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STATE COMPTROLLER COMMISSION  
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Case No. PUR-2023-00066  
Sponsor: ("DOMINION")  
Exhibit No. 47

Witness: ALAN W. BRADSHAW  
Bailiff: JABARI T. ROBINSON

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WITNESS REBUTTAL TESTIMONY SUMMARY

Witness: Alan W. Bradshaw  
Title: Vice President – Strategic Partnerships

Company Witness Alan W. Bradshaw responds to the comments and recommendations of Staff and respondents concerning the data center load forecast.

Mr. Bradshaw first provides an overview of the process the Company used to develop the PJM Derived Load Forecast. He also explains how the Company developed the 15-year data center forecast that was incorporated by PJM into its load forecast.

Company Witness Bradshaw counters Staff Witness Johnson's assertion that the load forecast relies too heavily on one sector of demand. The Company has over a decade of experience working with data center customers. The Company's access to, and integration of, real-world intelligence sets the Company's forecast apart from other forecasting models and approaches. He demonstrates that currently held customer commitments validate the Company's forecast.

Mr. Bradshaw explains that respondents' critiques about the data center forecast are not credible. The Company has gained experience with the data center industry and refined its forecasting methodology, which uses historical data to build statistical analysis, augmented with customer intelligence and validated through signed customer contracts.

In response to comments by Appalachian Voices' Witness Wilson, Mr. Bradshaw explains that the Company, NOVEC, and PJM regularly communicate about the data center forecast, and the allegation that future data center load has been double counted is incorrect. The Company develops a detailed forecast by county and no electric cooperative load is incorporated into the PJM Derived Load Forecast.

Company Witness Bradshaw responds to alternative data center solutions proposed by respondents. He notes that, based on current customer behavior, non-wire alternatives and demand response are not resources data center customers would leverage. Data centers are not interruptible, the Company has an obligation to serve, and it is not prudent to deter future investment in Virginia by delaying projects. He explains that shifting data center load to other parts of the country or the world during times of peak may be technically feasible but appears to be limited to emergency situations. Despite a large portion of the data industry participating in time of use rates, it has not incentivized the industry to shift load.

Finally, Mr. Bradshaw responds to respondents' recommendations for future integrated resource plan proceedings regarding the data center forecast. He explains that the Company's data center forecast already includes energy efficiency and demand response program impacts utilized by data center customers. He counters Appalachian Voices' recommendations to use the Bass Diffusion Model or provide additional scenarios, and explains that the Company's forecast uses forward looking research and analysis gained from day-to-day work with customers and industry experts.

EXHIBIT# 47

**DIRECT TESTIMONY  
OF  
ALAN W. BRADSHAW  
ON BEHALF OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
BEFORE THE  
STATE CORPORATION COMMISSION OF VIRGINIA  
CASE NO. PUR-2023-00066**

1 **Q. Please state your name, business address, and position with Virginia Electric and**  
2 **Power Company (“Dominion Energy Virginia” or the “Company”).**

3 A. My name is Alan W. Bradshaw, and my business address is 600 East Canal Street,  
4 Richmond, Virginia 23219. I am the Vice President – Strategic Partnerships for the  
5 Company. A statement of my background and qualifications is attached as Appendix A.

6 **Q. Please describe your areas of responsibility with the Company.**

7 A. My areas of responsibilities include Key Accounts, the Data Center Practice, the Rural  
8 Broadband and Grid Transformation Plan fiber programs, Outdoor Lighting, and the  
9 Energy Conservation team.

10 **Q. Have you previously submitted testimony with the State Corporation Commission of**  
11 **Virginia (the “Commission”) in this proceeding?**

12 A. No.

13 **Q. What is the purpose of your rebuttal testimony in this proceeding?**

14 A. I am testifying in support of the Company’s 2023 system-wide Integrated Resource Plan  
15 (the “2023 Plan”). My rebuttal testimony responds to certain comments and  
16 recommendations offered by Bernadette Johnson on behalf of State Corporation  
17 Commission Staff (“Staff”); Edward Burgess and Maria Roumpani on behalf of

1 Advanced Energy United (“AEU”); Devi Glick on behalf of Sierra Club; and Gregory  
2 Abbott and James Wilson on behalf of Appalachian Voices (“APV”).

3 **Q. Are you sponsoring any exhibits or schedules with your rebuttal testimony?**

4 A. Yes. Company Exhibit No. \_\_, AWB, consisting of Rebuttal Schedule 1, was prepared  
5 under my direction and supervision, and is accurate and complete to the best of my  
6 knowledge and belief.

7 **Q. Mr. Bradshaw, how is your rebuttal testimony organized?**

8 A. My rebuttal testimony is organized as follows:

9 I. LOAD FORECAST DEVELOPMENT, GENERALLY

10 II. RESPONSE TO STAFF TESTIMONY

11 III. DATA CENTER LOAD FORECAST

12 IV. ALTERNATIVE DATA CENTER SOLUTIONS

13 V. ADDITIONAL WITNESS RECOMMENDATIONS

14 **I. LOAD FORECAST DEVELOPMENT, GENERALLY**

15 **Q. Please explain the process by which the PJM Derived Load Forecast was developed**  
16 **for the 2023 Plan.**

17 A. Per the Commission’s directive in its Final Order in Case No. PUR-2018-00065 and  
18 explained in detail in Section 4.1.1 of the 2023 Plan, the Company created and used the  
19 PJM Derived Load Forecast as the basis for its 2023 Plan.<sup>1</sup> At a high level, PJM

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<sup>1</sup> *Commonwealth of Virginia, ex rel., State Corporation Commission, In re: Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to Va. Code § 56-597 et seq., Case No. PUR-2018-00065, Final Order at 11 (June 27, 2019) (directing the Company to use the PJM Load Forecast for future integrated resource plans and annual updates).*

1 Interconnection, LLC (“PJM”) annually solicits information from each electric  
2 distribution company (“EDC”) in PJM regarding significant future block load increases,  
3 including data centers, that are known to the EDC. This information is independently  
4 analyzed by PJM on a case-by-case basis, as explained by Company Witness Abhijit  
5 Rajan, and incorporated into its annual forecast at its discretion. For the 2023 forecast,  
6 PJM requested a 15-year data center load forecast for the Dominion Energy load serving  
7 entity (“DOM LSE”), which the Company provided to PJM in October 2022. As  
8 explained in detail through discovery responses in this proceeding, the Company used  
9 historical metered data along with customer intelligence and contracts to develop the 15-  
10 year data center load forecast it provided to PJM. The Company is also aware that  
11 Northern Virginia Electric Cooperative (“NOVEC”) provided a data center forecast to  
12 PJM for the NOVEC LSE during the 2023 load forecast cycle.

13 PJM independently reviewed and incorporated, as I discuss further below, the  
14 information provided by the Company and NOVEC and published the load forecast for  
15 the Dominion Energy Zone (“DOM Zone”) in January 2023. PJM’s methodology to  
16 develop the 2023 DOM Zone load forecast is described in its 2023 Load Forecast  
17 Supplement.<sup>2</sup>

18 To properly use the PJM load forecast to develop the 2023 Plan, the Company needed to  
19 adjust that forecast for modeling purposes. As explained in the 2023 Plan, PJM does not

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<sup>2</sup> PJM Resource Adequacy Planning Department, 2023 Load Forecast Supplement (Jan. 2023), available at <https://www.pjm.com/-/media/planning/res-adeq/load-forecast/load-forecast-supplement.ashx> [hereinafter “2023 PJM Load Forecast Supplement”].

1 provide a DOM LSE forecast, so the Company must first scale down the PJM DOM Zone  
2 coincident peak load and energy forecast to create the PJM Derived Load Forecast.<sup>3</sup>

3 My testimony will focus on critiques associated specifically with the development of the  
4 data center load forecast; Company Witness Abhijit Rajan provides additional detail on  
5 the development of the PJM Derived Load Forecast.

6 **Q. Please explain the Company's process to develop the 15-year data center forecast**  
7 **provided to PJM.**

8 **A.** The Company followed a systematic-based process, refined over the last several years, to  
9 develop its 15-year data center load forecast.

