COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF DUKE ENERGY KENTUCKY, INC.	)	
FOR AN ADJUSTMENT TO RIDER NM RATES AND	)	CASE NO.
FOR TARIFF APPROVAL	)	2023-00413

DIRECT TESTIMONY OF

MATTHEW KALEMBA

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

December 11, 2023

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I.   INTRODUCTION AND PURPOSE

1   **Q.   PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2   A.   My name is Matthew Kalemba, and my business address is 525 South Tryon Street,

3   Charlotte, North Carolina.

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

5   A.   I am employed by Duke Energy Business Services LLC (DEBS) as Managing

6   Director IRP and Analytics – Midwest for Duke Energy Kentucky, Inc. (Duke

7   Energy Kentucky or the Company) and Duke Energy Ohio, Inc. DEBS provides

8   various administrative and other services to Duke Energy Kentucky and other

9   affiliated companies of Duke Energy Corporation (Duke Energy).

10 **Q.   PLEASE   BRIEFLY   DESCRIBE   YOUR   EDUCATION   AND**

11   **PROFESSIONAL EXPERIENCE.**

12 A.   I received a Bachelor of Science in Chemical Engineering from North Carolina

13   State University in 2000 and a Master of Business Administration from Lake Forest

14   Graduate School of Management in Chicago in 2012. From 2000 to 2014, I held

15   various roles in the petroleum refining and petrochemical industry including

16   process engineering, feedstock and supply chain management, and short-term, mid-

17   term, and long-term strategy development. I joined Duke Energy in 2014 as an

18   analyst in the Carolinas Integrated Resource Planning team and became Director of

19   Distributed Energy Technologies Planning and Forecasting in March of 2020. In

20   March of 2023, I became Managing Director IRP & Analytics for Duke Energy's

21   Midwest regulated utilities.

1   Q.   **PLEASE DESCRIBE YOUR RESPONSIBILITIES AS MANAGING**

2   **DIRECTOR INTEGRATED RESOURCE PLANNING AND ANALYTICS.**

3   A.   I oversee the development of the long-term resource plans for the Company's

4   Midwest utilities. The overriding objective of those plans is to provide customers

5   with a generating system that is mindful of costs and risks, is increasingly diverse

6   and environmentally sustainable.

7   Q.   **HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY**

8   **PUBLIC SERVICE COMMISSION?**

9   A.   Yes.

10 Q.   **WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THESE**

11   **PROCEEDINGS?**

12 A.   The purpose of my testimony is to explain and provide support for certain prices,

13   cost data, and assumptions, as detailed below, that serve as starting points and/or

14   inputs for the calculations performed by Duke Energy Kentucky witness Bruce L.

15   Sailers in his Direct Testimony.

II.   DISCUSSION

16 Q.   **ARE YOU FAMILIAR WITH THE INTEGRATED RESOURCE**

17   **PLANNING PROCESS FOR DUKE ENERGY KENTUCKY?**

18 A.   Yes. Duke Energy Kentucky files its integrated resource plan (IRP) approximately

19   every three years. The Company filed its last IRP with the Commission in Case No.

20   2021-00245. Although this IRP provided a snapshot of Duke Energy Kentucky's

21   resource planning at that point in time, IRP planning is a dynamic process that is

22   periodically updated.

| 1 | Q. | **PLEASE GENERALLY DESCRIBE THE IRP PLANNING PROCESS.** |

1   Q.   **PLEASE GENERALLY DESCRIBE THE IRP PLANNING PROCESS.**

2   A.   The IRP planning process assesses various supply-side, demand-side and emission

3   compliance alternatives to develop a long-term, cost-effective portfolio to provide

4   customers with reliable service at reasonable costs. The IRP planning process

5   involves various assumptions such as future energy prices, future environmental

6   compliance requirements and reliability constraints. Among other things, the

7   Company develops a number of forecasts to generate inputs for the IRP planning

8   process.

