COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF DUKE ENERGY KENTUCKY, INC. FOR AN ADJUSTMENT TO RIDER NM II RATES AND FOR TARIFF APPROVAL	)))	CASE NO. 2025-00258

DIRECT TESTIMONY OF

JOHN D. SWEZ

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

August 4, 2025

TABLE OF CONTENTS

PAGE

I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John D. Swez, and my business address is 525 South Tryon Street, Charlotte, North Carolina 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed as Managing Director, Trading and Dispatch, by Duke Energy Carolinas, LLC, a utility affiliate of Duke Energy Kentucky, Inc. (Duke Energy Kentucky or Company).

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor of Science degree in Mechanical Engineering from Purdue University in 1992. I received a Master of Business Administration degree from the University of Indianapolis in 1995. I joined PSI Energy, Inc. in 1992 and have held various engineering positions with the Company or its affiliates in the generation dispatch or power trading departments. In 2003, I assumed the position of Manager, Real-Time Operations, on January 1, 2006, became the Director of Generation Dispatch and Operations, and finally assumed my current role on November 1, 2019.

Q. PLEASE BRIEFLY DESCRIBE YOUR DUTIES AS MANAGING DIRECTOR, TRADING & DISPATCH.

A. As Managing Director, Trading and Dispatch of Duke Energy, I am responsible for Power Trading on behalf of Duke Energy's regulated utilities in the Carolinas and Florida and Generation Dispatch on behalf of Duke Energy's regulated utilities in

Indiana, Ohio, and Kentucky. I am responsible for Duke Energy Kentucky's participation as a member of PJM Interconnection LLC (PJM) as it relates to the Company's generation dispatch, unit commitment, 24-hour real-time operations, and short-term maintenance planning. I am also responsible for the Company's submittal of supply offers in PJM's day-ahead and real-time electric energy (collectively Energy Markets) and ancillary services markets (ASM), as well as managing the Company's short-term supply position to ensure that the Company has adequate economic resources committed to serve its retail customers' electricity needs. I also work closely with the teams responsible for managing the Company's capacity position with respect to meeting its capacity obligation as a member of PJM.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes, I have testified before the Kentucky Public Service Commission (Commission) on several occasions.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony in this proceeding is to, as directed by the Commission, provide "additional evidence and testimony regarding the ancillary services" benefits of net metering, if any. In my testimony, I explain why behind-the-meter solar generators are primarily considered to reduce overall demand on the grid rather than directly supplying ancillary services, and therefore no ancillary services costs are avoided as a result of net metering customer-generators' activity.

II. PJM ANCILLARY SERVICES

Q. HOW DO THE BEHIND-THE-METER RESOURCES PARTICIPATE IN THE PJM ENERGY MARKETS TODAY?

A. Behind-the-meter resources do not directly participate in the PJM Energy Market. As an example, for the Company-owned Walton 1, Walton 2, Crittenden, and Aero Solar resources, there is no direct offer made as a supply resource to PJM as is done for the Company's East Bend and Woodsdale 1-6 generating stations. Walton 1, Walton 2, Crittenden, and Aero Solar only reduce the amount of load the Company purchases from PJM. Thus, the Company's customers are receiving benefits from the energy produced by these resources, since the amount of load purchased from PJM is reduced. However, the Company's Walton 1, Walton 2, Crittenden, and Aero Solar resources are not eligible to receive any ancillary services compensation from PJM.

Q. PLEASE EXPLAIN ANCILLARY SERVICES IN PJM?

A. As described by PJM in the Ancillary Services Fact Sheet[1], ancillary services "support the reliable operation of the transmission system as it moves electricity from generating sources to retail customers." PJM further explains that "PJM's ability to dispatch generation resources up or down and cycle them on or off in relatively short periods of time to balance supply and demand throughout the day is important today and will grow in importance in the future." PJM operates several markets for ancillary services, with those markets compensating participants for providing reliability services to the grid.