10 First, the Company identified the largest and/or fastest growing data center customers  
11 within the Company's service territory. Currently the Company has identified eight  
12 customers that meet these criteria. All other customers were combined into a ninth  
13 segment.

14 Second, the Company prepares a customer-by-customer forecast using statistics and  
15 confidential customer information, including forward-looking information shared directly  
16 by the customer. These by-customer forecasts were combined into an overall forecast  
17 identified as the "High" forecast. This approach is conservative because it uses the  
18 customer-informed by-customer forecast as the "High" forecast rather than assuming all

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<sup>3</sup> *Commonwealth of Virginia, ex rel. State Corporation Commission, In re: Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to Va. Code § 56-597 et seq.*, Case No. PUR-2020-00035, Final Order at 11 (Feb. 1, 2021) ("As part of the 2018 IRP proceeding, the Commission directed the Company to use the Dominion Zone PJM coincident peak load forecast and energy sales forecast, scaled down to the Dominion load serving entity.").

1 future load will materialize and then establishing an arbitrary scenario-based upper and  
2 lower limit.

3 Specifically, the Company calculated an initial megawatt-hour ("MWh") forecast for the  
4 nine customer segments using linear regression only. The Company then prepared three  
5 demand models for each customer segment resulting in 27 different demand models for  
6 the nine customer segments. Next, the Company applied customer intelligence to select  
7 the appropriate demand model for each customer segment. If none of the three models  
8 aligned with customer intelligence as to future business growth, then an adjusted growth  
9 curve is used, *e.g.*, a flat growth curve. A specific customer example is discussed later in  
10 my testimony. The Company then used the historical monthly usage of demand to create  
11 the forecasted demand values by month within each year. The Company adjusted the  
12 initial MWh forecast using a historical industry average load factor and removes retail  
13 choice MWh.

14 Third, the Company used historical metered data to develop six different statistical  
15 models of the overall industry. These six models are averaged to develop the "Low"  
16 forecast.

17 Finally, the Company took an average of the by-customer and aggregate (*i.e.*, "High" and  
18 "Low") scenario forecasts to calculate the "Medium" scenario which became the  
19 Company's official submission to PJM.

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1 II. RESPONSE TO STAFF TESTIMONY

2 Q. Turning now to address Staff's testimony, Staff Witness Johnson cautions on page 7  
3 of the report attached to her testimony (the "Enverus Report") that the Company's  
4 load forecast relies too heavily on one sector of demand. Do you agree?

5 A. Respectfully, no. As the Company has been demonstrating for years, data centers are  
6 growing at a fast rate in the DOM LSE with no immediate signs of slowing. Throughout  
7 my testimony, I will demonstrate that the Company has over a decade of experience  
8 working with data center customers and through these customer partnerships, the  
9 Company has been trusted with customer and industry intelligence that informs the  
10 Company's forecast. The access to, and integration of, this real-word intelligence sets the  
11 Company's forecast apart from other forecasting models and approaches. The Company  
12 will describe how previous forecasts by outside firms have fallen well short of actual  
13 results, which prompted the Company to change its long-term forecasting approach such  
14 that customer intelligence can inform the data center load forecast. Lastly, the Company  
15 will show how currently held customer commitments validate its forecast.

16 Q. Staff Witness Johnson states that the Company's forecast is stronger than the actual  
17 load that Enverus has measured in the entirety of ERCOT. (Enverus Report at 16).  
18 Do you have a comment?

19 A. Yes. First, I will refer to the JLL Report<sup>4</sup> introduced by APV Witness Wilson in this  
20 case. While the Company is on record stating that these industry reports typically  
21 highlight only the colocation data centers—one segment of the data center industry—

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<sup>4</sup> JLL, *Data Centers 2023 Global Outlook* (Apr. 13, 2023), available at <https://www.us.jll.com/en/trends-and-insights/research/data-center-outlook> [hereinafter "JLL Report"].



1 page 18 of the report displays the 8 largest data center markets in the U.S. The Dallas-  
2 Fort Worth area (ERCOT) is highlighted on page 18 of the JLL Report, which shows  
3 current capacity of 734.4 megawatts ("MWs") and 182.1 MWs in development. Contrast  
4 that to Northern Virginia, which is shown as having 3,442 MWs of current capacity and  
5 651 MWs in development. Again, the Company contends these numbers represent only  
6 the colocation market, which is 45% of the Company's market in Virginia. Additionally,  
7 data center development is growing in Henrico County and southside Virginia counties,  
8 which are not included in this data. Second, as part of this testimony, the Company will  
9 share the magnitude of currently held customer contracts that supports the Company's  
10 data center load forecast.

11 **Q. On page 16 of the Enverus Report, Staff Witness Johnson states she "is not as**  
12 **confident in data center load growth for two reasons." Do you have a comment?**

13 **A.** Yes. Company Witness Harrison Potter will address Ms. Johnson's statement about PJM  
14 and reliability challenges. As to her assertion that data center growth is elastic and "will  
15 follow low costs of real estate & power prices for development signals," I will again  
16 point to the large number of MWs included in a variety of customer contracts that support  
17 data center development in Virginia, discussed below. Additionally, the JLL Report,  
18 which on page 10 states that Northern Virginia will be one of three data center markets  
19 (Hong Kong and Frankfurt are the others) that "will continue to grow even in the face of  
20 high land prices and utility costs because these markets offer low risk and stability." The  
21 Company has experienced this phenomenon firsthand—despite challenges in Northern  
22 Virginia, the Company has not seen slower growth. In fact, the Company continues to  
23 receive requests for service throughout its territory.

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1 III. DATA CENTER LOAD FORECAST

2 Q. Turning to respondents, APV Witness Wilson claims that the Company and PJM do  
3 not take long-term data center forecasting “very seriously” and asks the  
4 Commission to request PJM or require the Company to hire an outside firm to  
5 prepare a detailed study and set of scenarios of future data center loads. (Wilson at  
6 5, 10-11). Please respond.

7 A. The allegation that the Company does not take long-term data center forecasting planning  
8 seriously or that the Company lacks experience is not credible and ignores that the  
9 Company has been conducting its own data center forecasting since 2015. As the data  
10 center industry has continued to grow within the DOM LSE, the Company has  
11 accumulated over 10 years of actual data center meter data, established working  
12 relationships with data center customers, economic developers, and industry consultants,  
13 and has submitted annual data center load forecasts for the DOM LSE to PJM since  
14 2014.<sup>5</sup>

15 The Company’s Strategic Partnership Department (the “Department”) that I oversee  
16 includes the Data Center Practice team, consisting of a Director, Key Account Managers,  
17 Data Center Economic Development Specialists, and a Senior Business Analyst. In all,  
18 13 colleagues work every day to support the data center industry in Virginia, including  
19 gathering customer intelligence. Collectively, the team possesses a broad array of  
20 customer service skills, electric distribution knowledge, economic development

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<sup>5</sup> Historically, PJM has requested a 5-year data center forecast from the LSEs. The development of the 2023 load forecast was the first time PJM requested a 15-year data center forecast. The Company has been using a 15-year data center forecast for its own load forecasting since 2015. See 2023 Load Forecast Supplement at 20.

1 experience, and over a decade of load forecasting experience, all utilized to develop the  
2 data center load forecast. The Data Center Practice also works closely with the team  
3 managed by Company Witness Rajan.

4 The Data Center Practice team works with data center customers in the very early  
5 planning stages (typically, 3 to 7 years in advance of project initiation) and in some cases  
6 this team works with customers who share longer term forecasts (greater than 7 years).  
7 As projects progress, the Company and its customers enter into a series of contracts that  
8 increasingly obligate the customers to financial commitments in the form of Substation  
9 Engineering Letters of Authorization (“SELOAs”), Construction Letters of Authorization  
10 (“CLOAs”), and Electric Service Agreements (“ESAs”). I describe these contractual  
11 mechanisms in further detail in my testimony below. The Company uses the information  
12 gathered from employees to yield ongoing customer intelligence that is used to inform  
13 and refine the long-term data center forecast. I apply my over 40 years of experience  
14 with the Company to oversee the operations of the Department and the Data Center  
15 Practice team.

