in Missouri I recommend that the Company investigate the feasibility of introducing solar grazing as an O&M feature at the Reform solar site. To be clear, there is nothing binding in this recommendation. If this feature is not economically or operationally feasible, I withdraw my recommendation. I am merely looking for a good faith effort on the part of the Company.

V. SOLSOURCE DATABASE

Q. What other conditions do you have?

A. I recommend that Ameren Missouri commit to sharing land-use and conservation impact data with the non-profit Renewable Energy Wildlife Institute's ("REWI") SolSource Database for the duration of its operations.

Q. What is the SolSource Database?

A. The SolSource Database seeks to answer the question: How can solar facilities support healthy ecosystems? That has proven to be a challenging question to answer as most site-specific information regarding these questions are confidential; thus any "lessons learned" are often not shared and mistakes continue to occur.

The SolSource Database intends to function as a one-stop-shop community resource of solar-datasets that will enable its users (developers, utilities, researchers, regulatory agencies, etc…) to learn and build on solutions to that question. Importantly, the process is both confidential where necessary and protects against sharing sensitive information

[19] See also GM-2.

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Q. What are some examples of data that would be shared?

A. Existing data templates include common types of standardized wildlife surveys conducted pre- and post-construction such as:

- Avian point counts
- Transect surveys for vegetation
- Transect surveys for pollinators & insects
- Transect surveys for herpetiles
- Artificial cover searches for herpetiles
- Camera trapping for wildlife detections, both traditional and Adapted-Hunt Drift Fence Technique
- Passive acoustic surveys for birds, bats, frogs, etc

Additional data templates in development include:

- Animal movement or location data, i.e., VHF[20] or GPS[21] collars
- Preconstruction surveys for presence of sensitive species habitat
- Site preparation data
  - Habitat maps
  - Soil preparation data (grading and vegetation removal)
- Operation and Maintenance data
  - Vegetation establishment plans
- Site Characteristics
  - Prior land use
  - Any mitigation actions taken including but not limited to permeable fences, habitat set-asides, habitat creation, establishment of wildlife movement passages

[20] VHF = Very High Frequency
[21] GPS = Global Positioning System

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Q. Why are you advocating for this feature?

A. All forms of electricity generation have an impact on our air, water, and land, but the impacts can vary. Being good stewards of our land and resources should be at the forefront of any planned investment because we have seen what happens when it's not. Ameren Missouri's High Prairie Wind Farm and its excessive "taking" (i.e., killing) of endangered and protected species which resulted in forced curtailments and millions of dollars in lost revenue should serve as an example of what should never occur again in Missouri (or anywhere else).

But the lessons to be gleaned from the High Prairie Wind Farm will largely be lost on the industry as a whole because data is rarely, if ever shared. Admittedly, my example is based on a wind farm, but I believe the same rationale exists for solar farms. According to REWI, the SolSource Database was designed to solve that problem for the Solar Industry. The SolSource Database would help provide:

> A clear understanding of the risks and benefits of solar energy to natural resources is needed to ensure the process of siting and permitting solar energy projects minimizes impacts/maximizes benefits. Collaboration through data-sharing will rapidly increase our understanding of solar-natural resources challenges and opportunities is data-sharing and collaboration. Rather than starting the environmental review of each new solar project from a place of complete uncertainty, we can pool information from numerous solar projects across regions for review and synthesis.[22]

The probability of successful siting and continued operations of solar generation projects with large geographic footprints (e.g., a 100MW solar farm requires between 400 to 500 acres to operate) should increase over time based on the lessons learned from past projects. But that will only be true if that information is shared and consolidated. The SolSource Database would serve as a valuable clearinghouse for that data.

[22] REWI (2025) SolSource Database. https://rewi.org/about-us/our-work/solsource/

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Q. Do you have any final conditions/recommendations to make?

A. Yes. I recommend that Ameren Missouri incorporate and solicit feedback on both the solar grazing and SolSource Data sharing from the U.S. Fish and Wildlife Service and the Missouri Department of Conservation for feedback and recommendations. Finally, I also recommend that the Company meet with the OPC and Staff annually for the next three years to provide updates on the Company's experience and participation with the SolSource Database, and, if executed, updates on the effectiveness in implementing solar grazing operations.

Q. Does this conclude your testimony?

A. Yes.

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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 Permission and Approval and Certificates of Convenience and Necessity Authorizing it to Construct Renewable Generation Facilities	)))))	Case No. EA-2025-0239

AFFIDAVIT OF GEOFF MARKE

STATE OF MISSOURI)
) **ss**
COUNTY OF COLE)

Geoff Marke, of lawful age and being first duly sworn, deposes and states:

1. My name is Geoff Marke. I am a Chief Economist for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my rebuttal testimony.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Geoff Marke
Chief Economist

Subscribed and sworn to me this 22nd day of January 2026.

TIFFANY HILDEBRAND
NOTARY PUBLIC - NOTARY SEAL
STATE OF MISSOURI
MY COMMISSION EXPIRES AUGUST 8, 2027
COLE COUNTY
COMMISSION #15637121

Tiffany Hildebrand
Notary Public

My Commission expires August 8, 2027.