[1] https://www.pjm.com/-/media/DotCom/about-pjm/newsroom/fact-sheets/ancillary-services-fact-sheet.pdf

Q. WHAT ARE THE DIFFERENT TYPES OF ANCILLARY SERVICES AVAILABLE IN PJM?

A. For the purpose of this testimony, a broad definition of ancillary services was used to cover all possible sources of additional potential avoided cost. This set of ancillary services is regulation reserves, synchronized reserves, non-synchronized reserves, secondary reserves, reactive reserves, and black start service[2]. The inclusion of reactive supply and black start service, although not managed through the PJM Energy and Ancillary Services Market Operations, are included for completeness. Additionally, note that there can be multiple names for the same type of ancillary service in PJM. For instance, synchronized reserves are sometimes referred to as spinning reserves, non-synchronized reserves as quick start reserves, etc. To avoid confusion, the PJM Billing Line Item (BLI) name for each ancillary service is used for the remainder of this testimony. In addition, since synchronized reserves, non-synchronized reserves, and secondary reserves have both a Day-Ahead and Real-Time market, but regulation reserves currently only have a Real-Time market, discussion regarding any differences between Day-Ahead and Real-Time markets is avoided since there is no impact to the overall conclusion. Finally, note that the PJM regulation market will undergo changes at PJM later this year, but this change is not expected to materially impact any discussion in this testimony.

The six ancillary services names used for the remainder of this testimony are:

- Regulation and Frequency Response Service (Regulation)

[2] https://www.pjm.com/-/media/DotCom/documents/manuals/m11.pdf, pp. 85-139.

- Synchronized Reserve
- Non-Synchronized Reserve
- Secondary Reserve
- Reactive Supply and Voltage Control (Reactive)
- Black Start Service

In this testimony, I will describe the requirements for and characteristics of each type of ancillary service and explain why the value of behind-the-meter solar generation is maximized by reducing overall demand on the grid rather than supplying or avoiding the costs of any ancillary services.

Q. CAN BEHIND-THE-METER SOLAR GENERATORS SUPPLY REGULATION, SYNCHRONIZED, NON-SYNCHRONIZED, OR SECONDARY RESERVES?

A. No. However, before we can discuss the specific supply of ancillary services, first a behind-the-meter resource must participate in the PJM Energy Market. Behind-the-meter solar resources, as implied by their name, do not directly participate in the PJM Energy Markets. To directly participate, behind-the-meter generators connected to the local distribution system that wish to participate in PJM's market would first need to execute a PJM Wholesale Market Participation Agreement (WMPA)[3]. If a behind-the-meter asset executed a WMPA, it would still have to pass the specific requirement eligibility for regulation, synchronized reserves, non-synchronized reserves, and secondary reserves. For this testimony, it was assumed that the behind-the-meter resources have signed a WMPA to participate in the PJM

[3] https://www.pjm.com/-/media/DotCom/documents/manuals/m14c-redline.pdf, pp. 16-17.

Energy and Ancillary Services Market. The impact of each of these eligibility criteria with regards to behind-the-meter generation will be discussed in detail later in this testimony.

Q. CAN A GENERATOR CLEAR FOR BOTH ENERGY AND REGULATION, SYNCHRONIZED, NON-SYNCHRONIZED, AND SECONDARY RESERVES SIMULTANEOUSLY FOR THE SAME PORTION OF A GENERATING UNIT'S CAPABILITY?

A. No.[4] Resources cannot be compensated for both energy and reserves for the same portion of a generating unit's capability at the same time. Basically, they cannot be paid twice. Using energy and synchronized reserves as an example, if a 100 MW generator is on-line and can move at 1 MW/minute, it is eligible to supply 100 MW of energy and no synchronized reserves, or 90 MW of energy and 10 MW of synchronized reserves (with 10 MW calculated by taking the unit's ramp rate of 1 MW/minute multiplied by the 10-minute requirement for synchronized reserves). Thus, this generator could sell 90 MW in the energy market and be cleared to supply up to 10 MW of synchronized reserves. In all hours that PJM cleared but did not deploy synchronized reserves, which would be most hours since deployment of synchronized reserves is not a common event, the generator would have generated only 90 MW in each hour, even though it had the capability to generate 100 MW. However, the same generator can never sell 100 MW in the Energy Market and clear 10 MW of synchronized reserves since if generating 100 MW, the unit would lack the capability to further increase output by 10 MW in the case of a