16 The Company’s data center forecasting process is much more than a “simple drawing of  
17 lines or curves through historical data” as Mr. Wilson suggests (p. 6). As explained in  
18 detail through discovery in this proceeding, as the Company has gained experience with  
19 the data center industry, it has continued to refine its forecasting methodology. While the  
20 Company’s forecasts certainly utilize historical data to build statistical analysis, those  
21 analyses are augmented with specific current and future customer intelligence, and  
22 industry trends. Additionally, they are validated through a variety of measures, including  
23 signed customer contracts, which are backed by financial commitments.

1 Q. Do you believe the Company should hire an outside forecaster for future integrated  
2 resource plan proceedings?

3 A. The Company has done so in the past and the previous studies have been informative;  
4 however, the load forecasts provided from external firms have consistently been well  
5 below actual results, which prompted the Company to begin developing its own forecasts.  
6 As an example, Mr. Wilson references the 2013 and 2015 Quanta Technology (“Quanta”)  
7 studies, as “examples of how such a study should be pursued.” (Wilson p. 5). However,  
8 both studies significantly under-forecasted the growth of data centers in the DOM LSE.  
9 In 2020, the Company hired Itron, Inc. (“Itron”) to conduct an independent review of the  
10 Company’s load forecasting process. Itron’s forecast also significantly under-forecasted  
11 data center growth. Using 2022 as a comparison, Table 1 provides a summary of the  
12 under-forecasting and demonstrates that the prior Quanta and Itron studies did not  
13 produce a reasonable forecast of data center growth in the Company’s service territory.

14 **Table 1**

3rd Party Consultant	Year of Forecast	Forecast Range For 2022		Consultant Recommendation (MWs)	2022 Actual (MWs)
		Low (MWs)	High (MWs)		
Quanta	2013	845	1,630	1,317	2,767
Quanta	2015	1,932	2,412	2,229	
Itron	2020 (Plan)	N/A	1,660	1,660	

15

1 The Company notes that the outside firms that developed these forecasts are highly  
2 competent firms, and the Company utilizes their valued services even today. The point is  
3 that the growth of the data center industry continues at unprecedented levels and  
4 forecasting requires not only an understanding of mathematics and statistical analysis but  
5 also requires day-to-day interaction with customers to receive customer intelligence and  
6 apply that intelligence to the load forecasting process as I discuss in more detail below.

7 **Q. Sierra Club Witness Glick states on page 38 of her testimony that the Company just**  
8 **now started to plan for data center load growth, when the build-out of data centers**  
9 **has been occurring for years. Is this statement accurate?**

10 A. No, it is not. As described above, the Company has been gathering information and  
11 refining its data center forecast for over 10 years, working closely with data center  
12 customers and other industry partners. Although the Company has developed a data  
13 center load forecast every year since 2014, at PJM's request, the Company provided a 15-  
14 year data center load forecast in 2023.

15 **Q. Do you agree with APV Witness Abbott's assertion that the Company modeled load**  
16 **growth equally across the service territory and is "not solving the actual problem**  
17 **the data center forecast is presenting?" (Abbott at 41-42).**

18 A. No, I disagree with his premise for two reasons. First, the Company used its extensive  
19 customer intelligence to provide PJM a data center load forecast broken down by county  
20 in October 2022. Second, the Company's forecast showed growing data center load in  
21 multiple counties throughout the DOM Zone, not just in Northern Virginia counties. As  
22 noted above, the Company works closely with data center customers on a daily basis to

1 understand their needs and future plans, including location, and the Company  
2 incorporates that information into its data center load forecast.

3 While customers reach out to the Company's Data Center Practice team to request  
4 information on available transmission and distribution infrastructure, determining the  
5 final location to site a new data center is ultimately a business decision made solely by  
6 the customer. The Company does, however, have an obligation to serve when it receives  
7 a request from a customer. When a request for service is received, the Company then  
8 proceeds to conduct studies to determine the new or upgraded transmission and  
9 distribution infrastructure necessary to provide the requested service, regardless of  
10 location.

11 As explained by Company Witness Shane T. Compton, the PLEXOS model used to  
12 develop the 2023 Plan does not choose the location for generation resources and that  
13 location is a project specific determination based on myriad factors such as land  
14 availability (or unavailability), cost, transmission, etc. Further, the Company's system  
15 includes important generation facilities like Bath County Pump Storage Station that  
16 provide necessary energy and capacity despite not being located next to large areas of  
17 load.

1 Q. On page 12 of his testimony, AEU Witness Burgess claims that the 2023 Plan did not  
2 consider key factors that could ultimately limit the impact of growth sectors, such as  
3 data centers. He alleges that the 2023 Plan fails to fully account for increases in end  
4 use efficiency and does not fully consider the role that energy efficiency (“EE”) and  
5 demand response (“DR”) programs could play to mitigate growing energy and peak  
6 demand needs. Do you agree with this position?

7 A. No. As Data Center Coalition Witness Levi states in his testimony, by centralizing  
8 computing resources, data centers have been able to leverage innovations in design,  
9 equipment, and technology to maximize energy efficiency. (Levi at 8-9). The  
10 Company’s data center load forecast utilizes actual loads as an input—more simply  
11 defined as energy consumption measured by the meter. As such, any ongoing energy  
12 efficiencies incorporated by the data center industry within the DOM LSE are being  
13 captured in the Company’s analysis and carried forward within the forecast.

14 As for DR programs, PJM has existing DR programs with economic incentives available  
15 to customers. Additionally, the Company has time-of-use (“TOU”) rates, Schedule 10  
16 and market-based rates, available to customers. Data center customers make their own  
17 business decisions as to whether they will make use of these options. If they do, any  
18 impacts to metered load data will be included in the data center load forecast and  
19 assumed to continue.

20 Lastly, data center customers are consistently signaling to the Company that the industry  
21 is in the infancy of the next wave of new growth with new advances in artificial  
22 intelligence (“AI”) and other technologies, as explained by Company Witness Rajan.  
23 The Company’s current data center load forecast does not fully integrate the potential

1 impact of these new technologies because more data is needed. However, it is clear that  
2 the evolution of AI and other technologies are real and will drive further, or at a  
3 minimum sustain existing, growth in the data center industry.

4 **Q. Do you agree with AEU Witness Burgess's assertions on pages 13-14 of his**  
5 **testimony that the Company's load forecast adjustment is "very aggressive," and**  
6 **that caution should be applied when assuming that the data center load will**  
7 **continue to grow at its current rate for the next 15 years?**

8 A. No. As described later in this testimony, currently held, and financially backed customer  
9 contracts provide a strong measure of validation for the Company's near-term data center  
10 load forecast and mitigates forecasting risk. These contracts provide a sound basis for the  
11 validity of the data center load forecast into the future. The Company used certain  
12 customers' long-term forecasts to support the level of growth in the data center load  
13 forecast. While the Company utilizes a 15-year data center forecast for long-term  
14 planning, as Company Witness Compton explains, the next five years should be the  
15 focus. The Company files a new integrated resource plan or update each year, refining its  
16 assumptions and forecasts.

17 **Q. Do you agree with APV Witness Wilson's statements on pages 5 and 26 of his**  
18 **testimony that "the Company's recent near-term data center load forecasts have**  
19 **been fairly accurate" and the Company's "near-term forecast is likely reasonably**  
20 **well supported by firm contracts and customer plans that are in a relatively**  
21 **advanced state of development."**

22 A. Yes. The Company agrees with APV Witness Wilson's assessment of the accuracy of  
23 the near-term data center forecasts, which he defines as between 2022 and 2027. The



1 Company agrees that many of the projects that will be connected between 2023 and 2027  
2 are currently advancing through the service connection process. Also, as described later  
3 in my testimony, these near-term projects as well as many long-term projects are  
4 supported by currently held financially backed, customer contracts.

