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MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. ET-2018-0063

SURREBUTTAL TESTIMONY

OF

MATT MICHELS

ON

BEHALF OF

UNION ELECTRIC COMPANY

d/b/a Ameren Missouri

St. Louis, Missouri
June, 2018

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I. INTRODUCTION

Q. Please state your name and business address.

A. Matt Michels, One Ameren Plaza, 1901 Chouteau Avenue, St. Louis, Missouri 63103.

Q. By whom and in what capacity are you employed?

A. I work in Ameren Services Company's Innovation and Corporate Strategy Department as Director of Corporate Analysis. The Innovation and Corporate Strategy Department provides various corporate support services to Ameren Corporation and its subsidiaries, including Union Electric Company d/b/a Ameren Missouri ("Company" or "Ameren Missouri").

Q. Please describe your professional background and qualifications.

A. I joined Ameren Services Company in 2005 as a Consulting Engineer in Corporate Planning. My responsibilities included coordination and monitoring of projects implemented in conjunction with the integration of processes and systems following the acquisition by Ameren Corporation of Illinois Power Company ("Illinois Power") in October 2004. I was subsequently involved in the integration of combustion turbine facilities acquired by Ameren Missouri in 2006. In September 2008, I was promoted to Managing Supervisor of Resource Planning with responsibility for long-range resource planning, including Ameren Missouri's Integrated Resource Plan ("IRP") filings and associated analysis. In February 2013, I was promoted to Corporate Analysis Manager, and in June 2017, I was promoted to my current position. In that capacity, I continue to have direct responsibility for Ameren Missouri's resource planning process, including plans related to the acquisition of renewable energy resources.

I earned a Bachelor of Science degree in Electrical Engineering from the University of Illinois at Urbana-Champaign in May 1990. I have been employed by an Ameren company or Illinois Power since June 1990 in various positions related to resource and business planning. During most of that time, my responsibilities have included the development, use and oversight of various planning models used for purposes such as production costing, acquisition evaluation, corporate restructuring, financial forecasting, and resource planning. I have previously testified before this Commission in proceedings involving resource planning, renewable energy standards compliance, and energy efficiency cost recovery.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your surrebuttal testimony in this proceeding?

A. The purpose of my surrebuttal testimony is to respond to the rebuttal testimony of Dr. Geoff Marke on behalf of the Office of the Public Counsel ("OPC") with respect to 1) Ameren Missouri's need for generation resources, and 2) the extent to which wind resources owned by Ameren Missouri are expected to provide value to Ameren Missouri's retail customers, regardless of whether they subscribe to the Company's proposed Renewable Choice Tariff ("Program").

Q. Please summarize the key observations and conclusions presented in your surrebuttal testimony.

A. Ameren Missouri ownership of wind resources used to serve subscribers of the Program provides an opportunity to further the transition of the Company's generation portfolio in a way that is beneficial to all customers, as well as to the environment and the communities we serve. This is true because:

- Wind resources are very likely to produce net benefits.
- Ameren Missouri is likely to need additional energy in the mid-2030s.
- The addition of wind resources provides additional flexibility to manage the Company's existing coal-fired resources to the end of their useful lives.

III. AMEREN MISSOURI'S RESOURCE NEED

Q. Dr. Marke cites Ameren Missouri's IRP to support his assertion that the Company has no need for new wind generation resources beyond those planned for compliance with Missouri's Renewable Energy Standard ("RES"). Is his assessment accurate?

A. While Dr. Marke correctly states that Ameren Missouri is currently long on capacity, he misses some important details that are relevant when considering the value of wind resources. These important details can be summarized as follows:

- Wind resources are primarily energy resources, not capacity resources.
- Ameren Missouri expects to be a net purchaser of energy by 2037 based on the same IRP work cited by Dr. Marke. This is around the same time that 15-year subscriptions served via company-owned wind resources under the Program would expire. Until then, Program assets would not be a part of the Company's resource portfolio but instead would be dedicated to subscribers.