9   Q.   **PLEASE EXPLAIN AND DESCRIBE THE PROCESS FOR DEVELOPING**

10   **AVOIDED CAPACITY, ENERGY AND ANCILLARY SERVICES**

11   **FORECASTS.**

12   A.   The Company uses the Peaker Methodology to develop avoided capacity and

13   avoided energy values. This methodology assumes that when a utility's generating

14   system, or in this case the PJM market, is operating at equilibrium, the installed

15   fixed capacity cost of a simple-cycle combustion turbine (CT) generating unit (a

16   "peaker") plus the variable marginal energy cost of running the system will produce

17   a reasonable proxy for the marginal capacity and energy costs that the utility avoids

18   (*i.e.*, "avoided costs") from power generated from net energy metered ("NEM")

19   resources Forecasts for avoided energy, capacity, and ancillary services are derived

20   from the models used in the development of the IRP:

21   •   Avoided energy costs represent an estimate of the system's marginal

22   variable operating costs that are avoided and otherwise would have been

23   incurred by the utility but for the addition of another resource, in this case

1		NEM resources. These costs are the company's forecast of the PJM hourly
2		Locational Marginal Prices (LMPs). This power price forecast is created
3		by modeling the Eastern Interconnection and includes a data base of
4		existing units, planned retirements and additions as well as fuel prices,
5		reagent costs and emission allowances.

6   • Avoided Capacity Costs represent fixed costs associated with the

7   construction, financing and staffing of a Combustion Turbine facility.

8   These fixed costs are not dependent on the actual use of the CT but rather

9   the costs to build the CT and have it available to meet customer demand.

10   • Avoided Ancillary Services are an output of the Eastern interconnect

11   modeling done to develop avoided energy prices.

12 **Q. PLEASE EXPLAIN AND DESCRIBE IN DETAIL HOW THE**

13 **FORECASTED LMPS USED IN MR. SAILERS' CALCULATIONS WERE**

14 **CALCULATED.**

15 A. Forecasted LMPs represent the hourly energy prices at which Duke Energy

16 Kentucky can purchase or sell power into the broader PJM marketplace. These

17 hourly prices are calculated through modeling in Anchor Power Solutions

18 Encompass power planning software. The Encompass model allows the Company

19 to model the entire Eastern Interconnection which includes nearly the entirety of

20 the central and eastern United States and Canada. Anchor Power Solutions includes

21 a database of existing units, planned retirements, and generation additions, as well

22 as fuel prices, reagent costs, emission allowances, and production and investment

23 tax credits (i.e., PTC and ITC). In order to calculate the LMPs, Duke Energy

1   Kentucky first uses Encompass's capacity expansion model to determine the

2   optimized least cost mix of resources for the entire Eastern Interconnection based

3   on the inputs in the database. Then, the Company uses Encompass's production

4   cost model to dispatch the optimized mix of resources on an hourly basis. The

5   forecasted LMPs represent the hourly dispatch price of the marginal unit in PJM

6   based on the production cost model results. These LMPs incorporate anticipated

7   environmental costs and impacts of the Inflation Reduction Act of 2022 (*i.e.*, the

8   IRA).

9 **Q.**   **PLEASE EXPLAIN AND DESCRIBE IN DETAIL HOW THE**

10   **FORECASTED LMPS INCORPORATE ANTICIPATED**

11   **ENVIRONMENTAL COSTS.**

12 A.   Environmental costs include Sulfur Oxide (SOx) and Nitrogen Oxide (NOx)

13   allowance costs. These allowance costs for years 2023 through 2032 are provided

14   to Duke Energy by a third party. Beyond 2032, the costs are escalated at 2.0%

15   annually. The allowance costs are included in the dispatch price for fossil-fuel fired

16   generators in the Eastern Interconnection in the Encompass, and they are reflected

17   in the LMPs as the marginal dispatch price that Duke Energy Kentucky can

18   purchase or sell power from/to the PJM marketplace. As explained below, the

19   forecasted LMPs incorporate the impacts of the IRA. The incentives included in the

20   IRA drive significant levels of renewable and other non-CO2 emitting resource

21   development in the expansion plan. The IRA acts like a "carrot" for reducing CO2

22   emissions. The Company did not include a Carbon Tax in the development of the

1   LMPs because the IRA is already achieving the same outcomes that a Carbon Tax

2   would promote.