5 **Q. However, Mr. Wilson also states that the process of providing a data center forecast**  
6 **to PJM “has been characterized by lack of communication and coordination**  
7 **between PJM and the utilities, and among the utilities, and this apparently may**  
8 **have led to substantial double-counting of near-term data center loads,” and the**  
9 **inclusion of data centers not in the Company’s service territory. (Wilson at 5, 27).**  
10 **Do you agree with that characterization?**

11 **A.** Not at all. PJM has a structured process for receiving separate data center load forecasts  
12 from both the Company and NOVEC, and both utilities are in regular communication  
13 with PJM and each other. In fact, PJM addresses this on page 18 of its 2023 Load  
14 Forecast Supplement which states, “[e]ach request is considered on a case-by-case basis,  
15 with particular caution paid to avoid double-counting anticipated load increases or  
16 decreases.”

17 On page 27 of his testimony, Mr. Wilson alleges, without evidence, that the Company  
18 and NOVEC double counted future data center load, particularly as it relates to Amazon  
19 Web Services’ recent investment announcement.<sup>6</sup> Mr. Wilson’s allegation is incorrect as

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<sup>6</sup> Governor of Virginia, *Amazon Web Services Plans to Invest \$35 Billion in the Commonwealth by 2040 to Expand Data Center Campuses* (Jan. 20, 2023), available at <https://www.governor.virginia.gov/newsroom/news-releases/2023/january/name-991808-en.html>.

1 the Company has been entrusted with specific locations of data center load associated  
2 with the Governor's announcement.

3 As previously described, the Company has been working with data center customers to  
4 prepare for new and expanded data centers for over a decade now, and the Company  
5 develops a detailed forecast *by county* based on the customer intelligence. It is the  
6 Company's understanding NOVEC does the same. The Company also meets with  
7 NOVEC to discuss forecasting methodologies and process improvements. Periodically,  
8 the Company also meets with NOVEC and data center customers to ensure consistent and  
9 accurate flow of information on specific projects. It is through these ongoing discussions  
10 that both the Company and NOVEC can determine data center locations within their  
11 respective service territories for purposes of forecasting.

12 Certainly, information can change, as it did in January 2023, when, based on additional  
13 customer information, the Company updated PJM with the location of certain forecasted  
14 load that the Company understands will fall within the service territory of two other  
15 electric cooperatives (not NOVEC) within the DOM Zone. The resulting math is zero  
16 impact to the overall DOM Zone forecast provided by PJM to the Company in early  
17 January 2023. However, this adjustment did lower the DOM LSE forecast and as  
18 explained by Company Witness Rajan, was incorporated into the Company's process to  
19 create the PJM Derived Load Forecast. Therefore, no electric cooperative load is  
20 incorporated into the PJM Derived Load Forecast used to develop the Company's 2023  
21 Plan. The fact that the January 2023 adjustment was made is actually evidence of an  
22 iterative process that works versus one that failed.

1 Q. What is your response to APV Witness Wilson's statement on page 6 of his  
2 testimony that "the longer-term data center forecast used in the 2023 Plan is not  
3 supported by firm evidence, market studies, or a reasonable forecasting approach, is  
4 highly speculative, and likely double counts some anticipated data center loads."

5 A. The Company disagrees with these unfounded assertions by APV Witness Wilson. I  
6 have already explained that the Company has carefully forecasted its data center load and  
7 did not double count future load. I will address Mr. Wilson's other criticisms in turn.

8 Q. Please explain how the Company's data center forecast is supported by firm  
9 evidence.

10 A. As explained above, the Company's data center forecast is informed and validated by  
11 existing contracts with customers that include financial commitments.

12 ESAs are the contracts for electric service between the Company and a customer. Each  
13 contract is structured for an individual account. By signing an ESA, the customer is  
14 committing to consuming enough electricity annually to cover the Company's  
15 incremental cost of the distribution infrastructure. The contract also includes a minimum  
16 demand requirement. If the customer does not meet these obligations, then the customer  
17 is required to reimburse the Company the costs the Company expended to serve the  
18 customer's expected demand. Many ESAs include ramp schedules where the contracted  
19 MWs grow over the term of the agreement. Looking out to 2032, the Company has 5,827  
20 MWs contracted with customers through ESAs.

21 CLOAs are the contracts that enable construction of required distribution and substation  
22 electric infrastructure to begin. Should a customer elect to discontinue a project, they are

1 obligated to reimburse the Company for its investment to date. As of July 2023, the  
2 Company has 2,008 MWs contracted with customers through CLOAs which include  
3 projects with customer requested completion dates through 2026.

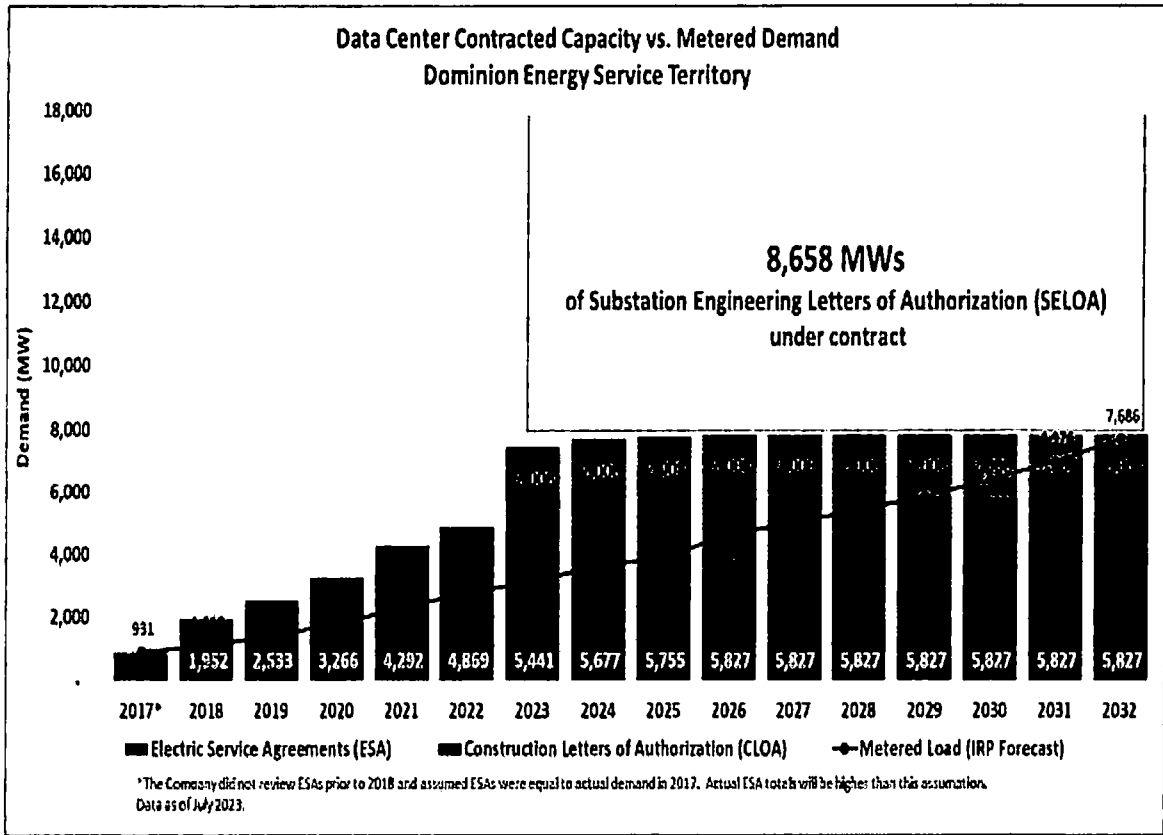
4 SELOAs are the contracts requesting the Company to begin the necessary engineering for  
5 new distribution and substation infrastructure required to serve a new data center project.

6 Should a customer elect to discontinue a project, they are obligated to reimburse the  
7 Company for its investment to date. As of July 2023, the Company has 8,658 MWs  
8 contracted associated with projects with customer requested completion dates through  
9 2031.