[4] https://www.pjm.com/-/media/DotCom/documents/manuals/m11.pdf, pp. 58-59, 105, and 122.

synchronized reserve deployment by PJM. PJM co-optimizes the supply of energy and ancillary services, meaning that the product, either energy or synchronized reserves, which produces the most value, will clear the market. Thus, a generator will not lose money if in one hour, it supplies 90 MW of energy and 10 MW of synchronized reserves, but in the next hour it supplies 100 MW of energy and 0 MW of synchronized reserves. On-line generators that have lower marginal energy costs tend to supply more energy and fewer synchronized reserves, with generators that have higher marginal costs supplying more synchronized reserves since this minimizes the overall market costs to serve the total customer demand.

Q. WHY IS THIS FACT IMPORTANT?

A. Behind-the-meter solar resources are valuable providers of energy. Comparing only the cost of marginal energy, very few conventional generators can compete in the energy market with a renewable generator's free source of fuel. In fact, where other conventional generators typically submit an energy offer that is greater than $0/MWh, solar and other renewable energy generators frequently submit an offer of $0/MWh, and at times submit a negative offer value. Thus, the value created by a behind the meter solar generating resource is in its very low cost of energy production. If there is an ancillary service that a behind the meter resource could theoretically supply, since the resource would need to give up producing some of its energy to be capable of supplying the ancillary service, the provision of an ancillary service from behind-the meter-generators is economically inefficient, if not impossible in most circumstances as will be described later.

A. Regulation and Frequency Response Service

Q. PLEASE DESCRIBE "REGULATION AND FREQUENCY RESPONSE SERVICE" OR "REGULATION."

A. Regulation and frequency response service, or regulation ancillary services, help maintain the stability of the grid by changing its generation output level, either up or down, in response to a request from a grid operator. Regulation must be supplied by resources that are on-line, and capable of instantaneous (*i.e.*, real-time, second to second) adjustments for short-term changes in the amount of electricity consumed and thus help to manage system frequency. To participate in this type of ancillary service, a resource must be capable of following the regulation signal from PJM up and down in real-time.

Q. WHAT ELIGIBLITY REQUIREMENTS DOES PJM SPECIFY IN ORDER TO SUPPLY REGULATION?

A. In the PJM Energy and Ancillary Services Market, regulation offers may be submitted only by resources that must meet the following criteria[5]:

- Resources must be able to provide 0.1 MW of regulation capability
- Resources must have a governor capable of automatic generation control (AGC)
- Resources must be able to receive and respond to an AGC signal
- The resource's MW output must be telemetered to the PJM control center in a manner determined to be acceptable by PJM

[5] https://www.pjm.com/-/media/DotCom/documents/manuals/m11.pdf, pp. 85-104 (regulation and frequency response service) and pp. 107-108 (synchronized reserves, non-synchronized reserves, and secondary reserve).

- New resources must pass an initial performance test (minimum 75% compliance required).

Q. COULD A BEHIND-THE-METER SOLAR RESOURCE, PARTICIPATING IN THE PJM ENERGY MARKET, PROVIDE REGULATION RESERVES?

A. No. In addition to it not being economically practical, a behind-the-meter solar resource would most likely not qualify or be capable of supplying regulation. Although the solar resource can satisfy the provisions of being on-line and having AGC, the unit must be capable of both increasing (move up) or decreasing (move down) generation output. Solar resources can be moved down, but not moved up if there is no irradiance, *i.e.*, light from the sun, available to produce additional generation. The only way to supply both "up" and "down" regulation would be for the resource to generate less energy to create headroom, or a space for the generator to be able to increase output for regulation. If the unit were to move down to create room to provide this "up" regulation, if the irradiance level changed while the unit had moved back down, the unit would be responsible for updating its unit offer. With regulation being deployed or not deployed every few seconds, it would be impossible to update the offer this quickly. Further, a resource must be able to provide 0.1 MW of regulation capability, eliminating smaller resources. Additionally, PJM specifies that a resource must receive and respond to an AGC signal, with the MW output telemetered to the PJM control center, thus additional communication equipment is needed. Lastly, new resources must pass the PJM regulation performance test. These requirements are difficult and expensive for a

large generator, however for a single, small behind-the-meter generator, they are economically infeasible and in the case of being able to move generation up when not enough solar irradiance is present, impossible.