- Additional company-owned wind resources enhance the Company's ability to address potential risks around its coal-fired fleet.

Q. Please describe what you mean when you say that wind resources are primarily energy resources.

A. Wind resources are by their nature intermittent, with electric generating output that is determined from moment to moment by the speed and direction of the wind. The output is therefore largely out of the control of system operators. The available wind resources are often relatively low at the time of peak demand – hot summer days. As a result, the dependable capacity from wind resources at the time of peak load is also relatively low. The Midcontinent Independent System Operator, Inc. ("MISO") recognizes this by applying a multiplier to the rated output of wind resources to determine the dependable capacity that can be applied to the resource adequacy requirement for load-serving entities under the MISO tariff. The multiplier, known by the term Effective Load Carrying Capability ("ELCC"), based on MISO's most recent study of the load carrying capability of wind resources is 15.2%.[1] In contrast, new wind projects typically realize capacity factors for energy generation of 40% or more; that is, they generate energy that is 40% or more of what it would be if they were capable of producing at their maximum rated output for every hour of the year. Thus, wind resources are generally characterized by relatively high energy output compared to their capacity at the time of peak and are therefore considered energy resources.

Q. How do you consider energy needs for IRP planning?

[1] The ELCC of 15.2% is the average for the entire MISO footprint. MISO performs a new study each year. The MISO-wide value has typically been between 10% and 20% at the current level of wind penetration in MISO.

A. Energy needs are considered for our IRP analysis in the context of Ameren Missouri's participation in the MISO markets for energy, capacity, and ancillary services. We model all of Ameren Missouri's generation through dispatch models that simulate the operation of the units, using forecasts of power prices to which the units are dispatched based on their marginal costs of operation, with the resultant energy being sold into the MISO market. Separately, we model the purchase of energy from MISO needed to meet our retail load requirements. The model relies on the ability of the market to meet the energy needs for our retail load within certain constraints, such as import capability into Ameren Missouri's load zone. As long as the energy needs for retail load are being met by the market within those constraints, the energy needs are considered to be satisfied.

Q. Why has IRP planning typically focused on capacity needs?

A. The IRP focus on capacity needs has its roots in the steps that were taken to address grid reliability following the widespread blackouts in the northeastern United States in 1965. One of these steps was the establishment of a reliability standard that would ensure sufficient generating capacity to limit load loss due to generator availability to one day in ten years. That standard is then typically translated into a planning reserve margin requirement, a percentage of forecast peak demand that defines the amount of generating capacity needed beyond the peak load requirement to ensure reliability. Today's U.S. electric generating fleet has been built out to satisfy this requirement. Much of that fleet, including hydro, nuclear, coal and efficient gas-fired generation, has been able to provide both substantial capacity and substantial energy at a relatively low total cost.

Q. Should the emphasis on energy needs in IRP planning be greater than it has been?

A. That is something that should be considered, particularly as the economy and U.S. energy infrastructure transitions to cleaner and more diverse sources of energy. As existing coal-fired capacity is retired, we could see even greater percentage reductions in electric energy production because of the baseload nature of operations at these facilities. Meeting both capacity needs and energy needs will likely be an increasing focus for IRP analyses.

Q. You mention that Ameren Missouri expects to be a net purchaser of energy by 2037 based on the Company's 2017 IRP analysis. Please explain.

A. Our 2017 IRP analysis include retirements of Meramec Energy Center in 2022, Sioux Energy Center in 2033, and two units at Labadie Energy Center in 2036. For 2037, following the retirement of the two Labadie units in 2036, our analysis shows total generation of 28.3 million MWh. Our total retail sales at transmission in 2037 are expected to be 30.2 million MWh. Our analysis therefore shows that we would have net purchases (i.e., be "short" energy) of 1.9 million MWh in that year. If the last of these units retire earlier, our short position would occur sooner.