10 These contracted amounts do not contemplate the many data center projects that are in a  
11 development phase and have not yet reached a point in the service connection process  
12 where a contract is executed. The natural flow of these contracts is that some projects  
13 currently in an early development phase will result in new SELOAs, and some SELOAs  
14 will transition into CLOAs, and CLOAs will ultimately result in ESAs.

15 Figure 1 below illustrates the 5,827 MWs included in ESAs, 2,008 MWs included in  
16 CLOAs, and 8,658 MWs included in SELOAs through 2032. These contracts represent  
17 what the Company has executed and in hand as of July 2023.

Figure 1



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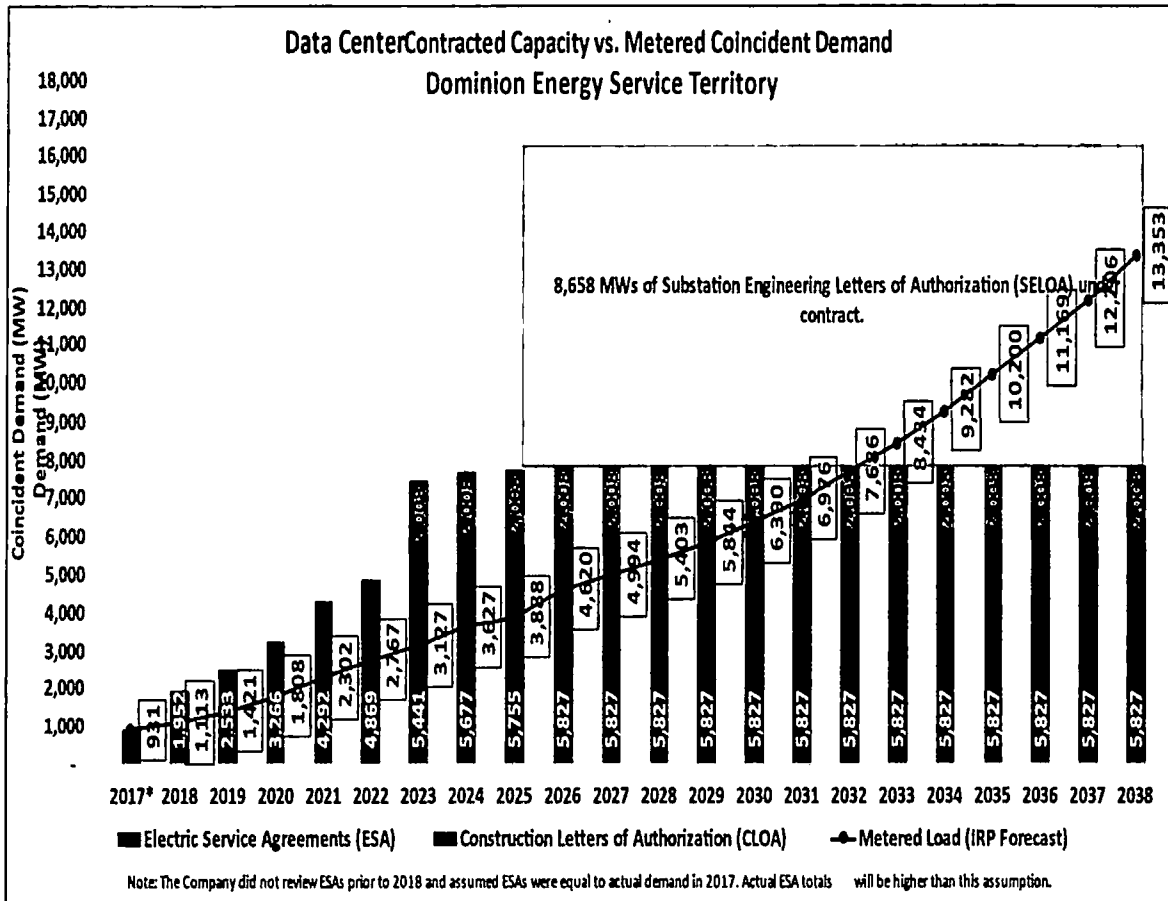
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In summary, the first third (2023-2027) of the Company’s data center load forecast is supported by a near-term forecast that APV Witness Wilson acknowledges has proven to be reasonably accurate. Additionally, both the first third and the middle third (2028-2032) of the Company’s data center load forecast are validated with 7,835 MWs (5,827 MWs + 2,008 MWs) of high-confidence customer contracts in the form of ESAs and CLOAs. The final third (2033-2037) of the Company’s forecast is supported by 8.6 gigawatts included in SELOAs that represent only what is executed and in hand today (exclusive of contracts that may be signed in the next 10 years). Figure 2 below depicts

1 the Company's longer-term forecast (through 2038) and supporting customer  
 2 commitments.

3 **Figure 2**



4  
 5 **Q. Do you agree that the Company's forecast is "highly speculative"?**

6 No. The Company's data center forecast is not speculative but based on extensive  
 7 historical data and future customer intelligence. As explained earlier, to develop the 15-  
 8 year data center forecast, the Company used recent historical data to develop individual  
 9 models for the eight largest and/or fastest growing data center customers in the  
 10 Company's territory. All other data center customers were included in a ninth segment.

1 Three separate statistical models were prepared for each of the nine customer segments.  
2 The Company then utilized its extensive customer intelligence to select one of the three  
3 statistical models that best depicted the customer segments' future business strategy. If  
4 none of the three models aligned with customer intelligence as to future business growth,  
5 then an adjusted growth curve is used. By way of a real-life example, a large and  
6 growing data center customer (Customer X) recently acquired another large and growing  
7 data center customer (Customer Y). Prior to the acquisition, both customers exhibited  
8 significant growth. However, after the acquisition, Customer X made the decision to  
9 move all new growth to Customer X and to halt all new investments at Customer Y.  
10 Based on the Company's discussions with Customer X, the Company did not assume the  
11 historical growth model for Customer Y would continue, but instead assumed a no-  
12 growth pattern going forward. The ability for the Company to leverage this type of  
13 customer intelligence in its forecasting process is necessary and, in the Company's  
14 opinion, produces a forecast grounded more in real world growth.

15 **Q. APV Witness Wilson also claims on page 9 of his testimony that the Company's high**  
16 **and low data center forecasts "represent a very narrow and rather arbitrary range**  
17 **around the base forecast – they greatly understate the uncertainty of the forecast."**

18 **What is your response?**

19 **A. APV Witness Wilson fails to provide a recommendation on what a reasonable range**  
20 **should be.<sup>7</sup> The +/- range of the Company's data center load forecast is not constant over**

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<sup>7</sup> The Company asked Mr. Wilson to identify a "reasonable range" in discovery, but he refused to provide a range. See Appalachian Voices response to DEV Set 03-63, which is attached as my Rebuttal Schedule 1.

1 time, but reasonably starts small and grows larger later in the forecast period. For  
2 instance, the range is +/- 10% in 2029 and +/- 18% in 2037.

3 The Company's high scenario is created by the long-term forecast of the nine customer  
4 segments. The low scenario is based on forecasting the industry in aggregate. Given  
5 these facts, the Company is comfortable with the ranges in its forecast. The Company  
6 believes the range is reasonable, because it incorporates specific (actual) customer  
7 intelligence into the forecast, which creates a level of certainty, especially for earlier  
8 years, that is not typical with other forecasting models. Again, the Company's data  
9 center load is supported by currently held customer contracts.

10 **Q. APV Witness Wilson also argues on page 46 that the Company has no basis for its**  
11 **claim that the industry reports capture less than half of the data center business.**  
12 **How do you respond to these claims?**

13 **A.** Contrary to Mr. Wilson's claim, the Company does believe these industry reports to be  
14 useful; however as explained in the 2023 Plan and in discovery, through the Company's  
15 own experience with data center customers, the Company knows that the industry reports  
16 typically report data from the colocation market and may not capture the entire industry.  
17 Cloud providers, which typically do not provide data for the industry reports, make up  
18 55% of the Company's data center customers; therefore, only about 45% of the  
19 Company's data center customers are potentially captured in industry reports.