Q. EVEN IF SOMEHOW ABLE TO PARTICIPATE, WOULD IT BE ECONOMICALLY RATIONAL FOR A BEHIND-THE-METER SOLAR GENERATOR TO PROVIDE REGULATING RESERVES?

A. No, it would not be economically rational. In addition to the cost of the equipment needed, as stated earlier, solar resources tend to be the lowest cost energy generators on the grid. The revenue lost from providing less energy and instead providing regulation, unless the generator is in a severely constrained area where there is a negative Locational Marginal Price (LMP), would not cause an increase in overall value for the resource and would cause the resource to actually lose value.

B. Synchronized Reserve

Q. PLEASE DESCRIBE SYNCHRONIZED RESERVES.

A. Synchronized reserves are a type of reserves used by PJM to provide an increase in generation output to respond to an unexpected, sudden loss of generation or other system disruption. To provide synchronized reserves, a resource must be on-line and capable of responding to a PJM contingency event by increasing its generation output within 10 minutes.

Q. WHAT ELIGIBLITY REQUIREMENTS DOES PJM SPECIFY IN ORDER TO SUPPLY SYNCHRONIZED, NON-SYNRONIZED, AND SECONDARY RESERVES?

A. In the PJM Energy and Ancillary Services Market, generation resources

participating in the energy market are eligible to provide synchronized reserves, non-synchronized reserves, and secondary reserves unless:

- The resource is not within the metered boundaries of PJM
- The entire output is offered as Emergency Only
- The resource type includes: Nuclear, Wind, Solar, or a Hybrid Resource comprising exclusively of wind and solar components, unless an exception is requested and approved
- The resource is not available to provide energy or reduce load.
- Additionally, any resource must be able to provide 0.1 MW of Reserve Capability in order to participate in the Reserve Markets.

Q. COULD A BEHIND-THE-METER SOLAR RESOURCE, PARTICIPATING IN THE PJM ENERGY MARKET, PROVIDE SYNCHRONIZED RESERVES?

A. No. As the PJM eligibility requirements state, a resource type that is exclusively solar is not permitted to supply synchronized reserves. However, a mechanism does exist where the asset owner can petition PJM and the Market Monitoring Unit (MMU) for an exemption if they are able to provide documentation that shows the unit's ability to respond by providing additional generation after a request by PJM. However, a solar resource cannot satisfy the provision of increasing generation output if there is no available irradiance. The only way to increase generation in response to a request to supply synchronized reserves would be for the resource to generate less energy to create headroom, or space on the generator to be able to increase output for the supply of synchronized reserves, but since irradiance levels

change, it is unlikely PJM would allow a behind-the-meter solar generator to provide synchronized reserves. Further, a resource must be able to provide 0.1 MW of regulation capability, eliminating smaller resources.

Q. EVEN IF ELIGIBLE TO PARTICIPATE, WOULD IT BE ECONOMICALLY RATIONAL FOR A BEHIND-THE-METER SOLAR GENERATOR TO PROVIDE SYNCHRONIZED RESERVES?

A. No, it would not be economically rational. As stated, solar resources tend to be the lowest cost energy generators on the grid. The revenue lost from providing less energy and instead providing synchronized reserves, unless the generator is in a severally constrained area where there is a negative LMP, would not cause an increase in overall value for the resource and would cause the resource to actually lose value.

C. Non-Synchronized Reserves

Q. PLEASE DESCRIBE NON-SYNCHRONIZED RESERVES.

A. Non-synchronized reserves are like synchronized reserves, in that these reserves are used by PJM to provide an increase in generation output to respond to an unexpected, sudden loss of generation, or other system disruption. However, unlike synchronized reserves, non-synchronized reserves are generally supplied by units that are off-line but otherwise have similar requirements and eligibility criteria.