Q. Dr. Marke indicates in his rebuttal testimony that the Labadie Energy Center is assumed to be retired in 2042 in Ameren Missouri's 2017 IRP.[2] Is that correct?

A. Not entirely. Two units are planned for retirement in 2036, and the other two units are planned for retirement in 2042. Depreciation rates are set at the generating

[2] Marke Rebuttal; p. 10, Table 1.

plant level for our coal-fired energy centers. Since the last unit retirements for Labadie are planned for 2042, that year is used to establish the depreciation rates for Labadie plant assets. Dr. Marke appears to have based the retirement dates in his exhibit on the dates used for establishing depreciation rates. Dr. Marke's failure to recognize the fact that two units at Labadie are slated to retire in 2036, rather than 2042, is a material omission in the context of this case. These two units that will retire just as wind assets could become available at the end of the subscription term of the Program represent over 1,000 MW of capacity. While, as I discussed earlier, wind generation is primarily an energy resource, the capacity value that it does have can offset some of the impact of the Labadie unit retirements in a timely fashion, in addition to filling in the energy shortfall I have just described.

Q. Does the correction of the retirement date to 2036 for those Labadie units have any implications for Dr. Marke's assessment of capacity need?

A. Yes, and it is significant. Those two Labadie units account for roughly 1,200 MW of capacity. Retiring the units greatly diminishes Ameren Missouri's capacity length and exposes it to a need for new capacity if it is necessary to retire other units early. This could happen for a host of reasons, including more stringent environmental regulations than expected, adverse changes in other market conditions, and/or a catastrophic equipment failure for which repairs may not be cost effective.

Q. Should the expectation that Ameren Missouri will be a net purchaser of energy under its IRP preferred plan be a cause for concern?

A. No. As long as Ameren Missouri remains a participant in a robust MISO market, being a net purchaser of such an amount in and of itself is not a cause for concern.

Q. If there is no cause for concern today, why should this expectation be considered in the context of this Program?

A. Ownership of the wind resources, which we believe results in the lowest long-term resource cost, in the context of this Program, provides us with an opportunity to take advantage of low-cost wind to meet subscriber needs in the near-term and the needs of all customers in the long-term.

Q. Why didn't Ameren Missouri include additional wind resources in its IRP preferred plan to address these complementary needs?

A. The reason comes down to timing and certainty. When we prepared the IRP analysis, we were still investigating the potential demand and the kinds of programs that could be deployed to meet customer demand for renewable energy. Our IRP filing mentions the potential for additional wind resources to meet this demand.[3] Once the Program becomes established and the resources needed to meet subscriber demand are identified, we will have a more concrete basis for adding any additional wind resources.

Q. How would the energy provided by 250 MW of company-owned wind compare to the net purchases in 2037 in the Company's IRP?

A. Assuming a 40% capacity factor, 250 MW of wind would be expected to generate nearly 900,000 MWh annually. This is a little less than half of the net purchases of 1.9 million MWh in 2037 in our IRP preferred plan.

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[3] Ameren Missouri 2017 IRP, Ch. 1 – Executive Summary, pp. 3-4.

IV. LONG-TERM VALUE OF WIND RESOURCES

Q. You mention that wind resources are very likely to produce net benefits. On what basis do you rely in making this statement?

A. This conclusion is based on our recent experience in evaluating and negotiating contracts for new wind resources. On May 21, 2018, Ameren Missouri filed an application for a Certificate of Convenience and Necessity ("CCN") to acquire a 400 MW wind farm upon completion of construction. Our analysis of the economics of this wind farm demonstrate that Ameren Missouri's customers will realize net benefits of up to $446 million over an assumed 30-year life of the assets. In fact, ten of twelve different scenarios for key driver variables result in net benefits of $79 million to $446 million. The remaining two scenarios each result in a slight net cost to customers of up to $25 million.[4]

Q. How do non-subscribing customers benefit from wind ownership once the associated subscription term under the Program has ended?