1 Mr. Wilson references JLL's most recent report<sup>8</sup> in an attempt to discredit the Company's  
2 forecast. The Company has several observations regarding the JLL Report:

- 3 • Mr. Wilson notes that the report shows 3,442 MW in the Northern Virginia region  
4 in 2022, which is greater than the sum of the DOM LSE and NOVEC load for that  
5 year. However, his comparison is flawed because the JLL Report shows *capacity*  
6 in MWs while the Company's DOM LSE of 2,767 MWs is actual *metered*  
7 *demand*. Data center customers contract for a certain amount of capacity but can  
8 take up to three to five years to ramp up loading. To further illustrate this point, of  
9 the Company's currently held ESAs 5,033 MWs are in Northern Virginia. This  
10 value for the Company alone is greater than the 3,442 MWs shown in the JLL  
11 Report for both the Company *and* NOVEC in Northern Virginia.
  
- 12 • Page 18 of the JLL Report shows the eight largest U.S data center markets with an  
13 aggregated total capacity of 7,594.4 MWs in 2022. The Company contends that  
14 this data is reflective of the colocation market only, because on page 12 of the  
15 report, the capacity of the five largest cloud companies (*i.e.*, hyper-scalers) in the  
16 U.S. is shown as approximately 10,000 MWs. Clearly the representation of the  
17 U.S. largest markets shown on page 18 does not include the cloud companies,  
18 which is consistent with the Company's position.
  
- 19 • Lastly, the map on page 18 of the JLL Report shows Northern Virginia as the  
20 largest U.S. data center market. The Company notes that markets in Henrico  
21 County and several counties in southside Virginia continue to grow and

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<sup>8</sup> *Supra* n.4.

1 collectively are or will be larger than several of the other national data center  
2 markets highlighted in the JLL Report.

3 **Q. On pages 37 to 40 of his testimony, Witness Wilson purports to have developed an**  
4 **alternative long-term data center forecast and claims it is more reasonable and**  
5 **prudent for planning than the Company's forecast. Do you agree?**

6 **A.** No. Mr. Wilson's Bass Diffusion Model approach introduces a forced S-curve to the  
7 forecast that the Company believes is not representative of the specific growth of the data  
8 center industry in Virginia. APV Witness Wilson's forecast begins to flatten data center  
9 growth around 2030 and plateaus at 6,810 MWs in 2040. As noted earlier, the  
10 Company's data center load reached 2,767 MW in 2022, and the Company currently  
11 holds an additional 7,835 MWs in ESAs and CLOAs, with customer requested project  
12 completion dates through 2026. The Company has another 8,658 MWs backed by  
13 SELOAs with customer requested project completion dates through 2031. These  
14 customer commitments, held as of July 2023, demonstrates that Mr. Wilson's forecast is  
15 significantly understated. Company Witness Rajan's testimony discusses how the  
16 Company has utilized the Bass-Diffusion Model as well as how APV Witness Wilson's  
17 arbitrary key inputs produce an unstable outcome.

18 **IV. ALTERNATIVE DATA CENTER SOLUTIONS**

19 **Q. APV Witnesses Abbott and Wilson and AEU Witness Burgess suggest alternatives**  
20 **to addressing data center load growth. Are you familiar with their**  
21 **recommendations?**

22 **A.** Yes, I am.

1 Q. Do you agree with APV Witness Abbott's conclusion on page 42 that non-wire  
2 alternatives ("NWAs") "could be a useful option to address forecasted data center  
3 load concentrated in northern Virginia and [the Company] has not attempted to  
4 develop NWA options for the model to select"?

5 A. No. Based on current customer behavior, this does not appear to be a solution data center  
6 customers would leverage. Today, PJM administers the capacity market, which includes  
7 Demand Response ("DR") as a resource type. The Company is not aware of a data center  
8 customer taking advantage of this opportunity and that is validated by examination of the  
9 metered data.

10 Q. On page 10 of his testimony, APV Witness Wilson claims that "data centers are  
11 similar to interruptible loads, not just in the operational timeframe, but also in the  
12 planning timeframe." He alleges that construction and service could be delayed  
13 until the utility is "able to absorb it." Do you agree?

14 A. No, I do not. Data centers run 24/7/365 and are not interruptible. This is evident by the  
15 fact that all data centers install back-up generation for 100% of their load as protection  
16 against utility power loss. However, it is the Company's understanding that many of the  
17 data centers in its service territory utilize Tier 2 diesel generators, which are heavily  
18 regulated by the Environmental Protection Agency and Virginia Department of  
19 Environmental Quality, particularly in Northern Virginia. Their use is limited to mainly  
20 emergencies and periodic maintenance—not for shifting load during daily peaks.

21 I also disagree that there are any advantages for data center customers or utilities to delay  
22 projects "until the system is able to absorb it." While data center customers may be  
23 planning developments across the country and world, the facts noted throughout my

1 testimony demonstrate a robust pipeline of projects and indicate strong demand for new  
2 data centers in the Company's service territory. The Company has an obligation to serve  
3 all customers on our system when a request is received and that includes data centers.  
4 Additionally, there are financial implications of shifting project plans for customers, as  
5 these projects take multiple years to complete and require investing in engineering,  
6 regulatory, permitting, supply chain, and construction phases. A policy of delaying  
7 construction for data center customers is not prudent as it could deter future data center  
8 investment in Virginia, significantly reducing the economic benefits the growing industry  
9 has provided to the Commonwealth, as discussed in Data Center Coalition Witness  
10 Levi's testimony.

11 **Q. AEU Witness Burgess and APV Witness Abbott suggest that data centers can shift**  
12 **computing power to other areas of the country or the world during times of peak**  
13 **load on the Company's system and the Company's load forecast should account for**  
14 **this "novel" form of peak reduction. (Burgess at 18-19; Abbott at 44-45). Mr.**  
15 **Abbott further recommends the Company be required to investigate a DR program**  
16 **to incentivize this practice. (Abbott at 46). Do you agree?**

17 **A.** No. The Company broached this subject with several data center customers while  
18 identifying options to relieve a temporary transmission capacity constraint in eastern  
19 Loudoun County. Many of the technologies that data centers support for themselves and  
20 for their customers require that latency is minimized. For example, buildings that support  
21 different business streams for the same customer may be strategically located within the  
22 same "availability zone." Additionally, data center customers may reserve some amount  
23 of capacity for unplanned events where demand spikes for periods of time (e.g., the Super

1 Bowl, national news events, etc.). In the Company’s conversations with data center  
2 customers on this subject, there may be some capacity to move computing load around  
3 the country, but those conversations also indicated that there are bottlenecks in the fiber  
4 network that limit the amount of fiber capacity. These bottlenecks introduce the risk of  
5 increasing latency. Therefore, there appears to be limited incentive to leverage this  
6 capability beyond emergency conditions. Ultimately, this is a customer business decision  
7 and not a Company decision. As discussed below, a large portion of the data center  
8 industry is on time of use rates, yet this has not incentivized the industry to shift load,  
9 suggesting that while it may be technically feasible, it may not be economic or practical.

10 Regarding the development of a DR or load curtailment program, the Company has  
11 begun an initiative to develop a program. Through discussions with data center  
12 customers, there is a desire to combine load curtailment with opportunities to add  
13 capacity for customers during times when system loads are lower. This type of program  
14 does not currently exist anywhere in North America, so it is being developed from  
15 scratch. There are many technological, algorithmic, and logistical issues to resolve. A  
16 one-year pilot is scheduled to begin early in 2024.