Q. COULD A BEHIND-THE-METER SOLAR RESOURCE, PARTICIPATING IN THE PJM ENERGY MARKET, PROVIDE NON-SYNCHRONIZED RESERVES?

A. No. Again, as the PJM eligibility requirements state, a resource type that is

exclusively solar is not permitted to supply non-synchronized reserves unless the asset owner petitions PJM and the MMU for an exemption and is able to provide documentation that shows the unit's ability to respond by providing additional generation after a request by PJM. The solar resource cannot satisfy the provision of increasing generation output if there is no available irradiance.

Q. EVEN IF IT WAS ELIGIBLE TO PARTICIPATE, WOULD IT BE ECONOMICALLY RATIONAL FOR A BEHIND-THE-METER SOLAR GENERATOR TO PROVIDE NON-SYNCHRONIZED RESERVES?

A. Again, no, it would not be economically rational for the same reasons as stated for synchronized reserves.

D. Secondary Reserves

Q. PLEASE DESCRIBE SECONDARY RESERVES.

A. Secondary reserves are used by PJM to ensure grid reliability, can be from either on-line or off-line resources, and can be converted to energy in less than thirty minutes.

Q. COULD A BEHIND-THE-METER SOLAR RESOURCE, PARTICIPATING IN THE PJM ENERGY MARKET, PROVIDE SECONDARY RESERVES?

A. No. Again, as the PJM eligibility requirements state, a resource type that is exclusively solar is not permitted to supply secondary reserves unless the asset owner petitions PJM and the MMU for an exemption and are able to provide documentation that shows the unit's ability to respond by providing additional generation after a request by PJM. The solar resource cannot satisfy the provision

of increasing generation output if there is no available irradiance.

Q. EVEN IF ELIGIBLE TO PARTICIPATE, WOULD IT BE ECONOMICALLY RATIONAL FOR A BEHIND-THE-METER SOLAR GENERATOR TO PROVIDE SECONDARY RESERVES?

A. Again, no, it would not be economically rational for the same reasons as stated for synchronized and non-synchronized reserves.

III. NON-ENERGY MARKET PRODUCTS

A. Reactive Supply and Voltage Control

Q. PLEASE DESCRIBE REACTIVE SUPPLY AND VOLTAGE CONTROL.

A. Reactive supply and voltage control, or simply Reactive power, is supplied by resources to help support voltage to allow for the movement of "real" power. Transmission connected generators follow a voltage schedule, within a tolerance band, with resources said to be either leading or lagging, depending on their supply or consumption of reactive power. In addition, there are devices on the distribution system that are used to control reactive power.

Q. COULD A BEHIND-THE-METER SOLAR GENERATOR PROVIDE REACTIVE SUPPLY AND VOLTAGE CONTROL?

A. From a strictly technological standpoint, this would be possible but practically speaking it does not occur for a number of reasons. Providing reactive supply and voltage control from behind-the-meter generators is generally not the least cost solution for customers and can lead to traditional reactive assets working against each other, resulting in voltage instability. Distribution interconnected (behind-the-meter) solar generators with a smart inverter, although they may be capable of

providing reactive power, are instructed to operate at unity power factor, thus not supplying reactive power. Duke Energy does not allow behind-the-meter resources to supply reactive power for multiple reasons. First, although some transmission connected solar resources can supply reactive at night, behind-the-meter solar generators generally cannot supply reactive power when not generating. Thus, other resources to supply reactive power will still be needed for reactive power control at night. Second, the distribution system already has assets in place to manage reactive power. Third, adding multiple reactive resources on the same line could require additional expensive distribution management system and communications equipment to ensure appropriate coordination of resources. Fourth, control of reactive power from large resources is relatively inexpensive. Finally, allowing behind-the-meter generating resources to supply reactive power could mean that traditional reactive assets and behind-the-meter solar resources work against each other, resulting in voltage instability.

Q. CAN BEHIND-THE-METER SOLAR GENERATORS IN PJM BE COMPENSATED FOR REACTIVE?

A. No. Compensation from PJM for the supply of reactive power is available for transmission-connected assets only. However, regardless, compensation for the supply of reactive power is ending for all generators in normal situations in PJM. According to PJM's compliance filing associated with FERC Order 904, if approved by FERC, payment for reactive power within the standard power factor

range is ending in PJM on June 1, 2026.[6]

B. Black Start Service

Q. PLEASE DESCRIBE BLACK START SERVICE.

A. Black start service is used to supply electricity for system restoration in the event that a portion or all of the entire PJM Interconnection grid loses power[7]. Black start units must be capable of starting and operating without external power sources within a 3-hour period. Owners of black start units are compensated for providing this service through the PJM OATT.