A. All customers would realize both direct, quantifiable benefits as well as less direct benefits. The direct, quantifiable benefits include market revenues from the sale of energy and capacity from the wind resources and realization of the value of deferred Production Tax Credit ("PTC") benefits that result from the smoothing mechanism included in the non-unanimous stipulation and agreement and explained by Ameren Missouri witness Steve Wills in his supplemental direct testimony.[5] The magnitude of the benefits would depend on the size of the project, its expected generation performance, and the expected value of capacity and energy.

[4] File No. EA-2018-0202, Michels Direct, p. 9, Table 1.
[5] File No. ET-2018-0063, Wills Supplemental Direct, p. 18.

Less direct benefits include mitigation of climate and environmental risks associated with Ameren Missouri's fleet and increased flexibility in responding to changing conditions that may affect the economics of our existing fleet.

Q. Please expand on that last point regarding increased flexibility to respond to changing conditions.

A. As Dr. Marke notes, Ameren Missouri is currently long generating capacity, and its long-term load expectations are flat to declining. However, conditions may change that affect electric demand, supply, or both. On the demand side, we are seeing greater interest in, and emphasis on, the potential for growth from efficient electrification. This includes electrification of transportation. The Company included a range of estimates for both electric vehicle load and broader, but still somewhat limited, electrification as part of its 2017 IRP analysis. However, it is possible that adoption of electric vehicles and other end uses that displace the need for fossil fuels could be greater than even the high end of this range. Indeed, the increased reliance on renewable sources of energy may be a factor in higher adoption given the resultant change in Ameren Missouri's energy mix and customers' interests in reducing overall carbon dioxide emissions. It is difficult to say with any certainty how these interactions will play out, but it is plausible that greater electrification, aided by shifts in energy production to cleaner sources, could drive future demand higher.

On the supply side, our existing fleet of resources faces well-known and well-documented potential challenges in the form of environmental regulations, low natural gas prices and customer interest in cleaner forms of energy. These and other factors are contributing to reductions in coal-fired electricity production and earlier retirements of coal-fired facilities. In fact, our 2017 IRP assumptions demonstrate an expectation for more retirements of coal-fired generation in the U.S. than that represented in our 2014 IRP. Should such trends continue and should conditions warrant reduced generation from, or earlier retirement of, Ameren Missouri's coal-fired units, we may find we have a greater and earlier need for new electric energy production. Having additional wind resources in Ameren Missouri's portfolio would enhance the Company's flexibility in dealing with such changing conditions by reducing the need for new energy resources at the time decisions to reduce coal generation may be warranted.

Q. Does the use of a 20-year life for purposes of calculating the subscription price have any effect on the economics of ownership following the subscription term?

A. Yes, and it is a beneficial impact. By using a 20-year life for the assets for purposes of setting the subscription price, 75% of the initial investment in wind used to serve subscriptions will have been covered by subscriptions over the 15-year term. The remaining 25% of the initial investment, along with the ongoing costs of operations, would represent the costs of continuing to use those assets to generate value in the MISO power market. With useful lives of 30 years or more now expected for new wind generation assets, this means at least 15 years of market benefits for 5 years of fixed asset costs, as well as any ongoing operating and maintenance costs.

V. CONCLUSION

Q. Please summarize your testimony and conclusions.

A. Ameren Missouri will likely need to acquire energy in excess of what it generates to serve its retail customers in the next 15 to 20 years. Potential increases in load due to electrification, along with curtailment of coal generation due to environmental constraints, competition from gas and renewable generation, and other market factors, could further increase this expected need for additional energy. These same uncertainties also highlight the need for flexibility in our long-term resource planning. New wind generation is expected to produce significant long-term net benefits for customers as a result of declining costs for new wind combined with the value of production tax credits. Ownership of a relatively modest amount of wind resources to serve subscribing customers under this Program provides a low-risk means to ensure Ameren Missouri's customers' long-term energy needs are met while securing significant long-term benefits.

Q. Does this conclude your surrebuttal testimony?

A. Yes, it does.