17 **Q. APV Witness Abbott also believes the Company could create a mandatory TOU rate**  
18 **for customers with a load of 20 MW or greater applicable to customers located in**  
19 **severely congested areas, such as Northern Virginia, and charge those customers a**  
20 **“punitive rate for usage during those hours.” He recommends the Company**  
21 **investigate the feasibility of designing such a rate for data centers in Northern**  
22 **Virginia. (Abbott at 47). Please respond.**

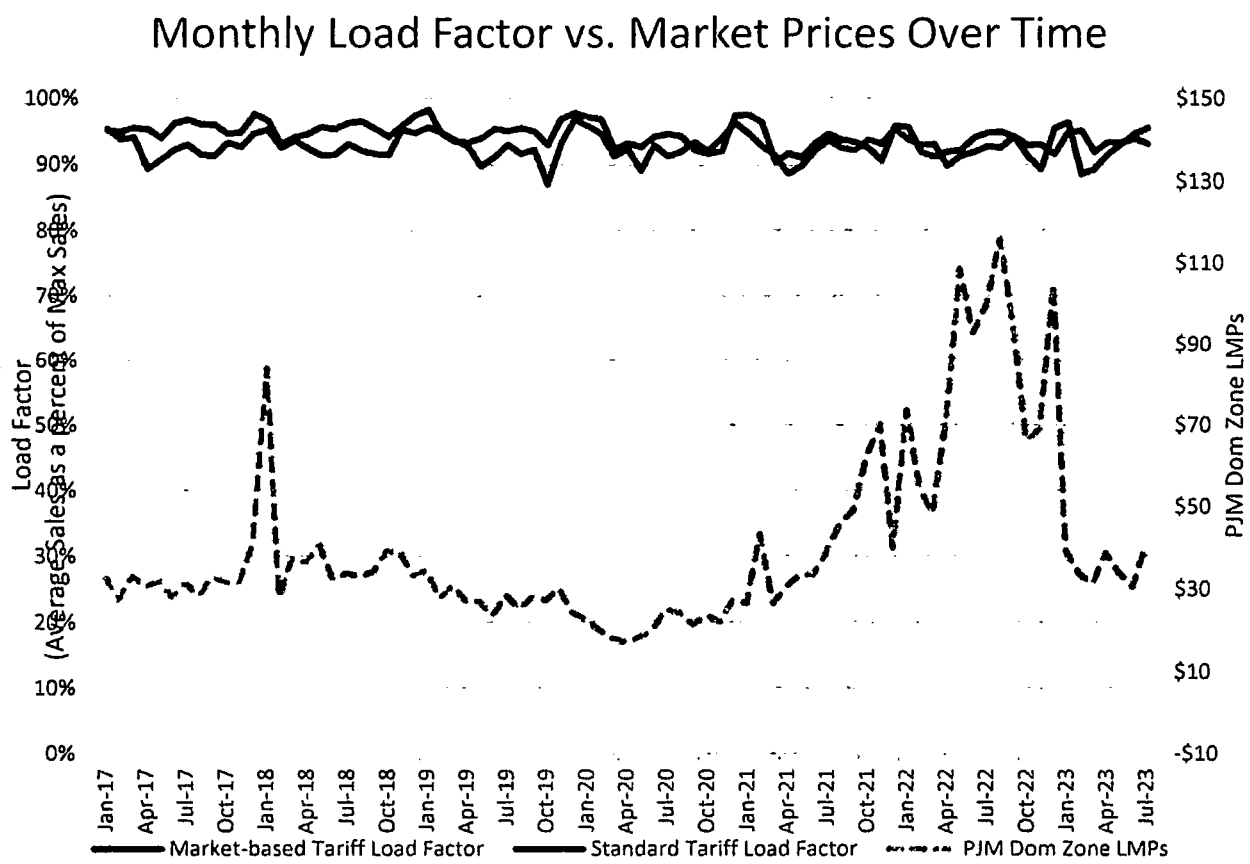
1 A. First, the Company does not develop programs or rates that “punish” its customers for  
2 their consumption as that would conflict with its core values and its desire to be an  
3 energy solutions partner for its customers who may then make business decisions based  
4 on their own economics.

5 Today, the Company has two time of use tariffs available for customers, including data  
6 centers. Schedule 10, available to customers with a demand equal to or greater than 500  
7 kilowatts, gives customers the opportunity to reduce load on the system based on high,  
8 medium, and low electricity price days. There are only a small number of data center  
9 customers on this voluntary tariff. A very large portion of data center customers are on  
10 one of the Company’s market-based tariffs, which are available to any customer with a  
11 demand equal to or greater than 5 MW. The market-based tariffs are based on real-time  
12 pricing from PJM, which is a very clearly a price signal, yet minimal to no customer  
13 curtailment has been evident during the periods of high market prices. Figure 3 below  
14 demonstrates this point by comparing monthly load factors for data center customers on  
15 market-based rates and standard tariffs to PJM market prices. It is clear that load factors  
16 remain relatively stable for data center customers on standard tariffs and market-based  
17 rates, even as market prices nearly quadruple.

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Figure 3



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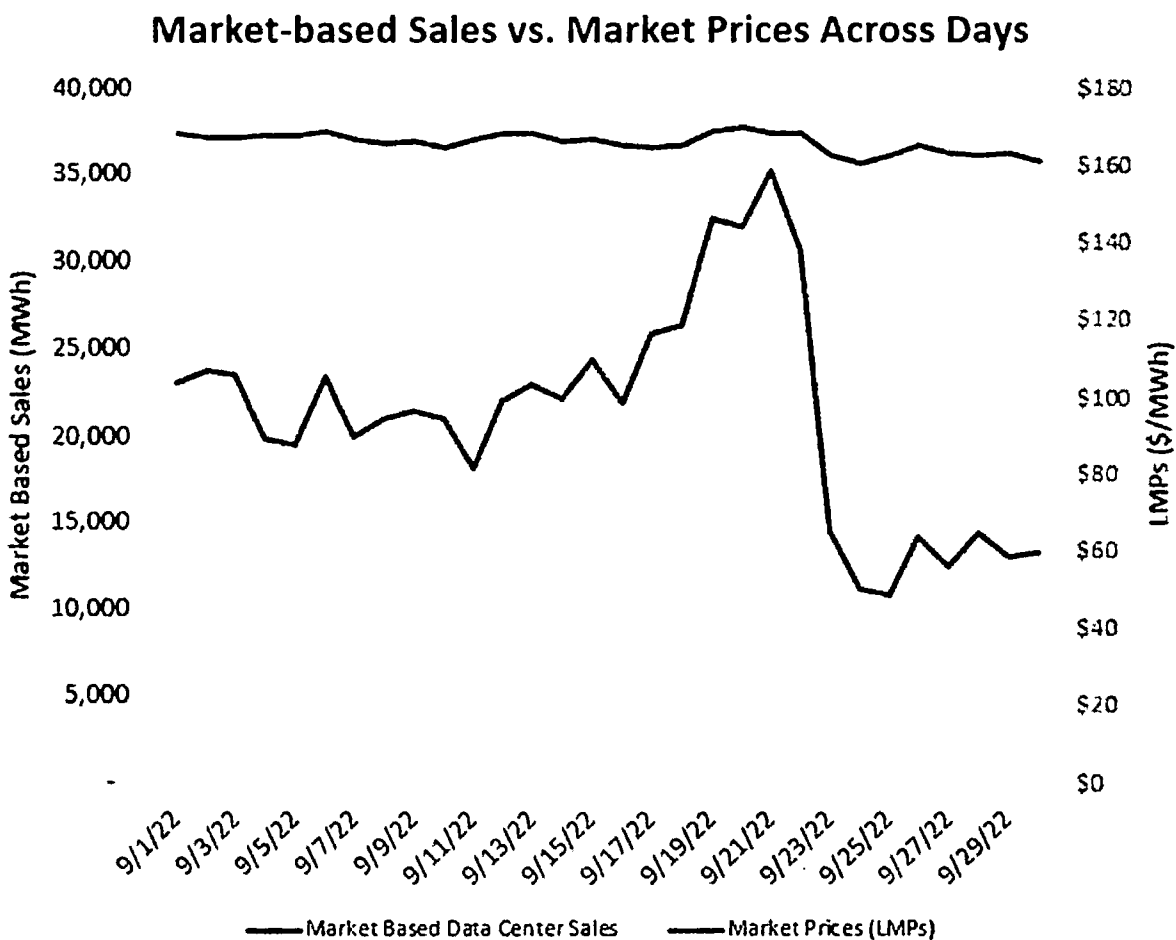
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Figure 4 below provides a different view, comparing market-based sales (MWh) to PJM locational marginal prices (“LMPs”) during the month of September 2022. Again, there were significant fluctuations in PJM LMPs, but they did not appear to influence energy usage for data center customers.