Q. WHAT ELIGIBLITY REQUIREMENTS DOES PJM SPECIFY IN ORDER TO BE ELIGIBLE TO SUPPLY BLACK START SERVICE?

A. PJM requires black start units to be able to close to a dead bus in 180 minutes, operate while maintaining voltage and frequency under different loadings, pass an annual performance test to verify its black start capability, and be able to start up on both a primary or secondary fuel (fuel assurance).[8]

Q. CAN A BEHIND-THE-METER SOLAR GENERATOR PROVIDE BLACK START SERVICE?

A. No. Unless the solar resource has a battery attached, it would not be eligible to provide black start service. Since a black start unit could be requested at any time, including after sunset or before dawn, there is no guarantee that the asset could start

[6] See *Compensation for Reactive Power Within the Standard Power Factor Range*, 189 FERC ¶ 61,034, FERC Docket No. RM22-2-000, pp. 4-5, available at https://www.ferc.gov/media/e-2-rm22-2-000; *Order No. 904 Compliance Filing of PJM Interconnection, L.L.C.*, FERC Docket No. ER25-1073-000, p. 8 (Jan. 28, 2025).

[7] https://www.pjm.com/-/media/DotCom/about-pjm/newsroom/fact-sheets/black-start-service-fact-sheet.pdf

[8] https://www.pjm.com/-/media/DotCom/documents/manuals/m14d.pdf, pp. 96-107.

without adequate sunlight and run for the required 180 minutes, in addition to other requirements. PJM considers these factors in ranking the benefits of Black Start Generation: located at a facility with multiple generators, start time, sized appropriately to provide MW cranking power and MVAR voltage control, transmission outlets and fuel diversity[9]. Further, PJM emphasizes the capability of blackstart resources so that the unit can help restoration of a broad area. Smaller behind-the-meter resources are not typically going to have a large enough impact and voltage control.

IV. ADDITIONAL DISCUSSION

A. Impact on Amount of PJM Ancillary Services

Q. DO SOLAR RESOURCES REDUCE OR INCREASE THE NEED FOR ADDITIONAL ANCILLARY SERVICES?

A. Due to their intermittent nature, solar resources create additional challenges for PJM. Referring to a recent PJM presentation, PJM listed factors that indicate the need for additional quantities of ancillary services due to additional intermittent generation, stating one reason as "Day-ahead uncertainty, including wind, solar, and load forecast error, generator performance risk, and interchange and weather-related uncertainty"[10]. In another PJM presentation[11], intermittent resources of wind and solar as well as behind the meter solar generation are listed as a source of uncertainty, and in addition, the need to manage the increasing impact on the PJM

[9] https://www.pjm.com/-/media/DotCom/documents/manuals/m36.pdf, pp. 77-78.

[10] "PJM's Preliminary Solution Options for the RCSTF Long-Term Scope," pp. 15, 20, 23-24, 29 (June 9, 2025).

[11] "Uncertainty in Operations," pp. 3, 10-15 (July 16, 2025).

net load ramp, stating "Renewable Growth Increases Net Load Ramps". Acknowledging this reality is not meant to diminish the effectiveness of solar generation resources. Solar generation is a low-cost provider of energy in that, once the assets are constructed, the fuel necessary to operate the generation is free. However, the reality is that additional solar generation, due to its intermittent nature, likely increases the need for additional ancillary services, rather than reducing such need.

Q. ARE THERE IMPACTS FROM BEHIND-THE-METER GENERATION TO THE AMOUNT OF BALANCING OPERATING RESERVE PAID BY THE COMPANY?

A. Yes. One reason the Company pays a balancing operating reserve charge to PJM is due to any load forecast error caused by the difference in the Company's day-ahead customer load demand bid and the real-time actual load. Due to the intermittent nature of behind-the-meter solar generation, the Company may pay an additional balancing operating reserve charge to PJM as a result of additional-behind-the meter solar generation.