3 Q. **PLEASE EXPLAIN AND DESCRIBE IN DETAIL HOW THE**

4   **FORECASTED LMPS INCORPORATE THE ANTICIPATED IMPACTS**

5   **OF THE IRA.**

6 A. The forecasted LMPs incorporate the anticipated impacts of the IRA in two ways.

7   First, the expansion plan model in Encompass calculates the optimized least cost

8   mix of resources based on the inputs provided to the model. Those inputs include

9   the IRA tax benefits including ITCs for solar and storage resources and PTCs for

10   renewable and nuclear resources that meet the requirements of the IRA. The

11   optimized least cost mix of resources would be different had the IRA benefits not

12   been included in the capacity expansion model. Then, when the optimized mix of

13   resources is modeled in the production cost model, the dispatch price of resources

14   includes the PTC benefits for the resources that are eligible for those tax credits

15   under the IRA. The inclusion of the PTC in the production cost model can impact

16   the order resources are dispatched. This change in dispatch order can lead to a

17   different marginal unit with a different marginal dispatch price had the IRA benefits

18   not been included in the model.

1 **Q.** **PLEASE EXPLAIN AND DESCRIBE IN DETAIL HOW THE COST OF A**

2 **COMBUSTION TURBINE AND FIXED OPERATIONS AND**

3 **MAINTENTANCE COSTS USED IN MR. SAILERS' CALCULATIONS**

4 **WERE CALCULATED.**

5 **A.** As mentioned previously, the Peaker Method assumes that a distributed resource

6 added to the system allows for a marginal resource to be avoided. Duke Energy

7 Kentucky assumes that the avoided marginal resource is a natural gas fired CT. The

8 cost to construct a simple-cycle CT is developed using overnight construction costs

9 provided by a third-party consultant that, along with the Company's financing

10 costs, represent the total cost to construct a CT. The fixed operations and

11 maintenance costs, such as staffing costs, are also provided by the third-party

12 consultant for resources specific to the Duke Energy Kentucky service territory.

13 This information is provided to Mr. Sailers to develop the avoided capacity rate

14 shown in this filing.

15 **Q.** **PLEASE EXPLAIN AND DESCRIBE IN DETAIL HOW THE**

16 **FORECASTED PRICES FOR ANCILLARY SERVICES USED IN MR.**

17 **SAILERS' CALCULATIONS WERE CALCULATED.**

18 **A.** The Horizons Energy database within the Encompass model includes ancillary

19 services price forecasts for contingency/operating reserves and spinning reserves.

20 These values are provided to Mr. Sailers for his calculations. These forecasts also

21 have an impact on the LMP prices. In a similar manner to how the IRA impacts the

22 dispatch order of resources in the production cost model, the ancillary services

23 forecast can also influence how resources dispatch in the model. This change in

1   dispatch order can lead to a different marginal unit with a different marginal

2   dispatch price had prices for ancillary services not been included in the model.

III.   CONCLUSION

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

4 A.   Yes.

VERIFICATION

STATE OF ~~NORTH~~ CAROLINA   south (AE)   )

COUNTY OF ~~MECKLENBURG~~   York (AE)   )   SS:

)

      The undersigned, Matt Kalemba, Managing Director IRP and Analytics - Midwest, 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.

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Matt Kalemba Affiant

      Subscribed and sworn to before me by Matt Kalemba on this 11th day of Dec., 2023.

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NOTARY PUBLIC

My Commission Expires: August 2, 2033