Figure 4



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3 **Q. What does this behavior, based on your knowledge of data centers' load factor, tell**  
 4 **you about whether data centers will respond to price signals and curtail load?**

5 **A.** As mentioned above, a significant portion of the Company's data center customers are on  
 6 one of the Company's market-based rates. The customers on these rates have not  
 7 historically responded to price signals. It is the Company's understanding that  
 8 opportunities for data center customers to curtail load are limited, due to the nature of  
 9 their business and this is confirmed by the data shown in Figures 3 and 4 above.



V. ADDITIONAL WITNESS RECOMMENDATIONS

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**Q. AEU Witnesses Burgess and Roumpani make several recommendations regarding future IRPs. (Burgess at 10, 40); Roumpani at 58). Will you please summarize certain of their recommendations as it relates to the data center forecast?**

**A. AEU Witnesses Burgess and Roumpani recommend that the Company develop a plan that includes a more limited data center load forecast that accounts for the limitations and expanded EE and DR programs focused on data centers.**

**Q. What is the Company's response to that recommendation?**

**A. The Company's data center forecasting process already includes all EE and DR program impacts that data center customers take advantage of because the Company utilizes historical metered load to develop its forecast. This method ensures the inclusion of the impacts of all customer-implemented EE and DR programs. The forecasting process also assumes these efforts will continue into future forecasting periods.**

**Additionally, as mentioned in earlier, the growth of AI and other technologies has the potential to impact long-term data center growth. In contrast to AEU Witnesses Burgess' and Roumpani's recommendation, it may be prudent to develop a long-term forecast scenario reflecting potential growth driven by the expansion of new technologies.**

1 Q. APV Witness Wilson makes certain recommendations on page 12 of his testimony  
2 regarding the Company's future integrated resource plans, including (1) to support  
3 data center forecasts with forward-looking research and analysis; (2) to use the Bass  
4 Diffusion Model for most data center customer projections; (3) to treat the first few  
5 years of the forecast period, supported by firm plans, as historical data in the  
6 regressions; and (4) to prepare higher and lower long-term load forecast scenarios  
7 to reflect the uncertainty. Please respond.

8 A. APV Witness Wilson disparages the Company's data center demand forecast as a simple  
9 extrapolation of historic data or the result of drawing lines through historic data.

10 Throughout this testimony, the Company has demonstrated that is not an accurate  
11 portrayal. In fact, the Company has access to customer data that external forecasters do  
12 not have, and the Company is extremely thoughtful in how it augments this intelligence  
13 with the statistical analysis aspect of its forecast. Mr. Wilson ignores the Company's  
14 application of customer provided information and industry knowledge, which is forward  
15 looking research and analysis gained from day-to-day work with customers and industry  
16 experts.

17 I have already described how APV Witness Wilson's updated Bass Diffusion Model is  
18 not a realistic model based on existing contracts the Company has in hand today. Based  
19 on the Company's experience with data center customers, industry reports, and recent  
20 investment announcements by data centers, the Company does not see growth slowing in  
21 the near term. To impose an arbitrary year and MW limit to curve the data center  
22 forecast in the Bass Diffusion Model is not reasonable or prudent for planning.

1 Company Witness Rajan further explains the problems with the Bass Diffusion Model  
2 used by Mr. Wilson.

3 APV Witness Wilson recommends using the first few years of the Company's forecast as  
4 opposed to recent historical data as the basis for the statistical analysis aspect of the  
5 Company's 15-year data center demand forecast. He does not articulate how this may  
6 improve the Company's forecast. The Company questions the value of this methodology  
7 which again highlights to APV Witness Wilson's misrepresentation of the Company's  
8 forecast as a simple extrapolation of historical data.

9 Finally, Mr. Wilson wants the Company to provide additional scenarios. The Company  
10 currently provides three scenarios: a high, medium, and low forecast, which benefit from  
11 the integration of customer provided intelligence. The Company believes these scenarios  
12 are more informative than scenarios provided in forecasts previously provided by outside  
13 firms. For example, the 2013 Quanta Report extrapolated data center growth and created  
14 four scenarios based on: no growth reduction; a 15% reduction in growth; a 30%  
15 reduction in growth; and a 45% reduction in growth. A scenario for higher growth is not  
16 considered. In its 2013 forecast, Quanta selected the 15% reduction in growth as the  
17 preferred scenario based on factors deemed relevant at the time. Table 1 above shows the  
18 preferred scenario in 2013 greatly under-forecasted compared to actual results in 2022.

19 **Q. Does this conclude your pre-filed rebuttal testimony?**

20 **A. Yes, it does.**

**BACKGROUND AND QUALIFICATIONS  
OF  
ALAN W. BRADSHAW**

Mr. Bradshaw was named Vice President, Strategic Partnerships for Virginia Electric and Power Company in August 2021, Mr. Bradshaw has responsibility for the Company's Rural Broadband and GTP Fiber programs, the Key Accounts organization, including the Company's Data Center Practice, and as of August 1, 2023, the Company's Energy Conservation team. His oversight of the Data Center Practice has engaged him in the Company's 2023 Integrated Resource Plan filing.

Mr. Bradshaw is a 1984 graduate of the Virginia Polytechnic Institute and State University with a Bachelor's degree in Accounting.

Mr. Bradshaw joined the Company as a cooperative education student in 1980 and then full time in 1984. He has more than forty years of experience in the electric distribution business. He has held management positions in Design, Project Management, Regional Operations Centers, Strategic Undergrounding, and in the Company's Emergency Preparedness Center.

Mr. Bradshaw has previously provided testimony before the State Corporation Commission of Virginia.

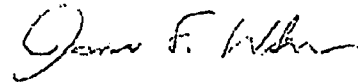
**Virginia Electric and Power Company**  
**Case No. PUR-2023-00066**  
**Appalachian Voices' Responses to**  
**Dominion Energy Virginia Third Set**

The following response to Question No. 63 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Dominion Virginia Power to Appalachian Voices received on August 25, 2023, has been prepared under my supervision.



\_\_\_\_\_  
Nathaniel Benforado

The following response to Question No. 63 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Dominion Virginia Power to Appalachian Voices received on August 25, 2023, has been prepared under my supervision.



\_\_\_\_\_  
James F. Wilson

**Question No. 63**

Please refer to page 9 of Wilson Direct, specifically the claim: "The Company presented high and low data center forecasts, however, these represent a very narrow and rather arbitrary range around the base forecast—they greatly understate the uncertainty of the forecast."

- (a) Identify the +/- range in percentages that Mr. Wilson believes would be reasonable for the high and low data center forecast.
- (b) Provide all analysis, studies, documentation, and workpapers in native format with formulas intact to support the response in subpart (a).

**Response:**

Appalachian Voices objects to this request to the extent that it is overly broad, vague, and unreasonably burdensome, and not relevant or reasonably calculated to lead to the production of admissible evidence in this proceeding, to the extent it seeks "all analysis, studies, documentation, and workpapers," without limitation. Appalachian Voices further objects to this request to the extent that it seeks to discover information that is protected from disclosure by the attorney-client privilege, work product doctrine, and/or other recognized protections.

Notwithstanding and subject to the foregoing objections, Appalachian Voices provides the following response:

Mr. Wilson does not believe “+/- range” is a sensible way to think about this question, as it presumes some central scenario, and a constant range over time. It also seems to presume the uncertainty is symmetric. Mr. Wilson recommends that the Company should be required to engage a professional forecaster to perform forward-looking research and analysis to identify reasonable and plausible scenarios, including high and low scenarios.

Mr. Wilson has not performed the forward-looking research that he recommends the Company or PJM pursue to answer this question.