B. PJM Settlements Impact

Q. WHAT IS THE IMPACT TO THE COMPANY'S PJM DEMAND FROM A BEHIND-THE-METER GENERATORS' ENERGY PRODUCTION?

A. As behind-the-meter generation occurs, for every additional 1 MW of such generation, the corresponding Duke Energy Kentucky demand, as seen by PJM, is reduced by 1 MW.

Q. WHY IS THIS SIGNIFICANT?

A. PJM allocates several charges and credits based on load ratio share, or the percentage of Duke Energy Kentucky demand divided by the total PJM demand. Thus, for every MW of load reduction, for the PJM Billing Line Items (BLI) that are allocated on load ratio share, a change in that BLI amount could have occurred.

Q. ARE ALL PJM BILLING LINE ITEMS ALLOCATED IN THIS METHOD?

A. No. However, PJM allocates the charges to load for the provision of ancillary services using the load ratio share method. In addition to these BLI charges, PJM also allocates other potential credits to the Company using the load ratio share method. Thus, in any month, there are charges that would be reduced, but there are also credits that are reduced due to the reduction in the Company's demand caused by behind-the-meter generating resources.

Q. WOULD IT BE POSSIBLE FOR THE COMPANY TO RE-CALCULATE THE PJM BILLING STATEMENT, APPROXIMATING WHAT THE CHANGE IN PJM CHARGES AND CREDITS WAS DUE TO THE IMPACT FROM BEHIND-THE-METER GENERATION?

A. No. The Company is unable to determine the impact on PJM BLI charges or credits from the reduction in Company load caused by behind-the-meter solar generation.

V. SUMMARY

Currently, the Company is not aware of any behind-the-meter solar resources providing ancillary services in PJM. In fact, by definition, behind-the-meter solar resources cannot supply ancillary services since PJM has no visibility to these products and cannot dispatch them to provide ancillary services. It is theoretically

possible to change the configuration of these behind-the-meter resources to allow them to participate in the PJM Energy and Ancillary Services Market. However, it is believed that doing so today would still not allow these resources to supply ancillary services and would cause a reduction in the unit's overall value, since the resulting loss in energy value would be worth more than the value of the ancillary services gained. Thus, it would be economically impractical and ineffective today to provide ancillary services from behind-the-meter solar resources in PJM.

As the grid is undergoing significant changes, it is too early to tell the future potential value of providing certain types of ancillary services products from behind the meter solar resources in PJM. Since the assets produce more value today as energy resources, it does not make economic sense to make a change in configuration. However, as the generation resource mix changes, markets evolve, and FERC Order 2222 is implemented in 2028 where behind the meter generators can aggregate together to sell products into the market, the provision of a limited set of specific ancillary services products from behind the meter solar resources could be possible. Providing limited specific types of ancillary services may be possible, if, for example, a down only regulation market were to be created where a resource is paid for the capability to decrease output. Since solar resources are dependent on the amount of irradiance from the sun, these resources could not participate in ancillary services products that require an increase in output.

Q. IS IT POSSIBLE THAT FUTURE CHANGES TO THE GRID AND ENERGY MARKETS COULD IMPACT YOUR OPINION ON THE VIABILITY OF BEHIND-THE-METER SOLAR GENERATORS PROVIDING ANCILLARY SERVICES OR REDUCING THE NEED FOR SUCH SERVICES?

A. Of course. The grid and energy markets are constantly changing over time. To the extent that there become additional ancillary services or other benefits that can be provided by behind-the-meter solar generation, the Company would at that time perform a new analysis.

VI. CONCLUSION

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

VERIFICATION

STATE OF NORTH CAROLINA)
) SS:
COUNTY OF MECKLENBURG)

The undersigned, John D. Swez, Managing Director Trading & Dispatch, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony and that it is true and correct to the best of his knowledge, information and belief.

John D. Swez Affiant

Subscribed and sworn to before me by John D. Swez on this 22nd day of July, 2025.

NOTARY PUBLIC

My Commission Expires: